

NOMAD

Safety as technological advance

BAG



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NOMAD BAG

Safety as technological advance

Final Thesis for
M.Sc. Design & Engineering
Scuola di Design
Politecnico di Milano

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April 2017

ABSTRACT



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This thesis explores safety and applied technology in general and smart bag issues in particular in engineering technological design and how we can design product to account for the safety and aesthetic purpose to a user. Work applies a combination of practical methods to explore the new design space at the intersection of technology, engineering and design. First, it contributes to theoretical understandings of psychological impact on humans need to feel safe and practical solution of technology design for it. Its recognized a gap between feeling free and feeling safe for important personal belongings when people are physically out of their comfort zone. "Tech Fashion" is proposed to interpret such dynamic action nets of arrangements that make technology wearable and desirable. Second, through associative design research, it is designed and developed prototype that account for security issues.

ACKNOWLEDGMENT

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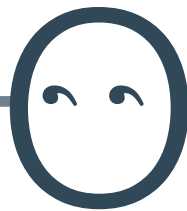
This thesis would not have been possible without the patience, support and guidance of my supervisor, Prof. Lucia Rampino. I am grateful to her for her encouragement and supervision with positive attitudes and clear advices.

I am grateful to all the respondents who agreed to complete the survey and also provided invaluable feedback regarding the research. Their inputs helped me develop a better understanding of the subject.

I owe my deepest gratitude to my family – particularly my sister her constant support and encouragement.

To Darko for being patient.

Finally, I would like to offer special thanks to all my friends who have been a great source of motivation



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INTRODUCTION

INTRODUCTION

In my mind the art of good product design is to be passionate about helping people while designing products with superior performance and distinct cultural value. My challenge is to design and create a bag that gives users the confidence to do everything they want anywhere without worrying about their belongings or comfort. Furthermore, it should make specific outdoor recreations being personalized, safe, functional. Doing a research on products already existing in a market I realized that there is a missing of a feature of safety personalization. A bag that “does everything” to keep valuables safe needs to be well rounded. I designed inner bag that best serves the users needs. It consists of a modular bag and closing system which are custom assembled by the customer to increase user efficiency and emotional attachment. It is a system with varying levels of ergonomics, load-bearing capabilities, electronics protection, capacity and weight which, can accommodate people who need a protection for small everyday valuables but who also need their bags to have enough sensitivity to cradle expensive electronics and costly small objects. It always needs to be the perfect size (which amounts to only the size of the things inside). It must be padded when you need padding but not bulky when you don't. It's got to be comfortable for everyday loads but with safety factor built in for unexpected pickpockets and threfts. Therefore a proper ergonomic harness is an important incorporation to the final design. Its got to look cool, but professional enough to even visually leave impression of trust. To do everything everywhere a bag needs to be



sensitive to a variety of environments — wet, formal, clean, abrasive, dirty, muggy, unsecured, etc. As a designer and engineer forced with the task of choosing my own product to design I was drawn to the broad idea of universal utilitarian objects. I decided to design a bag which will have added value as enjoying outdoor activities with more freedom and full heart. I believe the product category has lifetime potential for functional, cultural and institutional innovation. To understand what it takes to make the best bag for an urban multiplicity of needs, I followed a variety of paths of research. I will first offer an overview on safety as a human right and how I product design can contribute to it. Then will keep my research about who are thieves and pickpockets, going into detail on how and where they „work“. I will focus on the bag I created addresses those needs to be protected of. I will work on bag’s architecture and path how I gain a shape, selection of closing system and research of „smart“ and appropriate material. Finally I will explore the market and general issues associated with current bag and tech bag trends. I gathered external perspectives and experiences from a survey I distributed to 84 people. The responses of these lead users makes my targeted bag survey especially insightful. I will reference the results of the “How Do You Use Your Bag ?” survey throughout this thesis.





DESIGN RESEARCH

The bag’s use environment has a lot of bearing on the design of packs. Each separate context requires specific design considerations — for example pickpockets rarely exist in the same environment as wild animals. A large portion of hiking pack use occurs on the trail as passive carrying. The gear inside the pack is typically durable so few considerations are made for protecting pack contents. Modern urban environments are very different from the great outdoors. Currently most people live in some form of urban environment , yet well-rounded packs optimized for the unique diversities of urban environments only represent a slim minority of available products. Typical urban environments include abrasive asphalt, sharp corners, tall buildings, infrastructure like grocery stores, ATMs, shopping malls, mass transit, cars, bicycles, security hazards and weather. Throw fragile electronics, fresh produce and other sensitive possessions into the mix and you realize how complex the modern carry scenario really is. With extensive personal and observational experience schlepping stuff I started to evaluate which problems needed the most addressing. I defined distinct operational criteria of carry products: active interaction, dealing with the accessibility of belongings, packing and organization, and passive carrying, dealing with in-transit interaction and passive interaction.

I think that the passive carry experience is the most important for a utilitarian urban bag because it is directly related to comfort. This passive aspect of carrying usually poses ergonomic and engineering problems. Today’s users expect their bag to deliver the same level of comfort whether they are carrying a heavy load or an average one. Users want more comfort, however they don’t want to be hindered by added functional necessities.

Aspects of active interaction tend to pose more usage and organizational problems. For example some, including myself find, “Carrying small objects —wallet, cellphone, passport— with easy access (but still protected enough from pickpockets)” consistently problematic. Users address problematic interactions with their current bags, “When I pull them out of my bag they pull everything out with them. I am constantly checking to see if anything has dropped to the ground” some just cut to the point, “Crap organizing.” (Survey) The majority of survey respondents agreed that their bags should protect fragile objects from impact and crushing, however they admit that their current bags do not. I have personal experience carrying sensitive electronics in inhospitable places and it can be nerve racking. However some objects like, glasses, food containers, produce and beverages are unlikely to become more sturdy over time and still need to be provided for in a long term design solution. Other objects noted as “problematic to carry” shoes, tools, lots of small items, coins, wet umbrellas, bulky items, cables, nice clothing, pens and pencils, coffee and loose papers. We can conclude that the most important feature is safety. Particularly safety for documents, money and electronics. One of the response from the survey says: “I’m conflicted when deciding to carry my checkbook and passport. I live in Paris. I need them occasionally but I hate the thought of losing them.”



Chapter 1- Context research

SAFETY AS HUMAN RIGHT

"We were two of a kind, the only difference being that he was reverential before all the traditional word magic, and I would steal it if I could. He came to the tradition as a pilgrim, I as a pickpocket."

- Wallace Stegner, Crossing to Safety -



SAFETY AS HUMAN RIGHT

The demand for establishing a right to safety emerges in a society where people feel the need for a norm on which to base an actionable claim for protection from physical, social, or emotional harm. This need is also strengthened when societal agreement and action take hold. In the past, people used products and lived in homes and in an environment that they themselves, or local communities, participated in creating, and they blamed themselves if they suffered harm or injury from such arrangements. Modern systems, however, do not allow us to live in isolation or independently of others. Normal activities continually preclude individual choices. For example, most of us cannot choose the time at which we travel to work or the road we use to do so. Most of us live in homes that are designed and built by others and use technologies manufactured by powerful organizations not necessarily under our control. And we dare not guess the hazards found in chemicals and other products we purchase. This is a new development in human history, and for this reason we have to develop a new regimen of rights that protect us from unreasonable harm.

Systems that ensure a life safe from injury cannot be put in place without a societal and political understanding of the ethical and moral responsibilities of the state and civil society to ensure all individuals a right to life, according to currently available knowledge and technology. This need for a right is strengthened by research that has revealed severe limits to ensuring individuals' safety by "educating" them, and that there is a wide variation between people's knowledge and their actual behavior. This is particularly true for those situations in which we cannot specifically select the people who will be involved in certain activities, such as domestic work, use of the roadways, and in most of our work environments. In addition, on any day, the population in those situations might include individuals preoccupied with any of the following:

* Those who cannot concentrate on the job at hand because they have suffered a recent, personal loss or disappointment—such as death of a loved one, loss of a job, failure in an important examination, monetary loss, and the like.

* Those who are preoccupied with problems in personal relations

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* Those who cannot concentrate on the job at hand because they have suffered a recent, personal loss or disappointment—such as death of a loved one, loss of a job, failure in an important examination, monetary loss, and the like.

* Those who are preoccupied with problems in personal relationships with a spouse, parent, sibling, or close friend.

* Those who are taking medications or drugs that alter behavior and perceptual abilities, or those who are under the influence of alcohol.

* Children whose cognitive and motor skills make it difficult for them to understand or follow instructions given to them.

* Elderly people whose motor and cognitive functions are impaired. Psychologically disturbed persons who may not be able to function as desired but who cannot be excluded from participating in a specific activity.

If we estimated the percentage of individuals who might fall into one of the above categories on any given day, that estimate would amount to a significant proportion—possibly as high as 20 to 30%. These individuals cannot always be identified or prevented from participating in these activities. Moreover, they have a right to lead healthy lives and thus must operate in environments that give them a reasonable opportunity to do so. Therefore, we have a social and moral responsibility to design our products, environment, and laws so that people can easily and conveniently behave in a safe manner without sacrificing their right to earn a living and fulfill their other societal obligations. Systems must be designed safely, not only for “normal” people but also for those who might belong to any of the groups listed above. Such designs, rules, and regulations would reduce the probability of people hurting each other or themselves, even when someone makes a mistake. Such changes will take place in a systematic manner only when safety is recognized as a fundamental right of communities and is not dependent only on the goodwill of powerful institutions. Perrow states this issue forcefully: “Above all, I will argue, sensible living with risky systems means keeping the controversies alive, listening to the public, and the essentially political nature of risk assessment. Ultimately, the issue is not risk, but power; the power to impose risks on the many for the benefit of the few.” For a People’s Right to Safety is likely to help us move in this direction.

PICKPOCKETS AND THIEVES



PICKPOCKETS AND THIEVES

In this part I will try to understand which profile of people are pickpockets and thieves and even more how they make their activities and to present them and their “job” in a form of guide how to be protected of them.

In term of location, Europe is safe when it comes to violent crime. But it’s very “dangerous” in terms of petty theft: Purse-snatching and pickpocketing are rampant in places where tourists gather. Thieves target Americans — not because they’re mean, but because they’re smart. Americans have all the good stuff in their bags and wallets. Loaded down with valuables, jetlagged, and bumbling around in a strange new environment, we stick out like jeweled thumbs.

If people are not constantly on guard, they will have something stolen. Many tourists get indignant when ripped off. It’s best to get over it. You are considered rich and thieves aren’t. If guard is let down and thieves will grab your belongings. It can ruin a day and force people to buy a new thing, while they sell it for a week’s wages on their scale. And the score’s one to nothing. It’s wise to keep a material loss in perspective.

Nearly all crimes suffered by tourists are nonviolent and avoidable. Its important being aware of the pitfalls of traveling, but still being relax and have fun. Advice is to limit vulnerability rather than travels.

Before going somewhere its possible taking some steps in minimizing loss in case of theft.

Making photocopies of key documents — passport, rail pass, car-rental voucher, itinerary, prescriptions (for eyewear and/or medicine), and more — to bring along. For a backup, leaving a copy with loved ones, too, in case of loss a copy and need to have one faxed to. It could be brought a couple of extra passport pictures.

If there are expensive electronics (camera, tablet, smartphone, etc.), consider getting theft insurance. Taking a picture of pricey gear and store the picture at home, in case it’ll help settle an insurance claim. As travelling, backing up digital photos and other files frequently is smart.

Avoiding Theft

If its exercised adequate discretion, staying aware of belongings and avoiding putting yourself into risky situations (such as unlit, deserted areas at night), your travels should be about as dangerous as hometown grocery shopping. Its important not to travel fearfully — travel carefully.

Here are some advice given to me by a thief who won the lotto.

“Wear a money belt. A money belt is a small, zippered fabric pouch on an elastic strap that fastens around your waist, under your pants or skirt. I never travel without one — it’s where I put anything I really, really don’t want to lose.”

“Leave your valuables in your hotel room. Expensive gear, such as your laptop, is much safer in your room than with you in a day bag on the streets. While hotels often have safes in the room (or at the front desk), I’ve never bothered to use one, though many find them a source of great comfort. Theft happens, of course, but it’s relatively rare — hoteliers are quick to squelch a pattern of theft. That said, don’t tempt sticky-fingered staff by leaving a camera or tablet in plain view; tuck your enticing things well out of sight.”

“Establish a “don’t lose it” discipline. Travelers are more likely to inadvertently lose their bags than to have them stolen. I’ve heard of people leaving passports under pillows, bags on the overhead rack on the bus, and cameras in the taxi. Always take a look behind you before leaving any place or form of transport. At hotels, stick to an unpacking routine, and don’t put things in odd places in the room. Run through a mental checklist every time you pack up again: money belt, passport, phone, electronic gear, charging cords, toiletries, laundry, and so on. Before leaving a hotel room for good, conduct a quick overall search — under the bed, under the pillows and bedspread, behind the bathroom door, in a wall socket...”

“When you’re out and about, never idly set down any small valuable item, such as a camera, ereader, wallet, or rail pass. Either hold it in your hand or keep it tucked away. At cafés, don’t place your phone on the tabletop where it will be easy to snatch — leave it in your front pocket (then

return it to a safer place before you leave). Make it a habit to be careful with your things; it’ll become second nature.”

“Secure your bag. Thieves want to quickly and unobtrusively separate you from your valuables, so even a minor obstacle can be an effective deterrent. If you’re sitting down to eat or rest, loop a strap of your daypack around your arm, leg, or chair leg. If you plan to sleep on a train (or at an airport, or anywhere in public), clip or fasten your pack or suitcase to the seat, luggage rack, or yourself. Even the slight inconvenience of undoing a clip deters most thieves. While I don’t lock the zippers on my bag, most zippers are lockable, and even a twist-tie, paper clip, or key ring is helpful to keep your bag zipped up tight — the point isn’t to make your bag impenetrable, but harder to get into than the next guy’s.”

“Stay vigilant in crowds and steer clear of commotions. Go on instant alert anytime there’s a commotion; it’s likely a smokescreen for theft. Imaginative artful-dodger thief teams create a disturbance — a fight, a messy spill, or a jostle or stumble — to distract their victims.”

COMMON LOCATION AND PICKPOCKETS IDENTITY

Written in a style as deffence guide

COMMON LOCATIONS AND PICKPOCKETS IDENTITY

Crowds anywhere, but especially on public transit and at flea markets, provide bad guys with plenty of targets, opportunities, and easy escape routes.

“Be on guard in train stations, especially upon arrival, when you may be overburdened by luggage and overwhelmed by a new location. Take turns watching the bags with your travel partner. Don’t absentmindedly set down a bag while you wait in line; always be in physical contact with your stuff. If you check your luggage, keep the claim ticket or locker key in your money belt; thieves know just where to go if they snare one of these. On the train, be hyper-alert at stops, when thieves can dash on and off — with your bag.”

City buses that cover tourist sights (such as Rome’s notorious) are happy hunting grounds. Be careful on packed buses or subways; to keep from being easy pickings, some travelers wear their day bag against their chest (looping a strap around one shoulder). Some thieves lurk near subway turnstiles; as you go through, a thief might come right behind you, pick your pocket and then run off, leaving you stuck behind the turnstile and unable to follow. By mentioning these scenarios, I don’t want you to be paranoid...just prepared. If you keep alert, you’ll keep your valuables, too.



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While pickpockets can be found in nearly any city, the biggest concentrations are in cities that attract the most tourists (no surprise there). Here is a list of pickpocket hotspots in Europe:

Barcelona, Spain ; Rome, Italy; Paris, France; Madrid, Spain
Athens, Greece; Prague, Czech Republic; Lisbon, Portugal
Florence, Italy; London, England; Amsterdam, Netherlands

Who Are The Pickpockets?



Most people assume pickpockets are sketchy looking men, but a large number of pickpockets are actually young girls and boys — usually around 10-16 years old. Most tourists don't suspect that a young child would steal from them, so they're less defensive around them. Additionally, police can't really arrest minors, and most don't travel with any identification, so even if they're caught the police usually have to let them go. Other times, pickpockets are well-dressed and you'd never expect them to be thieves.



Where Pickpockets Hang Out?

Tourist attractions



Whether it be the Eiffel Tower in Paris, the Trevi Fountain in Rome, or the Charles Bridge in Prague, it isn't a surprise that pickpockets hang out in busy tourist spots. Naturally, tourists are more concerned about viewing the sights and taking photos than being attentive to their surroundings.

Public transportation



Subways and city buses are prime spots for pickpockets — and after living in Paris, I've seen my fair share of pickpockets on the Paris Metro. Public transportation is a great place for a pickpocket because it is often very crowded and it is easy for thieves to create confusion. Pickpockets normally target large metro/subway stations where many transit lines converge because it gives them plenty of places to exit if they're being chased.

Museums

During the summer, Europe's most popular museums swell to maximum capacity and there are bound to be a few pickpockets among the lot. While the admission price deters most pickpockets, it doesn't stop all of them from preying on unsuspecting visitors who are simply enjoying the art. In fact, in 2013, the workers at the Louvre in Paris went on strike because the pickpockets were getting so bad.

Train Stations

Trains stations are large, crowded, and full of confused tourists with their hands full of cumbersome luggage — which is exactly the kind of environment pickpockets love.

Restaurants, Cafés, And Bars

Many people let their guard down when they're enjoying a meal or a drink, so it's easy for a crook to sneakily snatch a purse from the back of a chair or a mobile phone from the top of a table.

Beach

Pay attention to your stuff when you're at the beach. Don't leave your bag unattended or out of sight because there is a good chance someone might snatch it up.

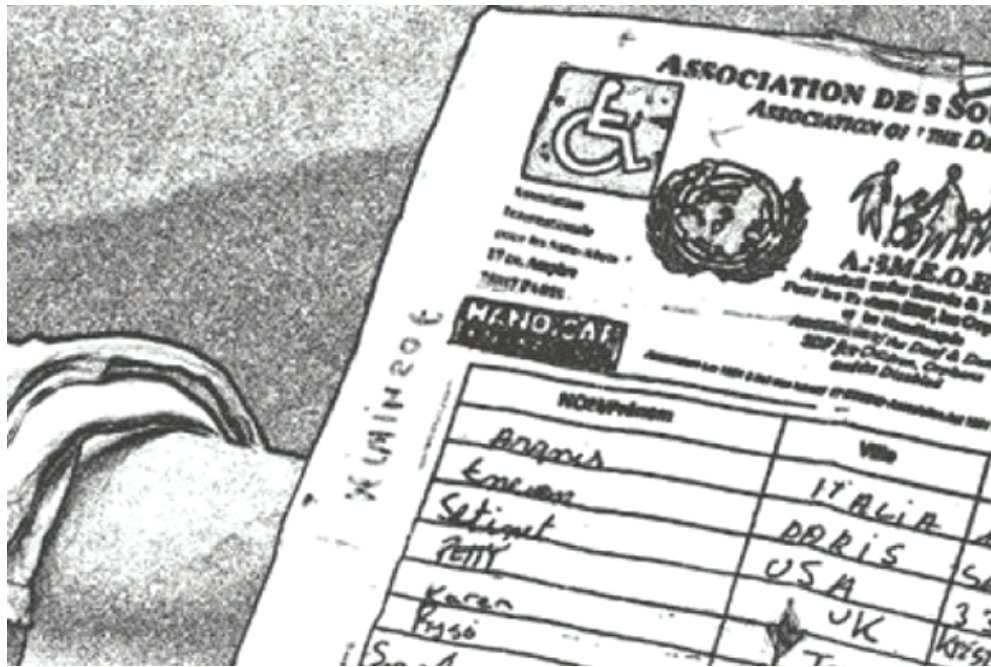
Retail Stores

Clothing and department stores in Europe can get extremely crowded, especially around the holidays. These are easy places for pickpockets to target tourists who are usually carrying a lot of money.

Tricks Pickpockets Use To Take Your Stuff

Distraction is the one tactic that all pickpockets use. They want to distract your attention just long enough to take your stuff. The following methods are well-known ways that pickpockets and thieves steal from tourists.

“Charity” Worker With Clipboards



This scam is very popular in Paris. It nearly always involves a group of young girls with clipboards. They’ll approach you and point to a clipboard while signaling that they’re deaf and mute. They want you to sign a petition for charity. If you sign, they’ll ask for a donation to the charity. Of course the “charity” is fake — in fact, the money often goes to these girls’ “boss” (i.e., human traffickers). While the tourist is signing/reading the petition, there is often an accomplice trying to pickpocket the victim.

Crowd The Metro

The metro (subway) trains can get very crowded. A common tactic is for a group of 4-6 kids to push on a crowded train shortly before the doors shut and crowd their target. They’ll swipe what they’re trying to steal and then they all hop off right as the doors begin to close. By the time the victim realizes what happened, it is too late and the train has already left the station.

Always be wary when a group of people crowd onto an already busy metro car. Also be wary of anyone who is standing very close to you on a train that isn’t crowded, as they might be up to no good.

Metro Smartphone Grab

People tend to zone out while they’re talking or texting on their phone. Be very careful about using your phone if you’re standing near the door of a subway car. Thieves will reach in and snatch your phone right as the doors close.

Help With Your Bag

Some metro stations have lots of stairs so “good samaritans” will grab ahold of your suitcase to help you carry it up the stairs. This usually takes people off guard a little and this is when their friend reaches into your purse or pocket. There are actually a lot of nice people who will offer to help carry a heavy suitcase, but they’ll ask you before grabbing onto your bag.

Bump And Lift

When you’re surrounded by crowds, it isn’t uncommon to accidentally bump into other people. However, this is a common move performed by pickpockets, so if someone bumps into you, it might be smart to take a quick inventory of your belongings.

Escalator Backup

Escalators are another area that pickpockets target because it is easy to create chaos. With this scam, there will be one or two people in front of the target and a few behind the target. Someone near the top of the escalator will stop right when they get off and this will create a huge backup of people trying to get off. As the backup occurs, the people behind the target will reach into the target’s bag/pocket and hand off the goods to one of his buddies behind him. I’ve also seen it where they’ve handed off the goods to someone on the opposite escalator, so it’s almost impossible to chase them.

ATM Confusion



Always be careful when using the ATM — especially when you're alone. While you're in the process of withdrawing money, a group of beggars will approach you from behind to try and get your attention. They might pull on your arm or shove a piece of paper in front of the screen. If you turn toward one of the thieves, another one will slip in from the other side and press the button for the max amount of cash. Then they'll swipe the money and run off.

Also be sure to cover up your pin code when you enter it. Some thieves will try to see your code (some even use hidden cameras) and then they'll follow you around for a chance to steal your card.

Ticket Machines Dupe

Always be a little leery of people who try to help you at ticket machines. I know some people who got scammed in Paris from a well-dressed man who "helped" them buy Metro tickets. They wanted to buy two 5-day passes, which cost about 30€/each, so the man offered to use his credit card because he told them Australian cards don't work in the machines. He said that they could just pay him in cash. He did buy them tickets, but he bought them a one-way child's ticket (which looks very similar to a 5-day pass) that costs about 1€ and he pocketed 60€ in cash from them.

The Helpful Tourist

Don't let pickpockets take advantage of your good nature. In this scam, one of the scammers will drop something in front of you and while you're helping them pick up the mess, the other pickpocket will swoop in and lift something from your bag. That doesn't mean you can't help your fellow man, but just be careful about your own stuff while doing it.

Slashed Bag



Some pickpockets don't even bother trying to steal your bag and they will simply slash it open with a knife. Pacsafe makes a range of slash-proof bags for extra security.

Scooter Snatch And Run

While not super common, some thieves will drive up on a scooter, snatch a bag from the victim's shoulder, and then ride off into the sunset. I wouldn't be too worried about this technique, but it can happen.

Turnstile Stall



Busy turnstiles are a common area for pickpockets to strike. As you're approaching a turnstile, one person will cut in front of you and then precede to stop (they might pretend that the machine isn't working) and their partner will come up behind you — essentially trapping you between the two of them. The person in the back will lift something from your bag or pocket while his partner in the front is fumbling with the turnstile.

Street Performances

There are many street performances that gather large crowds of tourists. These large groups of tourists draw pickpockets too.

Fake Fight

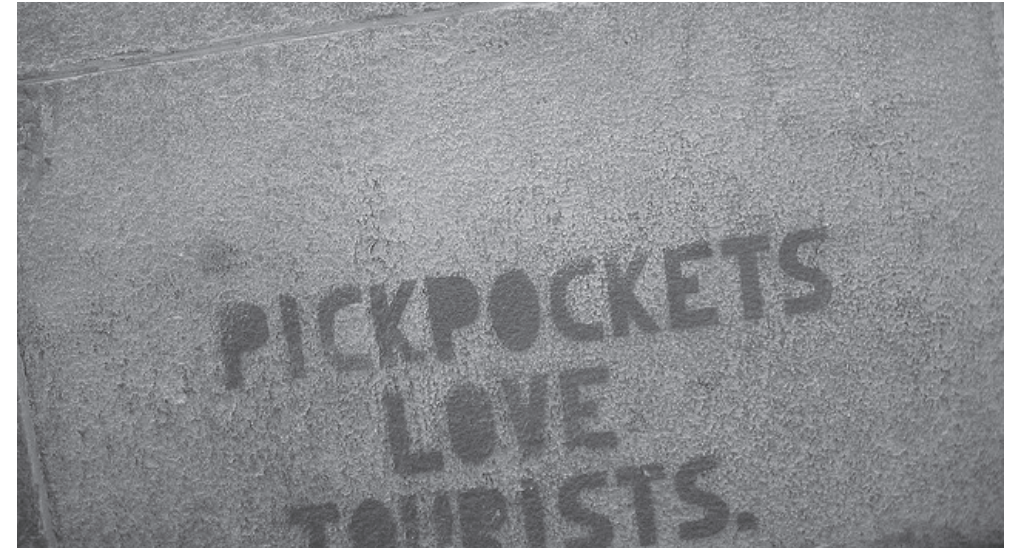
A large group of men might start a "fight" around a tourist, and in all the commotion one of the men will attempt to pickpocket the target.





TARGET GROUP

Who Do Pickpockets Target?



Anyone can be a potential target of a pickpocket, but they do tend to target certain types of people. Pickpockets will always look for the easiest target because they don't want a confrontation.

Tourist

Tourist = money, in the mind of a pickpocket. If you look like a tourist, you're automatically going to be singled out.

People With A Lot Of Luggage

If you are pulling along two suitcases and have a backpack, you're going to be a prime target for a pickpocket. You won't be able to watch over all your things since you have so much stuff.

Asians



Asians (specifically the Chinese) are a top choice for pickpockets because many of the Chinese who travel are very wealthy. Additionally, a large number of Chinese citizens don't have easy access to credit and debit cards, so they often carry large amounts of cash, and thieves know this. So even if you're not Chinese, but have Asian heritage, anyone might want to be especially cautious.

People Who Flash Valuables

Walking alone at night while using your iPhone? It shouldn't be a surprise if someone takes it.

Trusting People

From all travels, I've rarely met a more friendly bunch than the Australians. I've also never met another group of people who've been victims of pickpockets more often than Australians. I think the people who think everyone else around them is nice and helpful are the ones who get taken advantage of most often.

How To Protect Yourself From Pickpockets

If you've made it this far, you might be thinking that there are thousands of pickpockets trying to rob every tourist in Europe. But that really isn't the case, and you'll rarely have any problems if you take a few extra precautions. It is also important to remember that actual violent crime is really pretty low in Europe, so as long as you're vigilant, you'll be perfectly safe. In this section, we'll talk about the steps you can take to avoid becoming a victim.

Limit What You Carry

Pickpockets can't steal what you don't have — pretty simple. That is why I prefer to carry very little while I'm sightseeing. I especially recommend not carrying a lot of cash.

Wear A Money Belt

A money belt is one of the most secure ways to carry valuables like extra money and your passport. However, many tourists make the mistake of thinking that they should use their money belt like a wallet — but it isn't intended for that. Ideally, you should keep the money and debit/credit cards that you're going to need for the day in your wallet and then keep all extra cash and maybe a backup credit card in the money belt. The money belt should be worn under your clothes and should be fairly inconvenient to access (to deter thieves).

There are multiple styles of money belts available:

- Around the waist — This is the traditional style of money belt. You wear it under your shirt and around your waist.

- Around the neck — Money belts that hang around your neck are another good option. These are a lot easier to access (especially if you wear it under a button-up shirt).

- Hidden pocket — These hidden pocket money belts are nice because they tuck into your pant leg and I think they're more comfortable than one that goes around your waist.

- Belt with pocket — If you just want to stash some cash, you can use a belt with a hidden pocket built in.

Secure Your Bag/Backpack

Your bag or backpack is probably the most vulnerable area that pickpockets love to target. Backpacks are especially vulnerable because you can't see if

someone is trying to get into it. Here are some tips for securing your bag.

-Wear It Backwards — On crowded public transportation, a lot of people wear their bag backwards because this allows them to keep an eye on it.

-Lock The Zippers — At a minimum, you'll want to lock your zippers. You don't need anything fancy — a simple luggage lock will work well.

-Sling Backpack — Sling backpacks are nice because they stay close to your body and they can be slung over your chest easily if needed. They do tend to be small, so you'll have trouble if you plan on carrying a lot of stuff with you. Here is an example of a sling backpack, but there are many styles available.

-Secure It To an Immovable Object — When you're at a restaurant, loop your bag's strap around your leg or the leg of your chair so someone can't come by and swipe the bag. Similarly, it is smart to secure your bag to a chair or luggage rack while you're on a train — especially on overnight trains. A retractable cable lock will provide enough protection to deter most thieves.

Zippered Purse

Make sure your purse has a zipper, and don't forget to actually zip it up. Keep valuables in internal zipped compartments if possible.

Wallet In Front Pocket

A lot of guys keep their wallet in their back pocket, but this is an extremely easy target for a pickpocket. And that is why it is advisable to keep your wallet in your front pocket. I highly recommend getting a super thin wallet because a bulky wallet feels very strange in your front pocket — and it looks kind of dumb. The Big Skinny Multi-Pocket Bifold Wallet gets a lot of great reviews for having a low profile.

Keep Your Phones Off The Table

Smartphones are a super popular item for pickpockets to target. Many people simply leave it on the table while they're eating, which makes it easy for someone to come and snatch it up.

Split Up Your Valuables

Don't keep all your eggs in one basket so that, if you are pick-pocketed, you limit the amount you'll lose.

PSYCHOLOGICAL PURSE

It is criminal to steal a purse, daring to steal a fortune, a mark of greatness to steal a crown. The blame diminishes as the guilt increases.

- Friedrich Schiller -



PSYCHOLOGICAL BAG

When speaking about bag or more precise about the purse I would like to understand the process of decision making while selecting / buying one. This will guide me to understand should I enter development including fashion design or avoiding it and being fully in product design and engineering sector.

Examples of the Psychological Purse Shown in Daily Buying Behavior

The value of money is common to all. One hundred euros allow anybody at anytime to buy goods or services worth 100 euros. However, the satisfaction received from the goods or services and the psychological pain caused by paying that amount of money differs greatly by the individual and by what is bought. For instance , someone might feel great pain in paying 100 euros at a restaurant, but someone else might not . Generally speaking, people with less income would feel more pain. However, a gourmet might not feel so painful even if the income of that person is not large. Or, if it is a wedding anniversary dinner , it might not be so painful. Furthermore. , the source of income might affect the amount of pain: If one gets some unexpected income and pays for a meal from that income, 100 euros might not be so painful . From an economical viewpoint , generally, a larger expenditure causes greater pain, and a smaller expenditure causes smaller pain. However, there can be reverse cases psychologically. Someone who does not feel pain paying 100 euros for a meal in a restaurant might feel pain paying 10 euros for the custody charge for the dog that the person has taken with. Paving 200 euros for a dress may not he painful, but paying 20 euros for a taxi from the department store home might be painful. The concept of the psychological purse tries to explain these irrationalities and contradictions in consumer psychologies.

Types of Psychological Bag

Economically, a consumer pays money for goods or services he/she has bought from his/her account which is considered one. However, psychologically, a consumer is assumed to have several psychological purses. The psychological pain which accompanies spending money differs from the psychological purse with which a certain thing is paid, and that affects the buying decision. By assessing the degree of psychological pain a consumer feels when he/she pays for goods or services and by analyzing the data with the factorial analysis or the cluster analysis, we will be able to clarify what kind of and how many psychological purses the particular consumer has. Researches by Tanaka and Kitade (1974) and Kojima and Hama (1982) are some examples of such attempts. The type and the number of psychological purses are supposed to match the type and the number of the scales of value judgement required when the consumer buys goods and services. Kojima and Hama (1982) obtained major psychological purses of Japanese housewives as follows: (1) pocket money, (2) daily necessity, (3) personal fortune, (4) culture and education, (5) eating out, (6) raising the standard of living level, (7) security, (8) a little luxury, (9) feminine articles. Interestingly, expenses for the beauty parlor and year-end gifts to superiors are included in the security psychological purse along with insurance and security guards.

Classification of the Psychological Bag

The psychological bag differs by the individual and by goods and services

1) Inter-individual, same goods:

A father in his 50's feels silly to pay 50 euros for a noisy rock concert, but for his young son, it is quite a satisfactory expenditure.

2) Inter-individual, different goods:

A husband does not mind expenses for playing golf, and a wife does not feel any pain for expenses for the beauty parlor.

3) Intra-individual, different goods:

Paying for a dress at a department store is not painful, but the tax expense is painful.

4) Intra-individual, same goods:

This class is most intriguing. On one hand, it is an issue of enlargement and reduction of a psychological purse by the same consumer and for the same goods, and on the other hand, it exhibits the effects of TPO (time, place, occasion) on buying behavior. For instance, Japanese consumers tend to enlarge their psychological purses while travelling. Another example is that making a decision to buy a 5 000 euros carpet is difficult in everyday life, but can be easily decided when the same carpet is bought on the occasion of buying a 500 000 euros house.

Psychological Pain Measured by Product Category and Price Rank

The strength of psychological pain differs by the price of goods and services. By combining product category and price rank, we measured the strength of the psychological pain felt by college students under various conditions (Kojima, 1986). At a low price rank of ¥1 000, product categories make a big difference; products in different categories (books, lunch, clothes) affect the strength of the psychological pain differently. At a higher price rank of ¥5 however, the amount of price itself affects the strength of the psychological pain, and product category does not make much difference.

Shortly understanding the value of money product categories and experience based how choices are made for particular bag, as well as that each of us need several types of bags in a wardrobe in every moment for different occasions I will not enter a field which is not my target one. Then, to be able to understand how to make universal bag, which will be suitable for everyone gender, profession, interests, etc based I will research the purpose of the bag and their importance as well as the architecture of the bag.

PURPOSE OF BAG AND ITS IMPORTANCE



PURPOSE OF BAG AND ITS IMPORTANCE

Is a purpose of the bag to be functional, to be personal statement, or self expression, fashion accessory, or even status symbol?

The answer is: “All of the above.” Even a persons who are not „handbag“ persons mainly own one or more because its socially accepted and sometimes we have to satisfy some expectations. As many fashion designers used to say “...your purse is, in some absolutely horrible way, you...”

Whether real, fake, or new favorite, ‘luxury pre-owned,’ handbags are an expression of who we are and where we belong in social, economic and fashion terms. As our most visible fashion accessory, our handbag is both functional and symbolic, conveying to others the group to which we belong. A form of self-expression and signal of personal style, handbags are also an entre to luxury and glamour. One may not be able to afford penthouse apartment on Paris or, the private tented safari in Africa but, one could feel a part of that world with perhaps a Louis Vuitton bag.

The most iconic of all the handbags are Hermes and Chanel, followed by Louis Vuitton, at the top tier. Other favorites include Balenciaga, Celine, Prada, Fendi, Gucci. While many of these bags have no visible identification of status, meaning often no monograms or logos, status is what they convey. Everyone in the know, knows what they are and how much they cost. Whether a celebrity who has likely been given an ‘it’ bag for promotional purposes; a hip-hop diva; or an aspirational consumer who wants to send a strong message about who she is and spends much of her life savings on one, a handbag sends a loud message and carries an emotional reward for those who choose to invest in one. Hermes’ Birken model is the highest of high status — because it is not easily accessible. Pre-owned Birken have sold for over 100,000 euros, the preeminent retailer of luxury pre-owned handbags and watches.

Abraham Maslow’s Hierarchy of Needs is a well-known tiered pyramid of human needs. The system outlines five basic needs, culminating with self-actualization.

His theory posits that once our basic needs are met, we can achieve a higher level of awareness, creativity and moral purpose.

The bottom of the pyramid begins with the Basic Physiological or survival needs like air, food and shelter; progresses through Safety and Security, to Love and Belonging. Humans need to feel a part of something, primarily family and community. Brands play a role here. People want to be affiliated with other like-minded souls and a brand is a badge of affiliation. Retailers can, and often do, capitalize on this by merchandising accordingly. The next tier in Maslow's Hierarchy is Esteem where status, acceptance and recognition come to play. People want to be valued by others (and themselves) to gain self-esteem. A handbag, which is immediately recognized for its style, price and brand affiliation is one quick fashion route to status, recognition and the self-esteem that is derived from it. Susan Engle, CEO of Portera.com, says, "Bags are so important...they definitely say something about you and are the surest way for someone to know how much you paid. Obvious is key!"

Understanding importance of a bag as fashion identity its not only matter of fashion but from assembly of different fields as marketing, brand identity, psychology, price, etc,..Understanding basics in bag types and logic will guid understanding universal shape to sattisfy all this differenciation by not changing them.

THE ARCHITECTURE OF THE BAG



THE ARCHITECTURE OF THE BAG

MEASURING

Drop: Measure from the height of the top of the handle (in the middle of the handle) down to the top of seam of the bag body.

Height: Measure from the center top seam of the bag to center bottom seam of the bag.

Length: Measure the front of the bag from the bottom left seam to the bottom right seam.

Width (often referred to as the Gusset): Measure from the front side seam to the back side seam.

KEY TERMS

Piece Good: Material that a bag is mostly composed of, for example pie, fabric, etc.

Trim: Any material that is used as an accent or decoration.

Top Handle: A type of handle not long enough to go over the shoulder, it allows the bag to be held in the hand or in the crook of the elbow.

Seam: The line where piecegoods are stitched together.

Top Zip: A type of zipper main closure that runs along the top of the bag body.

Hardware: Any metal, plastic or jewel that acts as an connector, closure, clasp or decoration.

Bag body: The central and largest compartment of the handbag.

Flap: Portion of the bag or pocket that reaches over the top of a gusset, usually closing the top opening of the gusset.

Top Stitch: Any visible stitching, usually close to seams. Top stitching can be decorative, functional or both.

Gusset: The triangular end piece of a handbag or pocket that gives depth.

Feet: Small, usually metal, pegs placed on the bottom of a bag to add stability and protect.

Zipper: A fastening device consisting of three major parts: a.) zipper teeth; b.) zipper tape; c.) zipper pulley. Each of these should be specified when requesting samples.

Interior Back Wall: The back interior of the bag is the most accessible area of the bag interior. For this reason, it is usually where most pockets and interior functions are added.

Lining: A thin, soft material that encompasses the entire interior of the bag. Lining is necessary to separate and protect the items in the bag from the exterior shell and the interior shell material. Lining is also a great way to enhance the design of the bag through the color, pattern and texture.

Interface: Interface (not shown) is any material that pads or adds structure between exterior shell and the interior lining. Interface is commonly used when the exterior piecegood is very thin or fragile.

C/O Label: The country of original label calls out where the handbag was physically sewn together. C/O labels are now necessary by law for most items to pass through customs.

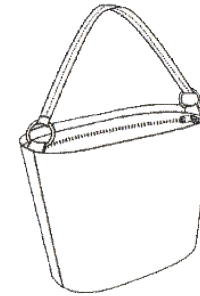
Seam Allowance: The distance between the seam line and the cut edge of the fabric on the interior of the bag. Regardless of whether the seam allowance is visible, it should always be “clean” to prevent fraying and add durability.

Zippered Back Wall Pocket: This is the most basic interior organization element.

Bag Divider: Separating the interior of the bag into halves for better organization, this divider may be zipped or have additional pockets added to it.

Interior Pockets: Another organizational element, they may be added to any

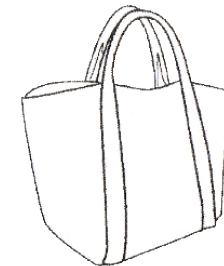
Bag identity



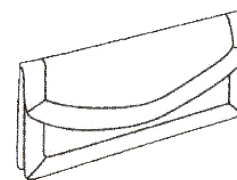
Bucket: Shoulder bag shaped like a bucket with wide open top entry and oval or round flat bottom and shoulder carrying strap



Facile Frame or Snap Frame: This type of bag uses a jointed or hinged covered metal frame that snaps together to close the bag. Unlike a regular frame, this wearer must apply pressure to open the bag instead of applying pressure to close it.



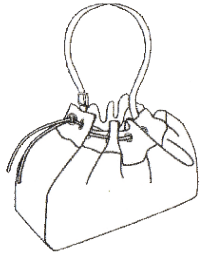
Tote or Shopper: A medium to large carry-all square bag with an open top entry and two handles.



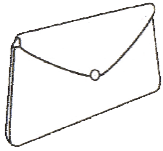
Wallet or Billfold: Is a small mini bag or Pocketbook that folds and has compartments for credit cards and cash. The wallet is the part of the Small Leather Goods (SLG) category.



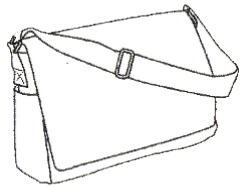
Barrel or Roll Bag: Horizontal, cylindrical purse with a zip top closure and short handle(s). *The Duffle* is the larger, studier version of this bag and is generally used to carry sports equipment.



Drawstring or Pull Tie: A bag that has a cord woven through eyelets to gather and close on the top. The drawstring may form straps or the bag may have a separate strap.



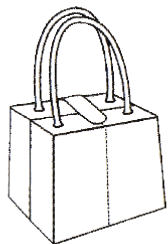
Clutch or Pouchette: So named because it is usually clutched in the hands of, or between the arm and the body of, the wearer. It is a small bag that either has no straps or removable straps. The Envelope (shown) is a type of Clutch with a flap closure.



Messenger: Rectangular, roomy bag with a long adjustable strap that is worn slung across the body. Messengers are usually East/West (horizontal orientation), but may also be North / South (vertical orientation). *Messenger Bags* were originally designed (and named) for urban bicycle messengers as an alternative to backpack. The School Bag is variation of the messenger, with two buckled outside pockets and an additional top handle.



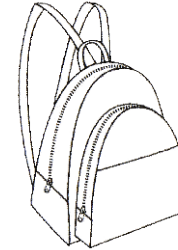
Satchel: Square or dome-shaped bag with a wide and flat bottom, a zippered or clasped top and two short handles or straps. The bottom of this bag usually sits on round metal or plastic feet that protect the bottom of the bag. The Satchell was adapted from luggage and may be different sizes. Variations of this bag include the *Doctor's Bag* (with a covered frame closure) or the *Bowler Bag* (taller, usually with hard plastic handles).



Structured or Box Bag: Bag that is reinforced with a rigid material (usually cardboard) for structure. The term "Box Bag" refers to its typical shape.



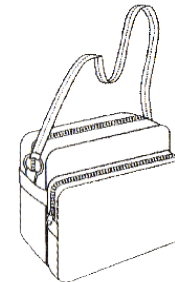
Frame: Bag that has a hinged metal top that fastens with a snap, knob or clasp closure. Often used in evening bags.



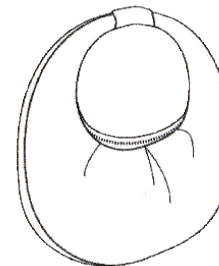
Backpack: Big with vertical double shoulder straps that is worn on the back, between the shoulders. This bag usually has an additional top handle. May also be worn slung on either shoulder.



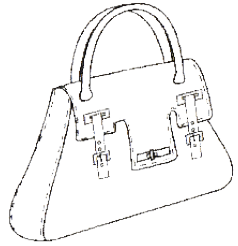
Attache or Briefcase: This bag is similar to a Messenger in shape, handles and sizes. However, the Attache is more structured than a Messenger and has additional interior organization and/or padding for office items. Often has a top zip closure construction to protect electronics. Due to its size and durability, it is often used as a *Laptop Bag*.



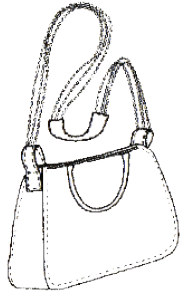
Camera: A rectangular bag with rounded corners. It has a top zip closure and often has zippered exterior pockets. This bag usually has one long adjustable strap used to carry the bag across the body and provide easy access to the wearer. The Flight Bag is the larger version of this bag.



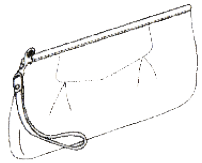
Hobo: Slouchy, crescent – shaped shoulder bag that dips in the center and usually has a zip-top closure and shoulder strap.



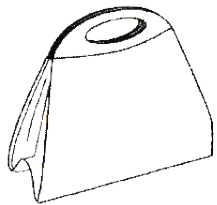
Trapezoid: Bag in an A-line shape that can also be referred to as a Four-Poster. The Trapezoid can be referred to as a Satchel as well.



Shoulder bag: Bag that was created initially for woman to be hands free in the earlier part of the 1930s. Historically small to medium, this bag can run large and is paired with two thin straps or sometimes chain handles to be worn over the shoulder. *The Crossbody* is a type of Shoulder Bag and has become popular and sometimes has one strap that is adjustable.



Wristlet: The wristlet is a small hand bag with wallet-like interior pockets with a wrist cuff or strap handle attached. The wristlet became popular again due to its convenient shape and hold-everything capacity. It is similar in shape but not in size to the clutch and can be also a frame bag as well.



Luggage Handle: A bag with a hard, structured handle. This type of bag is carried in the crook of the elbow by lacing the arm through the cut-out hole of the handle.



Chapter 2- Technical research

CLOSING SYSTEM AS A GATE

I really want to see everything. If it's around me and it's part of my show, I need to be a part of all of it. From the creation of the music, to the surface of the floor, to everyone's hairstyle, to the details with the buttons and the bows and the snaps and the zippers. All of those things to feel me!

- Madonna -



CLOSING SYSTEM AS A GATE

Closing system is a smart and one of the crucial parts of the bag. It will be considered as wearable technological gate.

In the past decade the term wearable technology has been used to describe the confluence of dress and technology in the twenty-first century. Though the term remains nebulous as it continues to evolve, wearable technology can refer to three related things.

Most commonly it is understood as a material product, specifically a garment or accessory worn on the body that is inspired by, created through, or enhanced by digital or electronic technologies.

Second, it can refer to a category of creative praxis, encompassing the diverse range of scientific and creative processes undertaken by the artists, fashion designers, technologists and hobbyists who make the products of wearable technology.

Finally it is an emerging subject of scholarship that connects multi-disciplinary research and discourse on the intersection of the body, dress and technology.

While the neologism may be only a decade old, wearable technology as a twenty-first century product, praxis and theoretical subject marks the timely collision of two otherwise discrete historical moments. The first is the cultural history of twentieth century technologised fashions, encompassing the overlapping history of worn technology in modern and contemporary art.

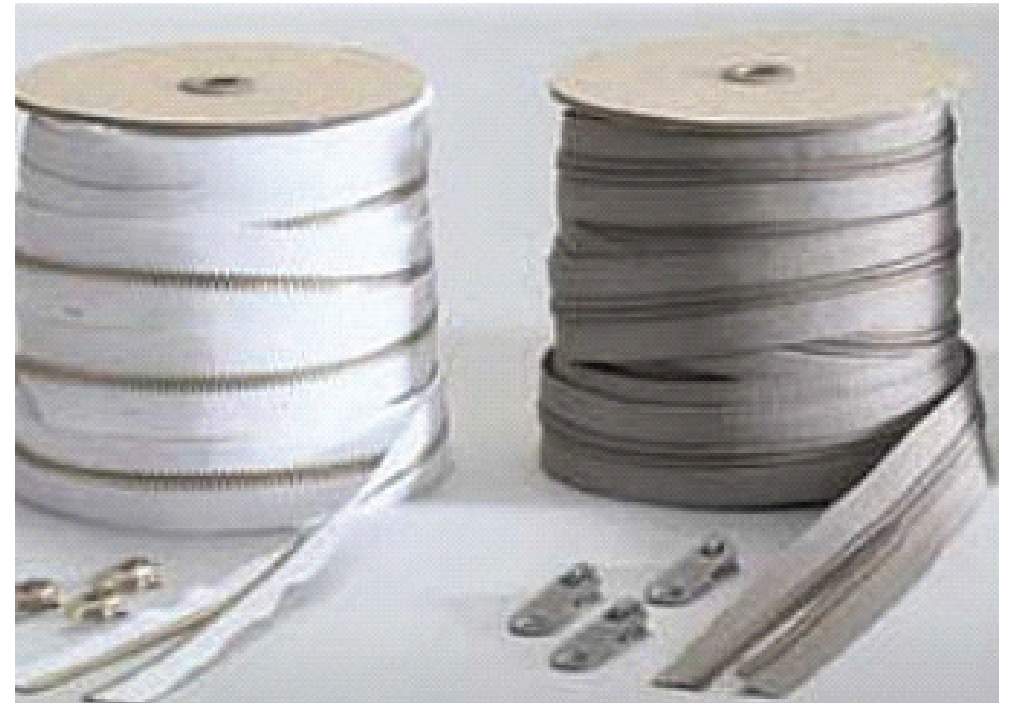
In 2011 the idea that technology can be incorporated into everyday dress is no longer a rarefied vision, as it was for the early twentieth century art and design vanguard (who, in the wake of industrialisation, imagined futuristic attire enhanced by the aesthetics, functionality and perceived symbolic values of nascent mechanical technologies), nor is it the science-fiction fantasy of computer engineers (who conceived wearable technology as the inexorable direction of developments in ubiquitous and miniaturised computing and electronics). Instead, speculation, enthusiasm and debate on the anticipated ubiquity of wearable technology in contemporary bag are had at all corners, engaging futurologists, cultural theorists and electronic media theorists, as well as the practicing scientists, artists and designers at the forefront of wearable technology research and development.

ZIPPER HISTORY



ZIPPER HISTORY

Accordingly, in the twenty-first century the relationship between the body, bag and technology has become a concern for a wide-ranging spectrum of commercial, cultural and academic disciplines.



Fasteners have come a long way since the early bone or horn pins and bone splinters. Many devices were designed later that were more efficient; such fasteners included buckles, laces, safety pins, and buttons. Buttons with buttonholes, while still an important practical method of closure even today, had their difficulties. Zippers were first conceived to replace the irritating nineteenth century practice of having to button up to forty tiny buttons on each shoe of the time.

In 1851, Elias Howe, the inventor of the sewing machine, developed what he called an automatic continuous clothing closure. It consisted of a series of clasps united by a connecting cord running or sliding upon ribs. Despite the potential of this ingenious breakthrough, the invention was never marketed.

Another inventor, Whitcomb L. Judson, came up with the idea of a slide fastener, which he patented in 1893. Judson's mechanism was an arrangement of hooks and eyes with a slide clasp that would connect them. After Judson displayed the new clasp lockers at the 1893 World's Columbian Exposition in Chicago, he obtained financial backing from Lewis Walker, and together they founded the Universal Fastener Company in 1894.

The first zippers were not much of an improvement over simpler buttons, and innovations came slowly over the next decade. Judson invented a zipper that would part completely (like the zippers found on today's jackets), and he discovered it was better to clamp the teeth directly onto a cloth tape that could be sewn into a garment, rather than have the teeth themselves sewn into the garment.

Zippers were still subject to popping open and sticking as late as 1906, when Otto Frederick Gideon Sundback joined Judson's company, then called the Automatic Hook and Eye Company. His patent for Plako in 1913 is considered to be the beginning of the modern zipper. His "Hookless Number One," a device in which jaws clamped down on beads, was quickly replaced by "Hookless Number Two", which was very similar to modern zippers. Nested, cup-shaped teeth formed the best zipper to date, and a machine that could stamp out the metal in one process made marketing the new fastener feasible.

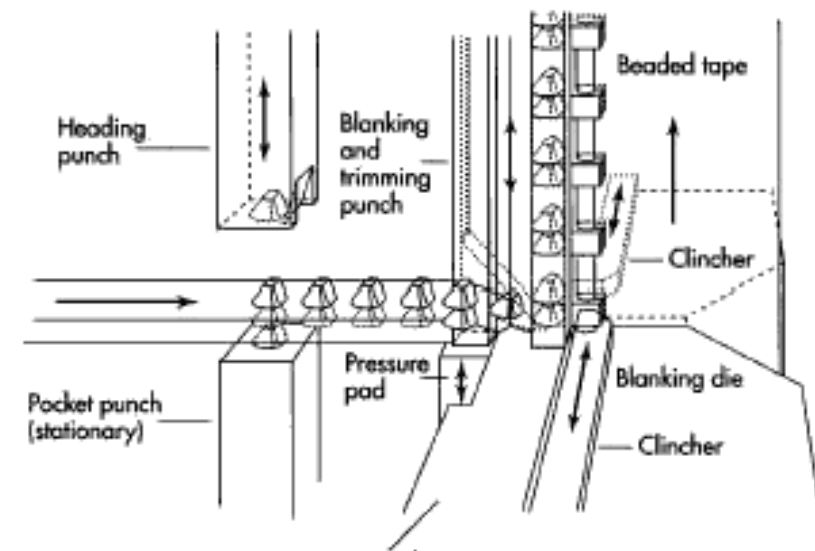
The first zippers were introduced for use in World War I as fasteners for soldiers' money belts, flying suits, and life-vests. Because of war shortages, Sundback developed a new machine that used only about 40 percent of the metal required by older machines.

Zippers for the general public were not produced until the 1920s, when B. F. Goodrich requested some for use in its company galoshes. It was Goodrich's president, Bertram G. Work, who came up with the word zipper, but he wanted it to refer to the boots themselves, and not the device that fastened them, which he felt was more properly called a slide fastener.

The next change zippers underwent was also precipitated by a war—World War II. Zipper factories in Germany had been destroyed, and metal was scarce. A West German company, Opti-Werk GmbH, began research into new plastics, and this research resulted in numerous patents. J. R. Ruhrman

and his associates were granted a German patent for developing a plastic ladder chain. Alden W. Hanson, in 1940, devised a method that allowed a plastic coil to be sewn into the zipper's cloth. This was followed by a notched plastic wire, developed independently by A. Gerbach and the firm William Prym-Wencie, that could actually be woven into the cloth.

After a slow start, it was not long before zipper sales soared. In 1917, 24,000 zippers were sold; in 1934, the number had risen to 60 million. Today zippers are easily produced and sold in the billions, for everything from blue jeans to sleeping bags.



A stringer consists of the tape (or cloth) and teeth that make up one side of the zipper. One method of making the stringer entails passing a flattened strip of wire between a heading punch and a pocket punch to form scoops. A blanking punch cuts around the scoops to form a Y shape. The legs of the Y are then clamped around the cloth tape.

Raw Materials

The basic elements of a zipper are: the stringer (the tape and teeth assembly that makes up one side of a zipper); the slider (opens and closes the zipper);

a tab (pulled to move the slider); and stops (prevent the slider from leaving the chain). A separating zipper, instead of a bottom stop that connects the stringers, has two devices—a box and a pin—that function as stops when put together.

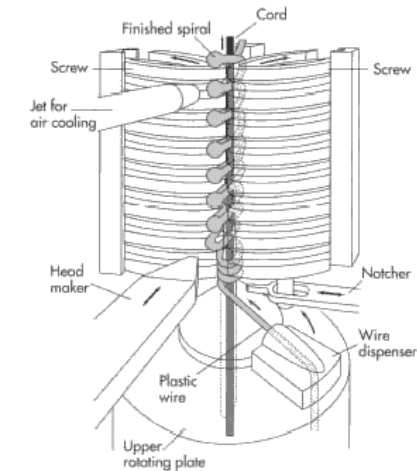
Metal zipper hardware can be made of stainless steel, aluminum, brass, zinc, or a nickel-silver alloy. Sometimes a steel zipper will be coated with brass or zinc, or it might be painted to match the color of the cloth tape or garment. Zippers with plastic hardware are made from polyester or nylon, while the slider and pull tab are usually made from steel or zinc. The cloth tapes are either made from cotton, polyester, or a blend of both. For zippers that open on both ends, the ends are not usually sewn into a garment, so that they are hidden as they are when a zipper is made to open at only one end. These zippers are strengthened using a strong cotton tape (that has been reinforced with nylon) applied to the ends to prevent fraying.

The Manufacturing Process

Today's zippers comprise key components of either metal or plastic. Beyond this one very important difference, the steps involved in producing the finished product are essentially the same.

Making stringers — metal zippers

1. A stringer consists of the tape (or cloth) and teeth that make up one side of the zipper. The oldest process for making the stringers for a metal zipper is that process invented by Otto Sundback in 1923. A round wire is sent through a rolling mill, shaping it into a Y-shape. This wire is then sliced to form a tooth whose width is appropriate for the type of zipper desired. The tooth is then put into a slot on a rotating turntable to be punched into the shape of a scoop by a die. The turntable is rotated 90 degrees, and another tooth is fed into the slot. After another 90 degrees turn, the first tooth is clamped onto the cloth tape. The tape must be raised slightly over twice the thickness of the scoop—the cupped tooth—after clamping to allow room for the opposite tooth on the completed zipper. A slow and tedious process, its popularity has waned.



To make the stringer for a spiral plastic zipper, a round plastic wire is notched and then fed between two heated screws. These screws, one rotating clockwise, the other counterclockwise, pull the plastic wire out to form loops. A head maker at the front of each loop then forms it into a round knob. This method requires that a left spiral and right spiral be made simultaneously on two separate machines so that the chains will match up on a finished zipper.

Another similar method originated in the 1940s. This entails a flattened strip of wire passing between a heading punch and a pocket punch to form scoops. A blanking punch cuts around the scoops to form a Y shape. The legs of the Y are then clamped around the cloth tape. This method proved to be faster and more effective than Sundback's original.

2. Yet another method, developed in the 1930s, uses molten metal to form teeth. A mold, shaped like a chain of teeth, is clamped around the cloth tape. Molten zinc under pressure is then injected into the mold. Water cools the mold, which then releases the shaped teeth. Any residue is trimmed.

Making stringers — plastic zippers

3. Plastic zippers can be spiral, toothed, ladder, or woven directly into

the fabric. Two methods are used to make the stringers for a spiral plastic zipper. The first involves notching a round plastic wire before feeding it between two heated screws. These screws, one rotating clockwise, the other counter-clockwise, pull the plastic wire out to form loops. A head maker at the front of each loop then forms it into a round knob. Next, the plastic spiral is cooled with air. This method requires that a left spiral and right spiral be made simultaneously on two separate machines so that the chains will match up on a finished zipper.

The second method for spiral plastic zippers makes both the left and right spiral simultaneously on one machine. A piece of wire is looped twice between notches on a rotating forming wheel. A pusher and head maker simultaneously press the plastic wires firmly into the notches and form the heads. This process makes two chains that are already linked together to be sewn onto two cloth tapes.

4. To make the stringers for a toothed plastic zipper, a molding process is used that is similar to the metal process described in step #2 above. A rotating wheel has on its edge several small molds that are shaped like flat-tened teeth. Two cords run through the molds to connect the finished teeth together. Semi-molten plastic is fed into the mold, where it is held until it solidifies. A folding machine bends the teeth into a U-shape that can be sewn onto a cloth tape.

5. The stringers for a ladder plastic zipper are made by winding a plastic wire onto alternating spools that protrude from the edge of a rotating forming wheel. Strippers on each side lift the loops off the spools while a heading and notching wheel simultaneously presses the loops into a U shape and forms heads on the teeth, which are then sewn onto the cloth tape.

6. Superior garment zippers can be made by weaving the plastic wire directly into the cloth, using the same method as is used in cloth weaving. This method is not common in the United States, but such zippers are frequently imported.

Completing the manufacturing process

7. Once the individual stringers have been made, they are first joined together with a temporary device similar to a slider. They are then pressed,

and, in the case of metal zippers, wire brushes scrub down sharp edges. The tapes are then starched, wrung out, and dried. Metal zippers are then waxed for smooth operation, and both types are rolled onto huge spools to be formed later into complete zippers.

8. The slider and pull tab are assembled separately after being stamped or die-cast from metal. The continuous zipper tape is then unrolled from its spool and its teeth are removed at intervals, leaving spaces that surround smaller chains. For zippers that only open on one end, the bottom stop is first clamped on, and then slider is treated onto the chain. Next, the top stops are clamped on, and the gaps between lengths of teeth are cut at midpoint. For zippers that separate, the midpoint of each gap is coated with reinforcing tape, and the top stops are clamped on. The tape is then sliced to separate the strips of chain again. The slider and the box are then slipped onto one chain, and the pin is slipped onto the other.

9. Finished zippers are stacked, placed in boxes, and trucked to clothing manufacturers, luggage manufacturers, or any of the other manufacturers that rely on zippers. Some are also shipped to department stores or fabric shops for direct purchase by the consumer.

Quality Control

Zippers, despite their numbers and practically worry-free use, are complicated devices that rely on a smooth, almost perfect linkage of tiny cupped teeth. Because they are usually designed to be fasteners for garments, they must also undergo a series of tests similar to those for clothing that undergo frequent laundering and wear.

A smoothly functioning zipper every time is the goal of zipper manufacturers, and such reliability is necessarily dependent on tolerances. Every dimension of a zipper—its width, length, tape end lengths, teeth dimensions, length of chain, slide dimensions, and stop lengths, to name a few—is subject to scrutiny that ascertains that values fall within an acceptable range. Samplers use statistical analysis to check the range of a batch of zippers. Generally, the dimensions of the zipper must be within 90 percent of the desired length, though in most cases it is closer to 99 percent.

A zipper is tested for flatness and straightness. Flatness is measured by passing a gauge set at a certain height over it; if the gauge touches the zipper several times, the zipper is defective. To measure straightness, the zipper is laid across a straight edge and scrutinized for any curving.

Zipper strength is important. This means that the teeth should not come off easily, nor should the zipper be easy to break. To test for strength, a tensile testing machine is attached by a hook to a tooth. The machine is then pulled, and a gauge measures at what force the tooth separates from the cloth. These same tensile testing machines are used to test the strength of the entire zipper. A machine is attached to each cloth tape, then pulled. The force required to pull the zipper completely apart into two separate pieces is measured. Acceptable strength values are determined according to what type of zipper is being made: a heavy-duty zipper will require higher values than a lightweight one. Zippers are also compressed to see when they break.

To measure a zipper for ease of zipping, a tensile testing machine measures the force needed to zip it up and down. For garments, this value should be quite low, so that the average person can zip with ease and so that the garment material does not tear. For other purposes, such as mattress covers, the force can be higher.

A finished sample zipper must meet textile quality controls. It is tested for laundering durability by being washed in a small amount of hot water, a significant amount of bleach, and abrasives to simulate many washings. Zippers are also agitated with small steel balls to test the zipper coating for abrasion.

The cloth of the zipper tapes must be colorfast for the care instructions of the garment. For example, if the garment is to be dry cleaned only, its zipper must be colorfast during dry cleaning.

Shrinkage is also tested. Two marks are made on the cloth tape. After the zipper is heated or washed, the change in length between the two marks is measured. Heavyweight zippers should have no shrinkage. A lightweight zipper should have a one to four percent shrinkage rate.

In the fashion industry, handbag manufacturers cut and make their own zippers to length. There are a number of reasons why you would want to make your own zipper using continuous zipper chain.

-While handbag and luggage zippers are available at your sewing notion retailer, the supply is limited and may not be to the length that you may require for your prototype. By making your own, you can customize the length and style of the zipper you want ie: one way non-separating, two-way non-separating or one-end-closed.

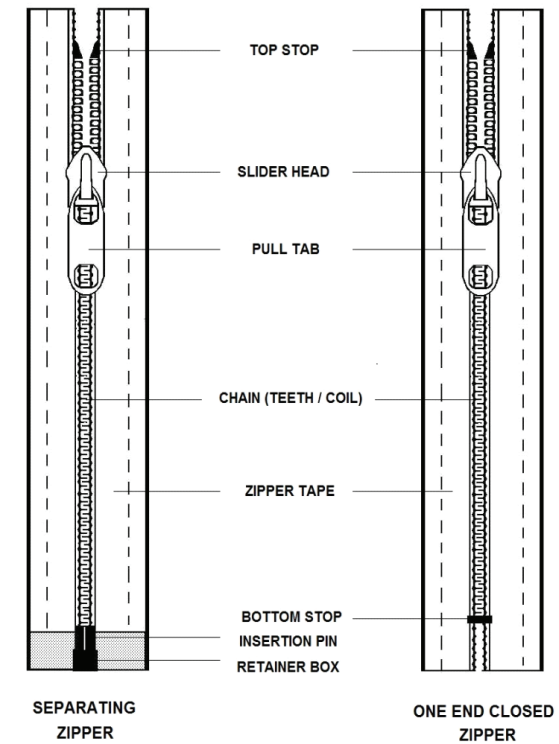
-When you make your own zipper you can select the style of zipper slider you desire: non-locking, locking, key locking or double reversible.

-Often times it is more economical to make your own. To determine how much to cut for a custom zipper, add 2 inches [5 cm] to the desired length you want the final zipper length to be (1 inches [2.5 cm] extra for each end) of continuous zipper chain.

ZIPPER TERMINOLOGY



ZIPPER TERMINOLOGY



TOP STOP – Two permanent stays affixed to the top most end of a zipper, to prevent the slider from coming off the chain.

SLIDER HEAD – The device that moves up and down the chain to open or close the zipper.

PULL TAB – The part of the slider that is held to move the slider up or down.

ZIPPER CHAIN (CONTINUOUS) – a length of zipper tape, either coil or tooth style, sold by the yard. Allows you to make and customize your own zippers. At least one end must be sewn closed. It cannot be used to make separating

jacket zippers.

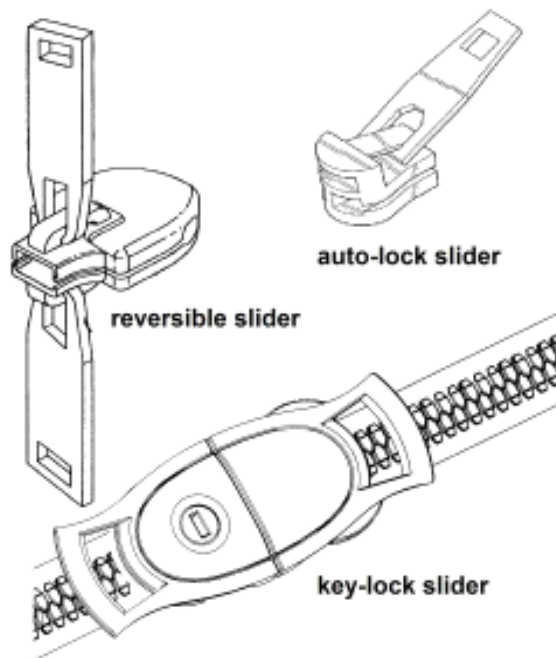
ZIPPER TAPE – The fabric part of the zipper.

BOTTOM STOP – A permanent stay similar to a large staple, used at the bottom end of a zipper to prevent each half of the zipper from separating.

INSERTION PIN – A device used on a separating (jacket type) zipper whose function is to allow the joining of the two zipper halves.

RETAINER BOX – A device used on a separating (jacket type) zipper whose function is to correctly align the pin.

ZIPPER SLIDER & PULL: the sliding head on the zipper. The actual pull is the articulated lever attached to the slider. [Note:the zipper sliders from one brand (ie: YKK brand) are usually not interchangeable with other zipper brands (ie: Riri brand zippers, etc.)]



-single slider-a zipper slider with only one pull

-double-reversible slider – a zipper slider with a pull tab on both sides of the slider. Uses: reversible totebags

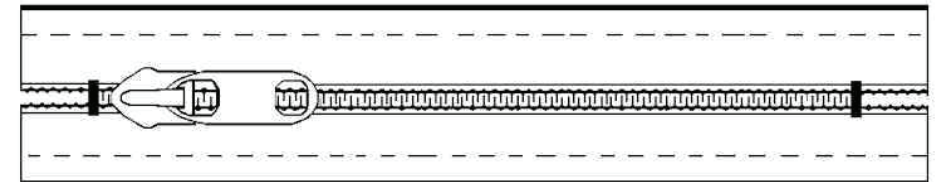
-non-locking slider – a zipper slider which slides easily and has no internal locking mechanism to hold it in place. Uses: purse pockets, hand bags, luggage

-auto-locking slider – a zipper slider which has an internal locking mechanism to hold the slider in place. Uses: handbag openings

-key locking slider – a zipper slider which locks and unlocks with a removable key. Uses: security envelopes, portfolios, luggage

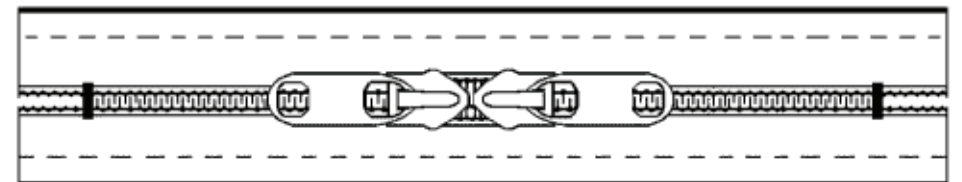
HAND BAG ZIPPER CONFIGURATIONS

A. One-way Non-separating Bag Zipper



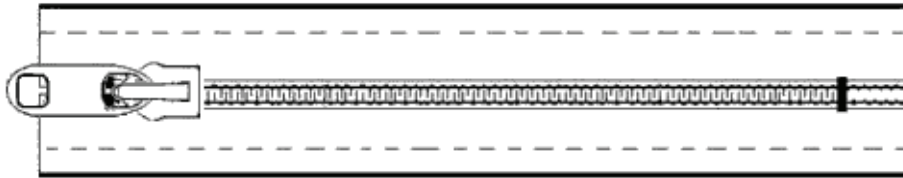
Uses: Purse Openings, Inset zip pockets

B. Two-way Non-separating Bag Zipper (head-to-head)



Uses: Totebags, Portfolios, Luggage

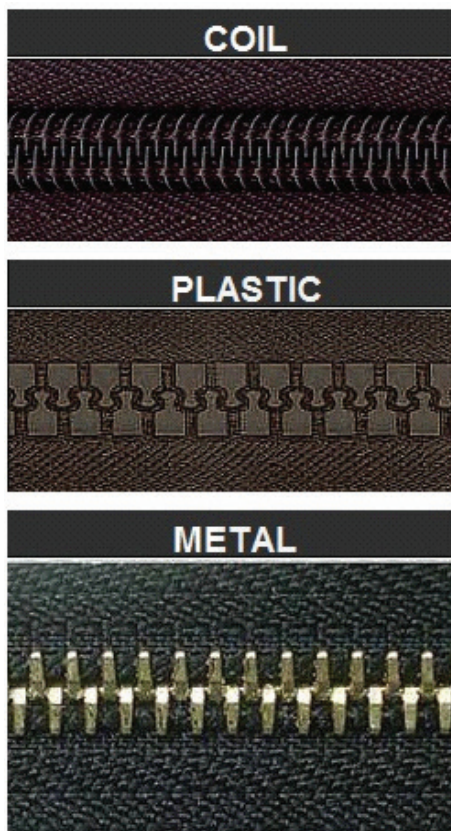
C. Reversible Non-separating Bag Zipper (flip pull tab)



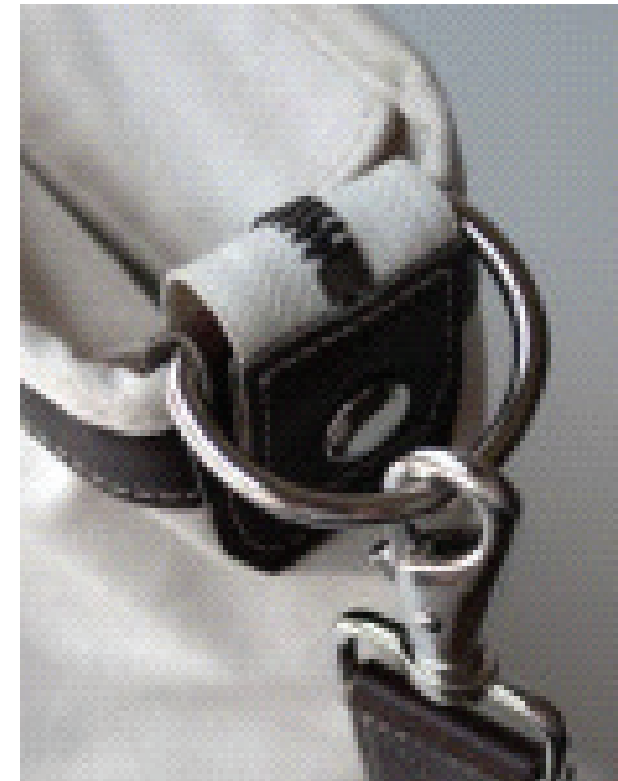
Uses: Reversible Totes

WHAT IS THE DIFFERENCE BETWEEN TOOTH AND COIL STYLE ZIPPERS?

For many bag projects it is preference which style to choose:



SHOULD BE USED TOP AND BOTTOM STOPS?



The purpose of zipper stops is to keep the zipper sliders from derailing when the zipper is in use. In handbag construction, use of top and bottom stops can be optional. If the ends of the zipper chain are sewn into a seam, you may choose not to attach top/bottom stops because the seam will act as the “stops”. I often use what is known as a “wedge” instead of a stop.

Another option is to attach a grip tab to each end of the zipper chain. It is often made from the fashion fabric used in the prototype. This finish will prevent the zipper slider from dislodging while the tab itself can be gripped in the hand when operating the zipper.

When using zipper stops, bottom stops are attached to one end of a one end closed zipper and both ends of a one or two-way non-separating zipper. Bag manufacturers tend to use the latter method. Top stops are used at the top end (the “open” end) of a one-end closed zipper and usually are not very practical in handbag design.

ZIPPER FAILURE

Zipper failures are usually the result of the zipper slider wearing out, especially if no apparent damage is noticeable to the zipper teeth. For zippers where the teeth separate after the zipper is closed, a possible solution (though at times only a temporary one) is to pinch the slider from the top of the slider to the bottom of the slider with a pair of pliers to seat the slider closer to the zipper teeth (not too tight though). If this does not work, try replacing the slider before replacing the entire zipper.

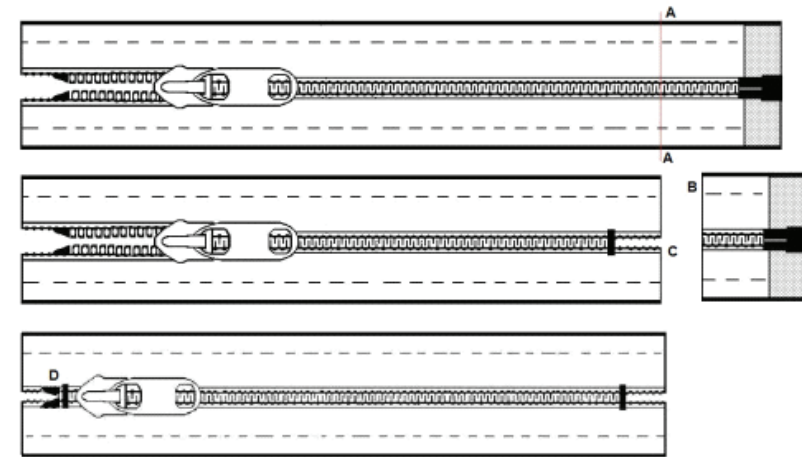
Coil zipper are a bit more forgiving as they are often called “self-repairing” zippers. Should the coil break open, carefully pull the slider to the “open” position at the bottom of the zipper then re-zip the fastener to correct the problem. Otherwise, if there is a kink or break in the spiral filament, the whole zipper will need to be replaced.

TOOTH STYLE ZIPPER:

1. Determine the final length you want the bag zipper to be. Measure this amount plus 2” [5 cm], from the stops at the top end of the separating zipper when the zipper is closed. Mark this length with chalk on the zipper tape.
2. Cut across the zipper tape at the chalk mark. Discard the bottom end of the zipper.
3. Attach the new zipper stop over the teeth channel on the face side of the zipper. Ensure the prongs of the zipper stop insert through the zipper tape completely. Bend the prongs flat against the back of the zipper teeth using pinch-nose pliers.
4. Pull apart the zipper teeth on the cut end up to the stop.
5. Using bull-nose pliers, carefully remove the excess teeth from the tape.
6. Neaten the zipper end by trimming it with pinking shears. Allow the same seam allowance from the stop as the amount at the top end of the zipper. This is usually 5/8 of an inch [15 mm].
7. You may add the second stop to the top end of the zipper to close both

ends or use the existing original zipper stops.

8. The zipper is ready to install in the bag



COIL STYLE ZIPPER:

1. Determine the final length you want the bag zipper to be. Measure this amount from the stops at the top end of the separating zipper when the zipper is closed. Mark this length with chalk on the zipper tape.
2. Attach a new zipper stop over the zipper coil on the face side of the zipper. Ensure the prongs of the zipper stop insert through the zipper tape completely. Bend the prongs flat against the back of the coil using pinch-nose pliers.
3. Repeat step #2 at the open end of the zipper.
4. Once the stops are in place, measure from the end stop an amount equal to the top end of the zipper and mark its location on the tape with chalk. Cut through the coil and discard the retainer box end of the separating zipper.
5. Using a match or candle, sear the raw edges of the nylon coil to prevent raveling.
6. The zipper is now ready to install.

MATERIAL SELECTION FOR CLOSING SYSTEM

MATERIAL SELECTION FOR CLOSING SYSTEM

The purpose of the closing system is to provide safety to the user from one side and from the another side, in a case of stealing, not to be able fast and simple to open the bag. First idea was to create entire mechanical system for closing but understanding all possible types of zippers I came to conclusion to use metal tooth style one. When is about the strength, strength of stinless steal is very high so in this case it has to be understood strength of zipp tooth cavities.

A zipper cavity is composed of two nanobeam cavities and the light is localized and enhanced in the gap between them. This localized electromagnetic field is strongly dependent on the mechanical displacement of the cavity; hence strong opto-mechanical coupling can be obtained. To increase the opto-mechanical coupling, the nanobeam cavity must have a high optical Q. Although there have been studies of high Q nanobeam cavities with high refractive index materials, it is a challenge to fabricate a high-Q cavity with low reflective index materials. Some studies have reported the fabrication of high-Q nanobeam cavities in low refractive index materials such as silica ($n = 1.46$), silicon nitride ($n = 2.0$) and polymer ($n = 1.34$).



INOVATIVE MATERIAL

INOVATIVE MATERIAL

There are three main things to think about when choosing materials (in order of importance):

Will they meet the performance requirements?

To be resistant on cutings and fire and light enough

Will they be easy to process?

To be able to sue it and for potential mass production.

Do they have the right 'aesthetic' properties?

Visual and tactile impression is important

I simultaneously began researching innovative materials and taking inventory of supplies readily available in my community.

Some of the most innovative textiles on the market today are composites, textiles made up of more than one type of fiber or polymer (Bags Case Study). For example XPAC, Spectra and Dyneema fabrics all feature a stronger fiber loosely woven inside the fabric. The reinforcement permits higher yeild strength while maintaining low weight. Industrial materials like Hypalon, uPVC, and PU (all used in Ridgid Inflatable Boats) consist of a woven fiber coated in a highly durable rubber, these materials are exceptionally durable and also waterproof, however they are also quite heavy.

I also browsed new material databases to see if there were any industrial materials that could provide customer benefit and might have been overlooked by other bag makers. Early on I found some heavy duty vinyl materials at the Scrap Box in Ann Arbor, a store which sells excess industrial materials to consumers for pennies on the dollar. I needed to dial in every detail of the entire construction even before ordering materials and hardware. Since I planned to construct a test-ready prototype considerations had to be made for the limitations of my manufacturing capabilities. Careful consideration had to be made in the layering of materials and positioning of stitches as not to overwhelm the sewing machine.



MATERIAL SELECTION FOR INNER BODY



MATERIAL SELECTION FOR INNER BODY

Checking materials with software and by searching online each was having some obstacle. Also realized, to be able to satisfy setted requirements that I have to look and understand nanofibers materials.

Nanofibers prepared by electrospinning are polymer filaments with diameters ranging from several micrometers to a few nanometers. The thin diameters of such fibers give them a very high surface-to-volume ratio, a property that makes them ideal for producing very porous materials with a number of potential application areas. In lab-scale electrospinning, a polymer solution is typically placed in a syringe and subjected to a strong electric field between the needle tip and a collector. If the electric field strength is sufficient, it will deform the pendant drop at the tip of the needle enough to eject a jet of solution which will travel towards the collector. On its way towards the collector, the jet will stretch immensely. Simultaneously, the solvent will evaporate, leaving a porous nonwoven sheet of very thin polymer fibers on the collector surface. A broad division of the application areas for nanofibers is Bioengineering, Environmental Engineering & Biotechnology, Energy & Electronics, and Defense & Security. To review all of these areas would be a vast undertaking that could fill a complete journal issue of its own.

Also by searching nanofibers materials used for work protection I came to Cut-Tex PRO what finally became my selection.

Cut-Tex[®] PRO is an ultra-high cut resistant fabric, made out of an innovative combination of ultra-high molecular weight polyethylene (UHMWPE) and other technical fibres weaved by special high-density knitting machines.

Cut-Tex[®] PRO has countless potential applications. It is primarily being used to create cut resistant clothing, to protect homeland security professionals, such as law enforcement, prison, and private security and immigration officers, as well as public transport employees from cut/slash related injuries (lacerations). Additional key sectors for cut resistant clothing made out of Cut-Tex[®] PRO are flat glass handling, metal sheet pressing and similar industries.

Due to the exceptional tear resistance of Cut-Tex® PRO, this fabric is also being used to manufacture tear and bite resistant clothing for mental health care facilities and secure hospital facilities around the world, as well as schools specialised in severe learning disabilities, challenging behaviour, special needs and autism.

Even if Cut-Tex® PRO cannot stop the sometimes severe bruising following a human bite, it will eliminate the risk of potentially severe infections following the skin penetration of a human bite.

Most recently Cut-Tex® PRO is being used to create cut resistant seating within public transport, cut resistant back packs or cases for travellers, and protective clothing for animals. Many other tests around the world are currently conducted to establish additional potential applications.

PARAMETERS AND LIMITATIONS

Standards Width & Length of Fabric Roll

Cut-Tex® PRO fabric is knitted on a circular machine, resulting in a tube of material, measuring 80cm flat width (160cm cutopen)

Cut-Tex® PRO fabric will be supplied as a tube of material.

Each roll is 25 metre in length (40 squaremetre)



Fashion Handbags

Historically, most designs have been made of leather or other natural materials. Current technologies allow synthetic polymers such as polypropylene to replace natural materials - these can easily be moulded or woven, and made in exotic colours or even translucent. Interesting, semi-rigid shapes can be moulded from the class of polymers known as elastomers (rubbers); polychloroprene (also known as neoprene) is one of these materials used in recent designs.

School Book Bags

A school book bag must support more weight than a hand bag and provide adequate wear resistance to survive the school environment for at least a couple of years. The most common materials chosen for this design are natural or polymer fabrics: canvas (usually cotton-based), nylon and polyvinylchloride (PVC) are examples.

Mountaineering Backpack

For mountaineering gear, the material and product must perform to high standards with special consideration for the weight of the product, its ability to withstand damage (such as scraping on rocks) and its performance in poor weather. Mountaineering backpacks have evolved from canvas to nylon to PTFE. "Goretex" is a PTFE-based laminated fabric used for wet-weather gear because the 'holes' between the fibres are too small to allow water in, but coarse enough to allow water vapour out.

Requirements

Each type of bag involves a different set of design requirements. All bags must be strong enough to carry the required load. However, the bag must provide this strength subject to other, less easily quantified, design requirements - see the table. Fabrics give a product good strength at low weight, while being very flexible and having good aesthetic qualities for designers to exploit.

Design Requirement	<i>fashion accessories</i>	<i>school book bags</i>	<i>mountaineering gear</i>
<i>required stiffness/strength</i>	low	medium	high
<i>weight of bag</i>	medium	medium	low
<i>water resistance</i>	none	partial	complete
<i>tear resistance</i>	low	medium	high
<i>estimated lifetime</i>	6 months	2 years	5 years
<i>allowable cost</i>	high	low	high

Joining of fabrics

The most common joining method used for fabrics is stitching. Stitching is a very versatile and fast process, though selecting the thread, fabric layup and stitching the pattern are skilled design processes. Stitching works with almost every fabric and can also join fabrics round difficult curved seams (such as for putting the arms onto a jacket). Many joining processes are limited to flat, nearly straight joints, and some will only work with specific fabrics (depending on the polymers used in the fabric).

Fabric technology

A fabric is a "structured material", usually made as a flat, flexible sheet, by weaving or knitting fibres in bundles - some processes simply tangle the fibres up and the fabric holds together by friction between the fibres. Many fabrics are made as multi-layer composites, with polymer films covering the weave on both sides (this could be to give protection to the fibres, to provide waterproofing, or to change the appearance of the fabric). The fibres can be aligned or random, and are made of natural materials like silk, cotton or wool, or of synthetic materials like nylon, polyethylene (PE), carbon, glass or aramid (known under the trade name Kevlar).

For high performance fabrics, we require strength and reasonable stiffness at low weight. The strength and stiffness of a fabric depends on the type of fibre used, but is also strongly affected by the type of weaving used (which changes the waviness and amount of friction between the fibres). Many fabrics are also composites of a strong fibre weave laminated with weaker polymer coatings. The fibres are critical however, so it is useful to plot their specific strength and specific stiffness on a selection chart this allows

comparison of natural and synthetic fibres, and also comparison of synthetic fibres with the same polymers in bulk form.

The chart shows that many fibres have excellent specific properties - but of course these can only be exploited by building the fibres into a structured material like a rope or a fabric. The material bubbles in red show long-fibre properties; the other materials and material classes show bulk properties i.e. those you would expect if the material is not drawn into fibres. The strength for the bulk ceramics shown on the chart is compressive strength - the tensile strength is typically only 10% of this value; for the other materials the strength is similar in compression and tension; the strength for all fibres is for loading in tension.

Many fabric properties - particularly strength, stiffness and tear resistance - are directional, i.e. they depend upon the direction of loading compared to the orientation of the fabric. Most woven fabrics have two stiff/strong directions at right angles to each other, parallel to the fibres, with much lower properties in between ("on the bias"). This "anisotropic" structure gives these materials their unique properties.

SEWING WITH METALIC THREAD

SEWING WITH METALIC THREAD

To satisfy condition that bag has to be safe and secure decision is made to be suided by metalic thread.

Metallic threads add a great contrast to many embroidery designs, however they can present a challenge to work with even for experienced embroiderers. Metallic threads feature a metal wrapping around an inner core. Because of this delicate structure, the less they are handled the better.



IOT OF THE BAG



IOT OF THE BAG

When thinking about technology and Internet of Things my inspiration for this bag, particularly was one story written by Ida Auken, current member of Parliament Denmark and I am showing it here.

Welcome to 2030. I own nothing, have no privacy, and life has never been better

Welcome to the year 2030. Welcome to my city - or should I say, "our city". I don't own anything. I don't own a car. I don't own a house. I don't own any appliances or any clothes.

It might seem odd to you, but it makes perfect sense for us in this city. Everything you considered a product, has now become a service. We have access to transportation, accommodation, food and all the things we need in our daily lives. One by one all these things became free, so it ended up not making sense for us to own much.

First communication became digitized and free to everyone. Then, when clean energy became free, things started to move quickly. Transportation dropped dramatically in price. It made no sense for us to own cars anymore, because we could call a driverless vehicle or a flying car for longer journeys within minutes. We started transporting ourselves in a much more organized and coordinated way when public transport became easier, quicker and more convenient than the car. Now I can hardly believe that we accepted congestion and traffic jams, not to mention the air pollution from combustion engines. What were we thinking?

Sometimes I use my bike when I go to see some of my friends. I enjoy the exercise and the ride. It kind of gets the soul to come along on the journey. Funny how some things seem never seem to lose their excitement: walking, biking, cooking, drawing and growing plants. It makes perfect sense and reminds us of how our culture emerged out of a close relationship with nature.

"Environmental problems seem far away"

In our city we don't pay any rent, because someone else is using our free space whenever we do not need it. My living room is used for business meetings when I am not there.

Once in awhile, I will choose to cook for myself. It is easy - the necessary kitchen equipment is delivered at my door within minutes. Since transport became free, we stopped having all those things stuffed into our home. Why keep a pasta-maker and a crepe cooker crammed into our cupboards? We can just order them when we need them.

This also made the breakthrough of the circular economy easier. When products are turned into services, no one has an interest in things with a short life span. Everything is designed for durability, repairability and recyclability. The materials are flowing more quickly in our economy and can be transformed to new products pretty easily. Environmental problems seem far away, since we only use clean energy and clean production methods. The air is clean, the water is clean and nobody would dare to touch the protected areas of nature because they constitute such value to our well being. In the cities we have plenty of green space and plants and trees all over. I still do not understand why in the past we filled all free spots in the city with concrete.

The death of shopping

Shopping? I can't really remember what that is. For most of us, it has been turned into choosing things to use. Sometimes I find this fun, and sometimes I just want the algorithm to do it for me. It knows my taste better than I do by now.

When AI and robots took over so much of our work, we suddenly had time to eat well, sleep well and spend time with other people. The concept of rush hour makes no sense anymore, since the work that we do can be done at any time. I don't really know if I would call it work anymore. It is more like thinking-time, creation-time and development-time.

For a while, everything was turned into entertainment and people did not want to bother themselves with difficult issues. It was only at the last minute that we found out how to use all these new technologies for better purposes than just killing time.

"They live different kinds of lives outside of the city"

My biggest concern is all the people who do not live in our city. Those we lost on the way. Those who decided that it became too much, all this technology. Those who felt obsolete and useless when robots and AI took over big parts of our jobs. Those who got upset with the political system and turned against it. They live different kind of lives outside of the city. Some have formed little self-supplying communities. Others just stayed in the empty and abandoned houses in small 19th century villages.

Once in awhile I get annoyed about the fact that I have no real privacy. No where I can go and not be registered. I know that, somewhere, everything I do, think and dream of is recorded. I just hope that nobody will use it against me.

All in all, it is a good life. Much better than the path we were on, where it became so clear that we could not continue with the same model of growth. We had all these terrible things happening: lifestyle diseases, climate change, the refugee crisis, environmental degradation, completely congested cities, water pollution, air pollution, social unrest and unemployment. We lost way too many people before we realised that we could do things differently.

We live in the mobile age. We can wake up in San Francisco, spend the afternoon in New York, and be back in the West Coast right on time for drinks. Whether we walk or ride around your hometown, drive to another city, or fly to another continent- our trusty bag is always with us. My idea is to make smart and secure bag which will answer not only practical features but also designed and tech.

Unfortunately bags haven't changed much over time, so they're a little outdated. That's why I want to design a bag to fit in any type of bag .

MARKET RESEARCH

MARKET RESEARCH

The word “new” is sometimes over-played in marketing because it is so frequently used for everything from conceptually new products through to old wine in new bottles. The main types of product development are as follows:

New concepts – completely new products that have arisen as a result of innovation and which can sometimes create new markets.

Additions to existing product lines – new products that supplement established product lines. For example, a supplier of industrial gases may introduce a new, smaller cylinder to include in an existing product line, aimed at serving customers who require smaller amounts of gas.

Modifications of existing products – existing products that are modified in order to better meet customer needs, such as improved performance.

90% of new product research is focused on product ‘additions’ and ‘modifications’ rather than on the concepts. There is nothing wrong with this. Product improvements are obvious developments and are much more easily accepted than conceptually new products.

In my case I worked on modifications of already existing products. Somehow I managed to merge several features from different products into one to make it unique, quality and able to answer to the task.



Market research should be regarded as an experiment which may fail if it is not conducted in the right conditions.

Innovations that require potential users to try something new (which is likely to involve a change in mental attitudes) are difficult to research, given that potential buyers or users – when asked in an interview or focus group – cannot be expected to imagine using a product and to then state how likely they would be to buy it, or to state how much they would pay for it, without sufficient time to fully consider the product, or possibly trial it in the environment in which the product would be used.

Nevertheless, market research can explore the underlying needs of the market and make a judgement as to how well a new product meets these needs. Hence it is the researcher, and not necessarily the potential buyer or user, who makes the connection between the unmet needs and the new product development opportunities.

Key questions that should be asked in any concept screening research include the following:

Is the purpose of the concept clear and can potential users be persuaded of the product's benefits? (This will show the clarity and purpose of the offering.)+

Does the product meet a need? What is the specific nature of potential users' requirements? (This will assess the demand for the product.)

How are existing products used, i.e. for how long, how frequently, precisely what for etc.? (This will show the behavior of people buying existing products.)

What challenges do people face in using existing products and what requirements are not being met? To what extent are users of current products satisfied with these products and their suppliers? (This will identify any gaps in the market.)

Is the price reasonable in light of the concept's perceived benefits? (This will show if people are prepared to pay an appropriate price for the new product.)

How likely are potential users to buy the product? (This will show purchase intent, i.e. how many people are likely to buy the new product – at least at face value as this will certainly be affected by the promotional push.)

New product research almost certainly will require a mixture of qualitative and quantitative research.

Qualitative research is necessary to obtain a deep understanding of issues such as requirements and unmet needs. It allows more freedom in exploration depending on respondents' areas of interest. The principal research tools of qualitative research are focus groups or depth interviews, which allow questioning and probing far below the skin of the subject.

Once the needs have been understood and it is clear that there is a market for a new product, some means is required of measuring the size of demand, usage habits, attitudes to products and the likelihood of up-take of the new product. Quantitative research now takes over and a relatively large number of structured interviews are required to provide a robust and statistically valid result. Such quantitative research studies tend to be conducted either by telephone or online.

Conclusion

Product development research is used at all stages of the product life cycle, from the conceptual stage through to maturity. It serves a host of purposes, such as establishing (unmet) needs, estimating likely demand, setting prices, shaping the specification of the product or determining optimal price points, to name but a few examples. What's more, market research can unleash potential opportunities for new products, as well as rejuvenate existing products, perhaps by incorporating new features or finding new markets. Given the costs involved in innovation, research and development, and commercialization, as well as the costs incurred in maintaining an aging weak product, product development research provides a high return on investment.

Finally, it is important to acknowledge that people's tastes change slowly; they gradually see and acknowledge the adoption of products by others; and over time they are influenced by regular exposure to promotions. An initial rejection of a new product in a market research study may shortly become an enthusiastic embrace as attitudes change. Hence market research cannot be expected to give definitive and direct answers to new product questions; rather it should be used to provide a backdrop of understanding to the needs and unmet needs of the market. It is the researcher's task to use these insights in order to assess the new product's potential. New product research needs more intuition and judgment from the researcher than any other tool in the market researcher's tool kit.



A company called Pishon Lab has launched a smart padlock that you can open with your fingerprint, in much the same way you unlock a smartphone. The TappLock comes in two flavors, a larger version that lasts three years and can charge up your phone, and the smaller TappLock Lite, with a six-month battery life. Thanks to iOS and Android apps, you can also unlock the device using your smartphone and store up to 100 fingerprints, letting friends use it too.

The concept of a biometric padlock isn't new. Another company called iFingerLock has a model that runs about \$100 on Amazon, for instance. There are also Bluetooth models like the Noke. Naturally, the biggest fear with any such device is that it will fail to open, leaving you on the outside looking in. However, the company said it uses the FPC 1020 sensor "typically used in high-end smartphones" like the Huawei Mate 7. The company also promises a quick unlock time of about 0.8 seconds. If the lock is cut, an alarm will go off, though the company admits that it has to be completely cut through and that the video representation (below) isn't accurate.



Qifang Dai and Ray Lei created the HiSmart bag to make life easier for commuters. It can transform from backpack to messenger bag, but either way, the marquee feature is its strap, which hosts the HiRemote. The silver disc features two Bluetooth chips that communicate with an app on your phone, even if it's buried deeply within your bag. The remote has a simple interface: 'plus' and 'minus' buttons control music volume and let you skip tracks. A triangle button answers or ignores calls. A circular button handles the extras, like dropping a pin (to remember where you parked, say), recording notes with a built-in mic, and taking pictures.

"This is the first true smart bag," Dai says. "A smart wearable is not limited to just watches or fitness trackers. It can be more than that."

There are plenty of practical perks to embedding technology into a bag. Dai notes that the HiSmart bag lets the wearer use both hands: "Some functions even smartwatches can't realize. When riding a bike, you can't answer a call and talk to the watch." If you have your bag, but not your phone, the bag acts as an automatic Find My iPhone-type of sleuth. The picture-taking functionality is especially clever: You set your phone down, back up, and just tap a button on the bag's remote. The strap could spare the world an untold number of selfie sticks.



It's a wonder several freestylers this luggage ever made it from Point A to Point B before the advent of Trunkster, a self-weighing suitcase with a built-in USB charging system and a location tracker that debuted in 2015. From major technological upgrades (automatic cellphone reception wherever in the world you are, a super-sleek external hard drive that is only 7mm thin) to convenient accessories you never even knew you wanted (taco-inspired cord organizers, an eyemask filled with soothing lavender) the best travel products of 2015 promise to simplify and improve your travels, whether you're constantly on the road for business or a person who lives for their annual family vacation.

There's something for everyone on this list—gift ideas abound, and there are plenty of ways to spoil yourself, too. Hyper-organized individual will find solace in an incredibly efficient wallet with separate pockets and slots for your passport and boarding pass, as well as business cards, credit cards, and cash. Pampered passengers and fashionistas can now pack fold-flat kicks with interchangeable soles and tops, carry-on size Jack Black grooming products, and a scarf-blanket combo by Club Monaco perfect for getting cozy on chilly flights.



The suitcase includes a GPS tracker, so that you can keep a track of where your luggage is. Perhaps, Bluesmart bag is not the first to integrate GPS, but what sets this apart from the other tech-embedded bags is that this connects to a mobile app and lets you keep track of your bag. Further, it allow the Bluesmart to be locked and unlocked digitally and let users have information of track routes and travel data.

Interestingly, the connected carry-on has a built-in battery, which provides enough power to juice up six mobile devices on the go. The suitcase also has a scale built-in, which tells you how much weight you're carrying just by lifting the bag off the ground. The creators have a functional prototype of the Bluesmart suit case ready and they expect to ship the first smart bag by mid-2015.



Andrew Lentz has designed a new smart bag guardian called Serenity that can connect to your smartphone and provide you with notifications when your back is open, being left behind or even his last known position.

Serenity has been designed to automatically grant owner recognition and deters others from opening or moving your bag when it is unattended. Watch the video below to learn more about the inspiration, design and functionality of Serenity. Its creator Lentz explains more about the design of Serenity :

We've all had the choice: Do I lock my things up or, am I willing to be chained to them with a nervous paranoia? Our bags exist to bring along the stuff we want to use, yet keeping a constant eye on them is stressful. And let's be honest, we humans make poor watchdogs. With Serenity, your bag will enjoy better than human protection, and you, can focus on the better things in life. Oh, and you won't be forgetting your bag anymore either.

Instead of trying to find your bag AFTER it is lost, Serenity enables your bag to automatically recognize its owners, and deters others from moving or opening it. Serenity also notifies your smartphone or wearable if you are about to leave your bag behind. But having to turn something on and off all the time would also be inconvenient, so we made it automatic. Keeping The Proverbial 'Eye-Out', So You Don't Have To.

LOCKING SYSTEM

LOCKING SYSTEM

Locking system is core system of the Bag.

Personalized way to open and close the Bag provides full awareness about personal belongings anytime anywhere.

Its made of:

- Fingerprint sensor
- Electromagnet
- Battery
- Arduino boards
- Supporting App



FINGERPRINT SENSOR

FINGERPRINT SENSOR



Fingerprint technology is one of the most popular biometric modality to verify the identity of individuals. Fingerprints were first used in China in 700 AD and no two fingerprints have been found to be identical so far. Fingerprints are unique to even identical twins which make fingerprint biometrics a highly accurate and reliable identity verification method. Fingerprint matching compares the unique features such as the characteristics of ridges or minutia patterns that are found within the print pattern.

The fingerprint sensing process typically consists of capturing the fingerprint image, extracting the distinguishing features of the fingerprint, and then storing a digital template of the fingerprint or comparing the current image with the stored fingerprint templates.

What is a fingerprint reader?

An electronic device that records a digital image of the fingerprint pattern is known as a fingerprint reader. The captured image is known as a live scan which is then digitally processed. The distinguishing features are extracted and a fingerprint biometric template is created. This biometric template is stored and will be used for matching later.

How Fingerprint Scanner Works?

A fingerprint scanner has many advantages over traditional identification mechanisms and provides businesses with a higher level of security. Organizations experience various benefits by incorporating a fingerprint reader such as reliable background checking of employees, secured access to facilities and assets and protection of confidential data. There are many types of fingerprint sensor technologies. We will be discussing the following three types of sensors namely optical fingerprint, capacitive based fingerprint and multispectral imaging.

What are optical scanners and how they work?

Optical scanners are the common types of fingerprint scanners that use an LED light to illuminate the finger. The sensor detects and creates the fingerprint image by determining the light and dark areas created by the fingerprint ridges. The scanning process starts when the individual places his finger on the glass plate that is known as a touch surface.

Optical sensors mostly use two types of detectors – charge-coupled-devices (CCD) and CMOS based optical imagers. The CCD detectors are very sensitive to low light levels and are thus able to make excellent grayscale pictures. An inverted image of the finger is generated where the darker areas represent more reflected light and the lighter areas represent less reflected light. The darker areas are actually ridges of the finger and the lighter areas are the valleys between the ridges.

Prior to comparing the individual's fingerprint with the stored template, the scanner processor ensures that a clear image has been captured by the CCD. It checks for various attributes such as the average pixel darkness or the overall values in a sample. The scan will be rejected by the processor if the overall image is too dark or too light. In such a case, the exposure time is adjusted by the scanner to allow more or less light and will try to scan the fingerprint again. When the darkness level is adequate, the scanner will check the image definition to determine the sharpness of the fingerprint scan. The scanner processor looks for many horizontal and vertical straight lines moving across the image. A line that runs perpendicular to the ridges and made up of sections that alternate between very dark and very light pixels implies that the fingerprint image has a good definition. The scanner processor proceeds to compare the captured fingerprint with the stored template if it finds that the captured image is crisp and properly exposed.

Charge coupled devices are however relatively expensive to fabricate and moreover fingerprint recognition does not require low-light sensitivity or grayscale imaging. On the other hand, CMOS based optical imagers can be manufactured at a lower cost. The CMOS imagers are manufactured in quantity and some of the image processing steps are built into the chip which attributes to its lower cost.

Here is our list of some popular optical scanners available in the market:

Factors that affect the image quality in optical sensors

The quality of fingerprint image captured by optical sensors may get affected by many real world factors. These factors may include stray light from another source or surface contamination such as fingerprint impression left behind by a previous user. Other factors that affect image quality are oil, dirt, condensation or ice and any scratches on the surface.

Compared to other scanner types, it is relatively easy to deceive optical scanners with impostor fingerprints by presenting a convincing picture of a fingerprint. Optical scanner manufacturers have thus introduced a variety of techniques that can validate a live finger. One such technique is electro-optical imaging that enhances optical sensors and improves its resistance to deception. In electro-optical imaging, a voltage is placed across a light-emitting polymer film. When the individual places his finger on the sensor, the fingerprint ridges present a ground to the polymer surface that creates a small current and generates light. This produces a high contrast image as the valleys of the fingerprint remain dark and the polymer is directly linked with the optical detector.

What are capacitive based fingerprint scanners and how they work?

Capacitive scanning is another common way of capturing fingerprint images that utilizes electrical current to sense the image instead of light. The capacitive scanning process uses an array of capacitor plates to capture the image of fingerprint. Similar to optical scanners, this process too generates an image of the ridges and valleys that compose fingerprints. Human skin is conductive enough and is able to provide capacitive coupling in combination with an individual capacitive element on the array. The physical ridges of the fingerprint are closer to the capacitor plates and have a higher capacitance whereas the valleys of the fingerprint i.e. the subdermal layer have a lower capacitance. A small voltage can be applied by some capacitive sensors to enhance the signal that results in an image with better contrast. The capacitive sensor is able to measure the smallest differences in conductivity that are caused by the presence of ridges.

An electrostatic discharge such as shock can interfere with this type of scanner but it is not affected by ambient lighting. Moreover, capacitive based fingerprint scanners can resist contamination issues better than some optical scanners. It is also quite difficult to fool this scanner using a high-quality fin-

gerprint photograph rather than an actual finger. But capacitive scanners can be deceived by using the mould of an individual's fingertip.

A comparison of optical and capacitive based fingerprint readers

The sensor type is optical in an optical scanner as the name suggests. In optical scanners, the sensor surface does not require any special treatment or maintenance. Optical sensors are very durable in nature. They are scratch-resistant and the glass plate is made of an unbreakable material that is as hard as quartz. Optical scanners are also resistant to shock, extreme weather and ESD. They are designed to perform well in high traffic as well as rough or outdoor environments. It has a large imaging area that results in a larger as well as a higher resolution image. The manufacturing cost is lower in optical scanners. It also has a long life and almost zero maintenance.

A capacitive scanner has a semiconductor or chip type of sensor. The coatings on the surface of capacitive scanners are uneven and wear out over time. This results in a degraded performance and also shortens the lifetime of the product. Capacitive sensors usually need some kind of a surface treatment such as ESD and other protective coatings. These sensors are not as durable as optical sensors and can be damaged by electrostatic discharge. Repeated handling and everyday exposure can corrode the surface easily. Moreover, silicon chips are thin and inherently fragile and prone to be damaged by hard external impact and scratches. A capacitive scanner usually has a smaller imaging area as compared to an optical scanner which results in a smaller image size with lower resolution. It is expensive to produce surface coatings of consistent quality. There can also be other expenses such as replacement, downtime and maintenance costs.

Vulnerability of optical and capacitive scanners to fingerprint sensor attacks

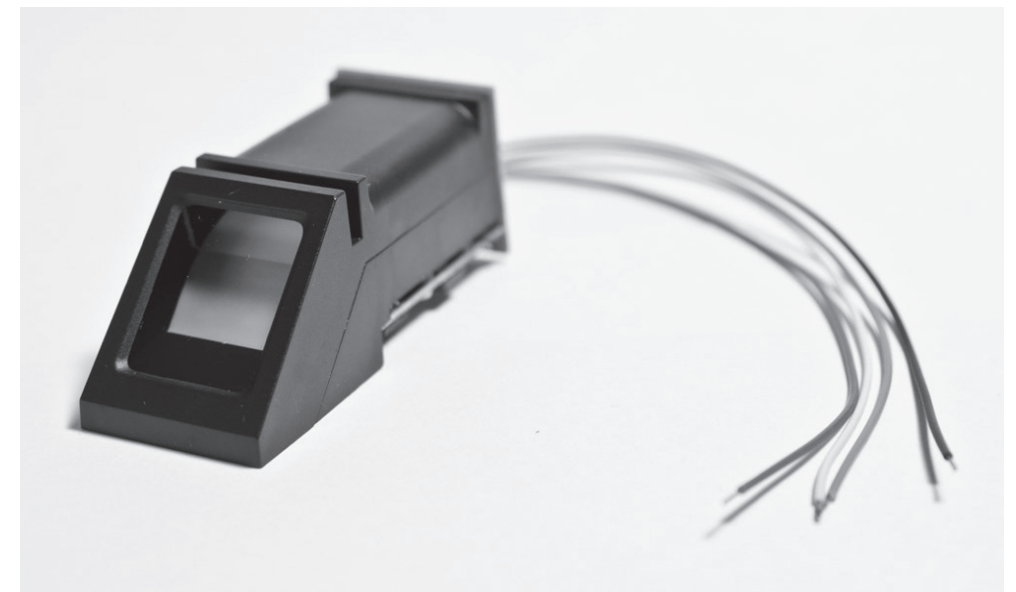
Optical sensors can be fooled by latent prints i.e. the print left behind when a real finger touches the sensor plate. Latent prints are usually produced by sweat, skin debris or other sebaceous excretions that cover up the palmar surface of the fingertips. If a latent print is on the glass platen of the optical sensor and light is directed on it, this print can fool the optical scanner. This happens because the light that is directed on the latent print gets optically scattered and the sensor detects it as a fingerprint image.

Capacitive sensors can be spoofed by using gelatine based soft artificial fingers. This material can mimic the physical characteristics of the skin and hence are able to deceive capacitive sensors.

What is multispectral imaging sensor and how they work?

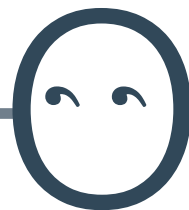
Multispectral imaging is an optical sensor that has been introduced to reduce the vulnerability of fingerprint sensors to spoof attacks. The speciality of multispectral sensors is that it can capture the features of the tissue that lie below the skin surface as well as the usual features on the finger surface. The features under the skin surface are able to provide a second representation of the pattern on the fingerprint surface. This enables the MSI sensor to collect good quality fingerprint images under a variety of conditions.

In cases where the surface features are worn out or the sampling conditions are adverse, the MSI sensor is still able to capture a fingerprint image. The MSI sensor is strongly able to distinguish between a live finger and other soft materials. The tissue features under the skin surface provide a great amount of information to the MSI sensor about the material that is being imaged and thus makes it less vulnerable to fingerprint sensor attacks.



ELECTROMAGNET

ELECTROMAGNET



While was trying to make technical system for opening the bag with fingerprint sensors was trying to understand several possible solutions and to make it as simple as possible.

First idea was to be able to lock mechanically and to unlock it electrically. For that I needed small motor which will communicate with sensor and batteries to do mentioned thing. Than was trying to reduce motor and came to an idea of electromagnet. Electromagnet should satisfy the purpose of not be able without code to open a bag and in the same time is simple technology with low energy consumption. It seemed as an interesting solution where some questions appeared to be solved. For this demands I contacted my colleague who is Electrical engineer Milos Nedeljkovic in one short interview and results mentioning down.

There was a need to make a small Electromagnet, that uses minimum power (by that is ment the battery), but still has to be very powerful.

An electromagnet is a kind of magnet whose magnetic field is created by the flow of electric current. The magnetic field disappears when the current stops. Electromagnets offer the advantages of controlled holding power and on command release. Through the application of controlled DC electrical current, an electromagnet has the ability to attract and hold ferrous materials with varying degrees of force, and to release the item as required.

Does the number of coils that is wound to the metal bar effect the strenght of the electromagnet?

Yes.The higher the number of windings the more“resistance” there will be within the coil. You actually want this.This will slow down the drain on the battery while allowing the magnet to remain strong: more electrically eco. (It may cost more in the short term).

Does the wire gauge (20,24,28,30,34,36 wire gauge) make a difference in the strength of the magnet?

Yes. (Electric economy again). This can be understood better with the idea of filling a pipe to a certain water pressure (voltage = water pressure). The wider your pipe, the more water it will take to fill it. This matters more if you are turning the power on and off, but still makes a difference while on due to the impact of the current (same as water current). Putting a resistor will also help to slow down the amp impact.

Does the voltage I supply to the coil affect the Electromagnet?

Yes. Voltage is the electrical equal of water pressure. The more pressure = the more power. The whole idea is to get very high voltage with very low amps.

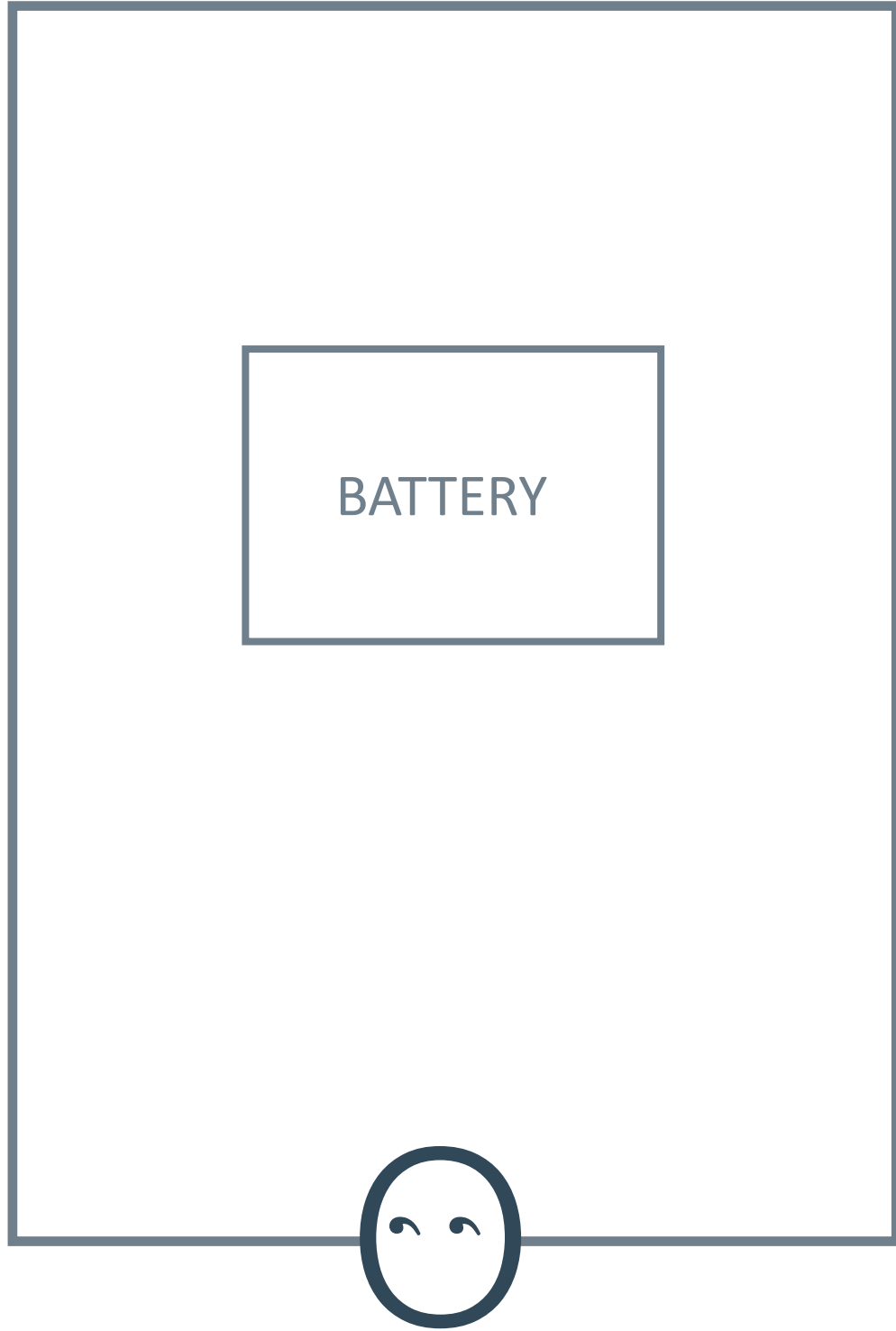
What type of battery is best for an Electromagnet (AA, AAA, C, D), and what voltage (1.5V, 3V, 4.5V, 6V, 9V) ?

Depends. Personally, I'd use rechargeable 9V batteries because they can be easily linked together. They also cost less in the long run, but bite in price at the start. Another tip for making it stronger is to use small wire and rap it in a single direction. By this I mean that you make a primary direction of your wire. You rap it going in one direction (left to right, for example), then when you reach the end, you bring it all the way back and continue the next level till done. (This is patented by the way, so don't try manufacturing this idea, but there shouldn't be any problem for what you seem to want).

An added benefit to this method is it allows you to make (using DC current) an electro magnet which can repel a permanent one. I did this with a McDonald's straw as the air coil center. When I took a group of those tiny strong magnets you can buy at Radio Shack and placed them in a tall group they would jump out of the small straw when I connected my 9Vs in series into it. Series = more volts; parallel = more amps.

For this to work the tower of magnets has to be higher than the coil of wire for some reason. I never tried to make two electros repel each other... yet. Finally electromagnet is designed this way.





BATTERY

Electromagnets require direct current power in order to generate a magnetic field. Typically the applied voltage is Direct Current (DC), but in some cases, Alternating Current (AC) can be used. Variable power sources and remote control are available. Smaller magnets can operate on 12 volts DC; larger magnets may require 115 or 220 VDC. A rectifier is required to release the electromagnet from the surface on which it is applied. The rectifier can be mounted on the magnet, and be operated by remote control.

Whether used in manual or automated handling of ferrous parts, they must release the work as readily as they attract and hold. Release is a function of the rectifier and not the magnet. Most rectifiers incorporate a provision for reverse current that ensures positive release of even those alloy steels which are magnetically retentive. Variable power and remote control are available.





Chapter 3- Product development

PRODUCT CRITERIA AND GOALS

PRODUCT CRITERIA AND GOALS

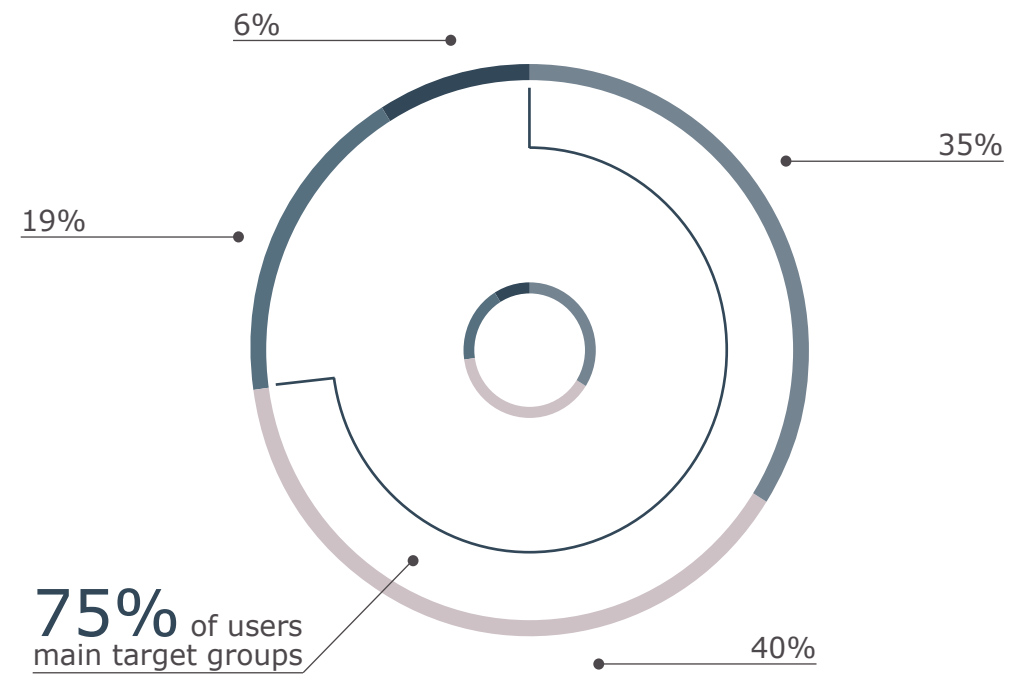
The plan was to design a bag consisting of fingerprint sensor, closing system and cut resistant material components which will provide security to increase user efficiency, joy and freedom. A system with varying levels of ergonomics, load bearing capability, electronics protection, capacity and weight which can accommodate people who need a rugged pack to haul a days worth of gear but that also has enough sensitivity to cradle fragile electronics and organize small objects. I wanted to create a durable product intended to last an everyday user a lifetime or more. This bag needed to be cutresistent because I rely on it to protect from pickpockets and threft in a variety of environments and situations. It needed to be padded to protect electronics and other fragile items from shocks. The ultimate goal is to design a bag system that is profitable and marketable because it delivers benefits through consumer alreedy defined lifestyle and habits what means is suitable to be fitted in any tipe of the bag. The last criteria was that I design a fully functional prototype product that I could make myself and use seriously.



QUESTIONARY & INTERVIEWS

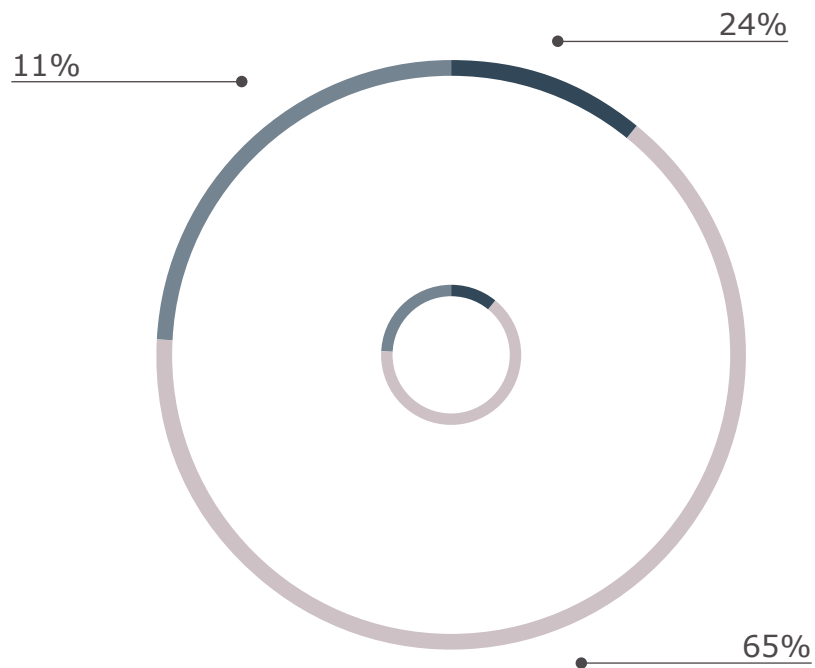


QUESTIONARY AND INTERVIEWS



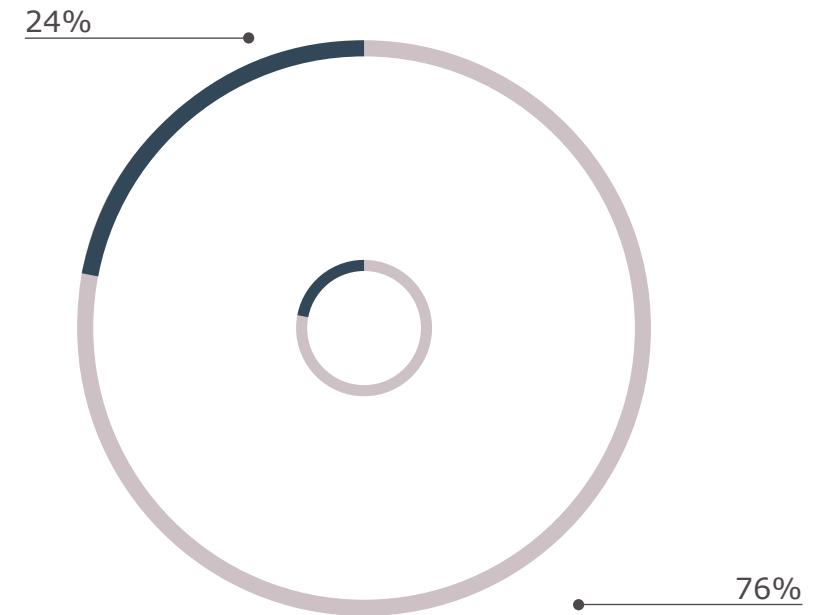
QUESTION: How old are you?

20-30 year old 35%
30-40 year old 40%
40-50 year old 19%
50+ year old 6%

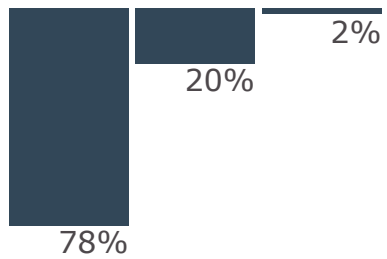
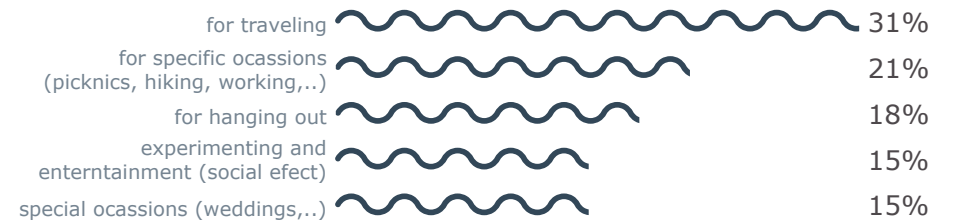
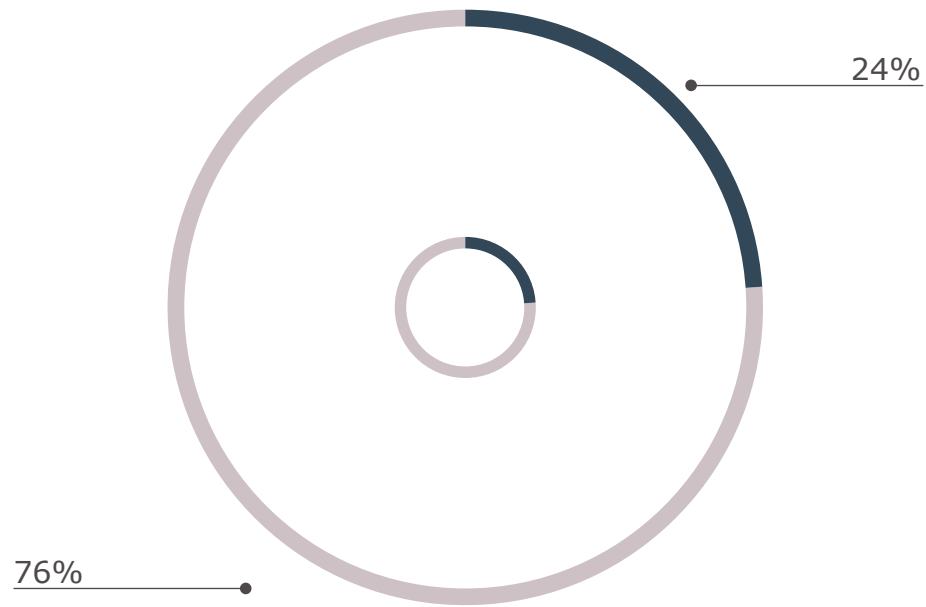


QUESTION: How important for you is weight of a purse?

very important and crucial 11%
 important but not crucial 65%
 if everything else is great, weight can be sacrificed 24%



QUESTION: Will you feel more secure / safe knowing that no one except you can use your bag?
 yes 76%
 no 24%

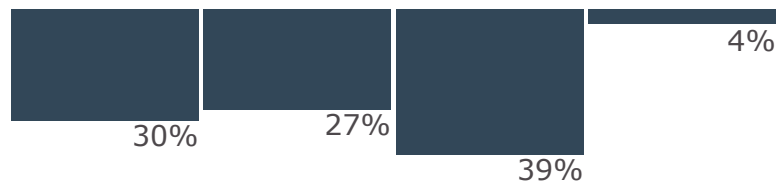
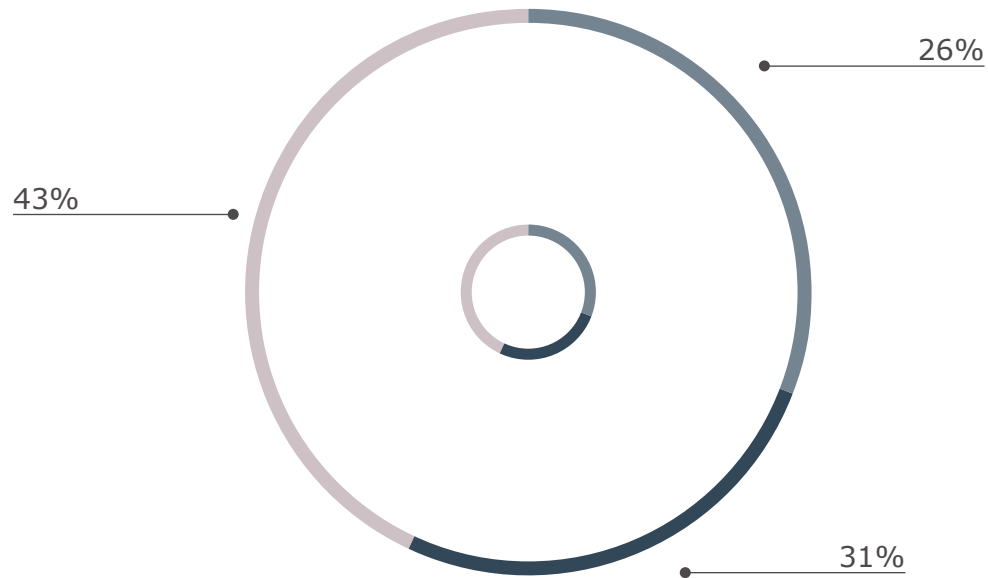


QUESTION: If because of safety reasons exist "bagsharing" (as for example car sharing) for which reasons it can be useful for you?

for travelling 31%
 for specific occasions (picknics, hiking, working,..) 21%
 for hanging out 18%
 experimenting and entertainment (social effect) 15%
 special occasions (weddings,..) 15%

QUESTION: Do you share your bag with someone (mother/sister/friend/cousine)?
 yes 24%
 no 76%

If yes with how many people?
 1 78%
 2-3 20%
 more than 3 2%

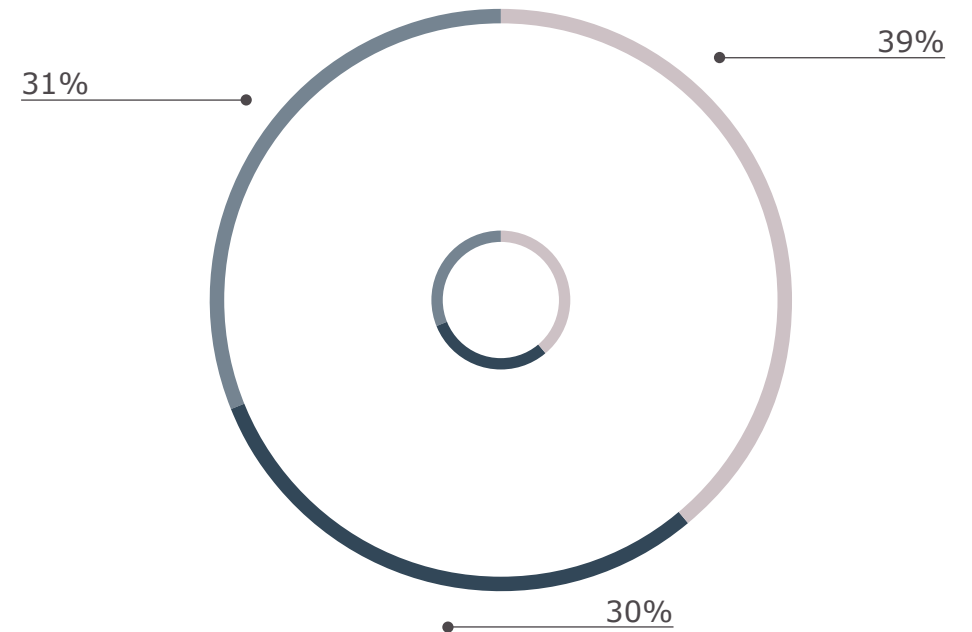


QUESTION: Will you pay extra for a purse which has antitraft system and tracking system?

yes if it is not much more expensive 31%
 yes if it is not complicated for usage 26%
 no 43%

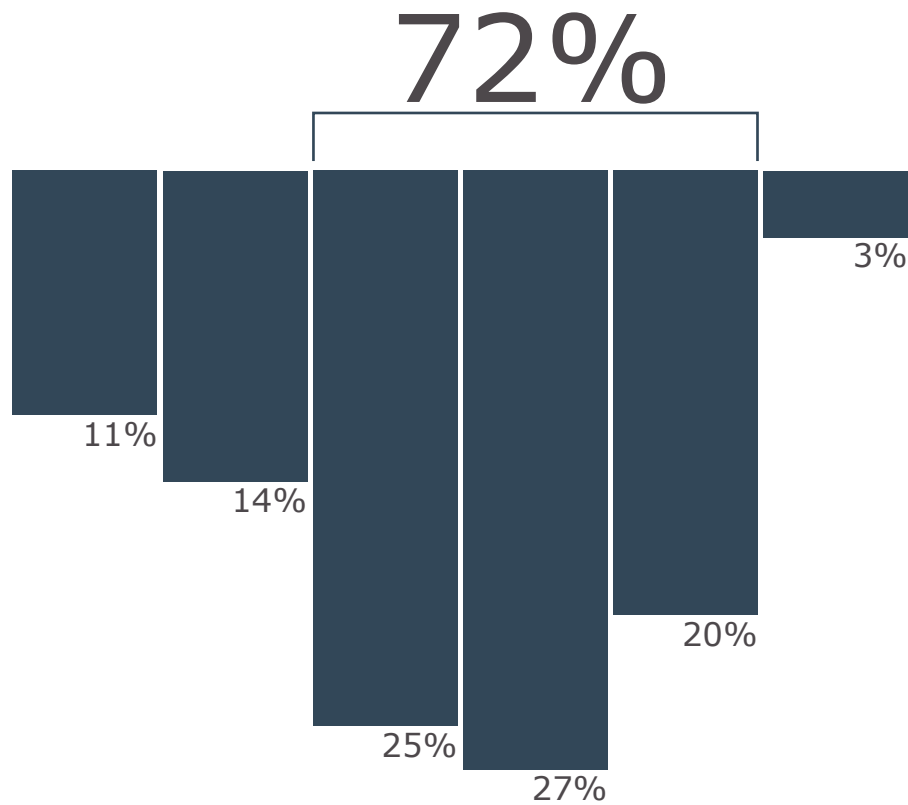
If yes how much extra you will be willing to pay for security/entertainment system?

up to 20 euro 30%
 up to 50 euro 27%
 up to 100 euro 39%
 more than 100 euro 4%



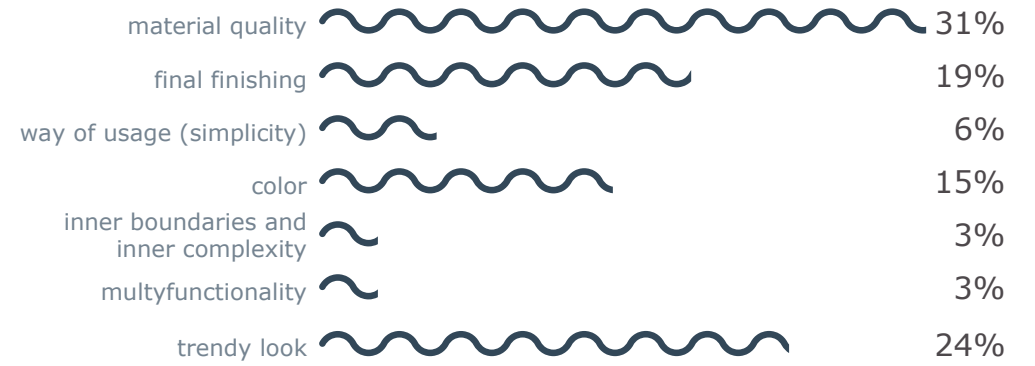
QUESTION: Which of this purses you will afford to yourself that you don't have money limitations?

classic, multifunctional bag with high quality materials and finishing 39%
 personalized, unique bag with elements for entertainment 30%
 purse of recognizable high brand with last trend design 31%

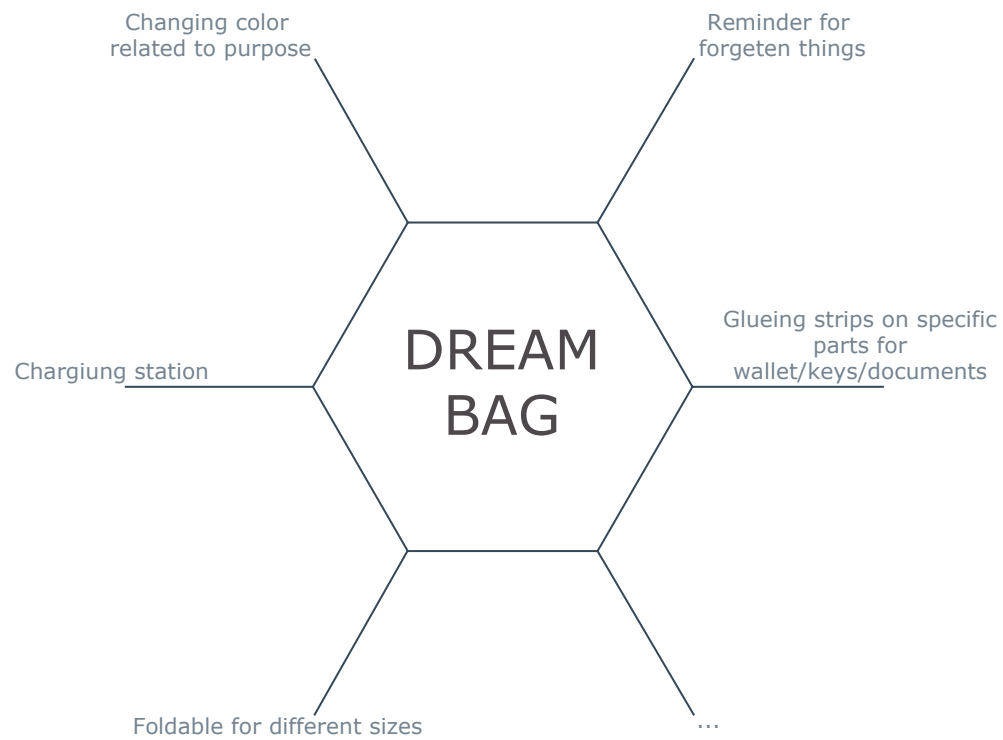


QUESTION: Which of this bag's features you will sacrifice for safety and security?

weight 11%
 complexity of usage 14%
 visual effect (beauty) 25%
 model 27%
 ergonomony (shape, comfort) 20%
 size 3%



QUESTION: Which of this bags features are particularly important for you?



QUESTION: Mention some of feauteres about which you dream your bag to have it

Reminder for forgotten things
 Changing color related to purpose
 Charging station
 Foldable for different sizes
 Gloving strips on specific parts for wallet/keys/documents

QUESTIONARY AND INTERVIEWS

QUESTIONARY & INTERVIEWS



name: Mihailo
surname: Anusic
age: 36
profesion: designer
company name: MihanoMomosa
position: CEO
date of questionary: 05/01/2017

"Idea is something what cannot be stolen. The way You imagine something and the way how You dream about it is unique, no one cannot feel it the same way to make it and put a passion in. Ideas should be spreaded"

"Bag nowadays is much much more than it was 50 years ago. Nowadays with bag, its possible to express everything"



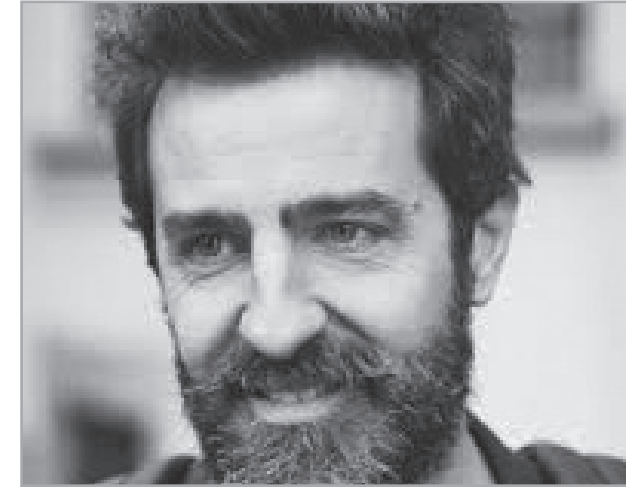


name: Ivana
surname: Damjanovic
age: 33
profession: designer
company name: Koishi Lamat
position: founder
date of questionnaire: 03/01/2017

"I started with a wish, curiosity and being brave. With this 3 attitudes everyone can do anything"

"Bags are like everything today: instant and catchy"

"I didn't like this phrase Being different, but now I almost do. Making bags taught me how important for success is being different. That difference sometimes can be just that - different "



name: Massimo
surname: Temporelli
age: 42
profession: inovator
company name: Piquadro
position: interaction designer
date of questionnaire: 22/12/2016

"Personaly I believe that is good leaving things not fully finished. Not being finished gives alternatives for different usage and new ideas"

"Its all about people, people are inspirative and people are consumers"

"Trend is not to own things. Trend are services. In a futurte we will rent everything, even nice plates for Christmas dinners. For sure. Cannot wait."

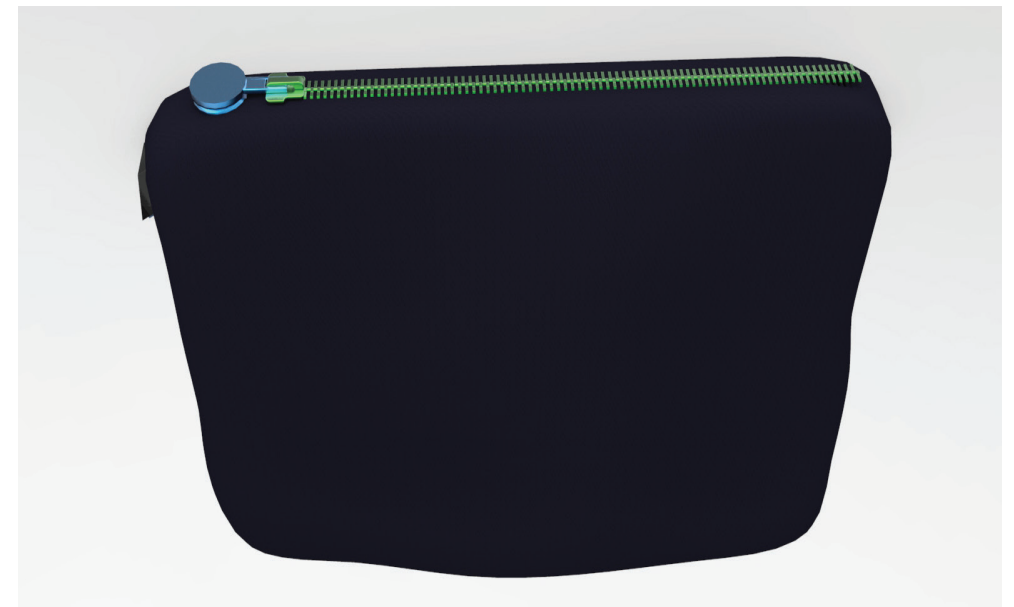
FINAL DESIGN AND PROTOTYPE

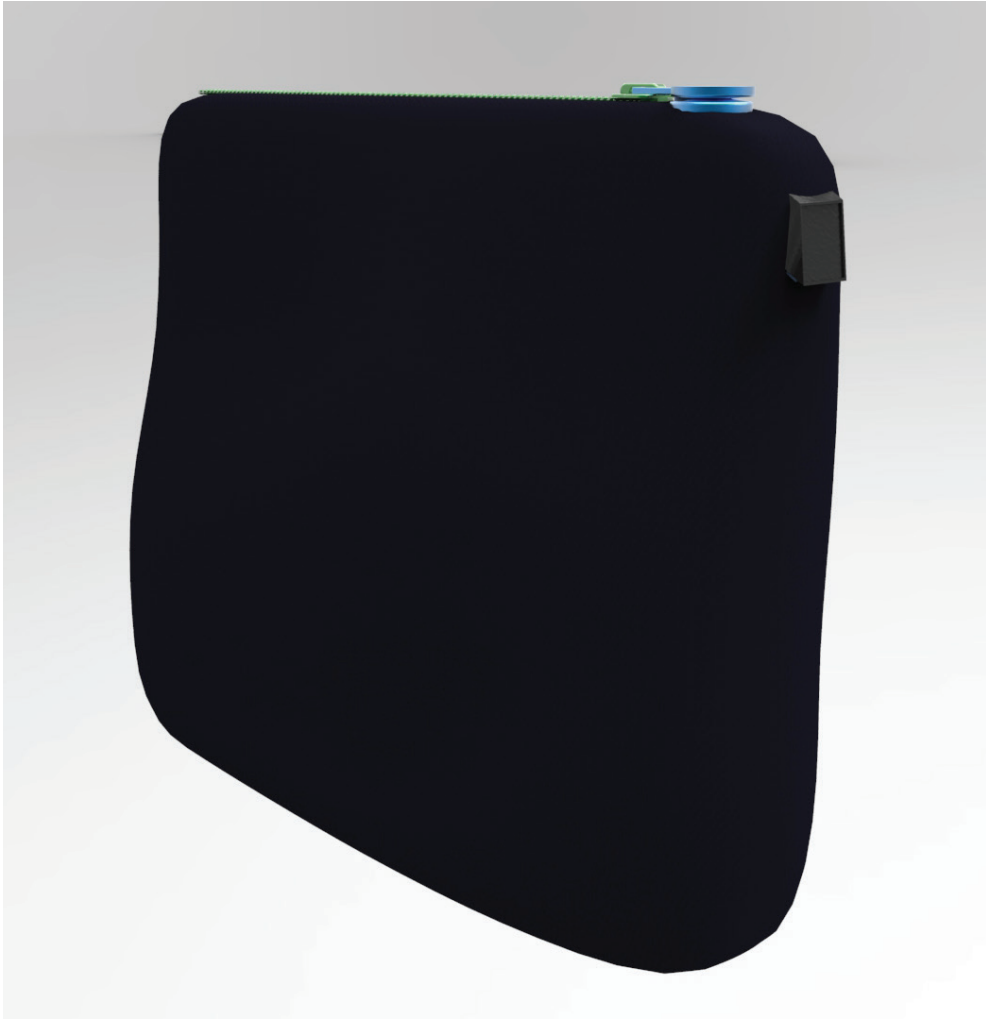


FINAL DESIGN AND PROTOTYPE

Few products are developed by a single individual working alone. It is unlikely that one individual will have the necessary skills in marketing, industrial design, mechanical and electronic engineering, manufacturing processes and materials, tool-making, packaging design, graphic art, and project management, just to name the primary areas of expertise. Development is normally done by a project team, and the team leader draws on talent in a variety of disciplines, often from both outside and inside the company. As a general rule, the cost of a development effort is a factor of the number of people involved and the time required to nurture the initial concept into a fully-refined product. Rarely can a production-ready product be developed in less than one year, and some projects can take three to five years to complete.

Guided by this reference I strongly believe that in a future, with a team of colleagues we will manage to develop product for production and believe that this thesis is a good starting point.





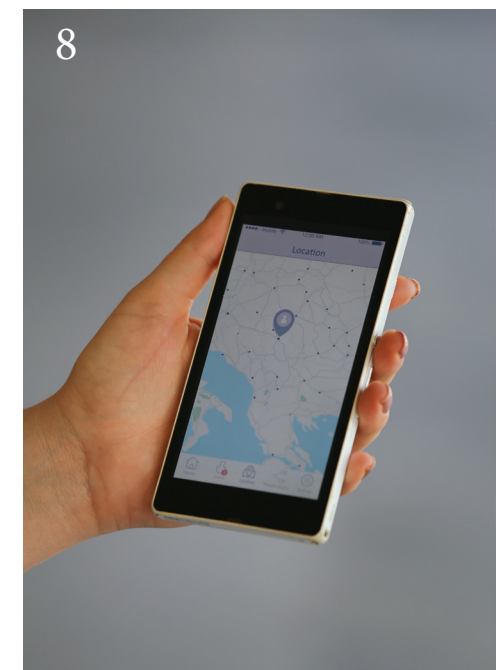
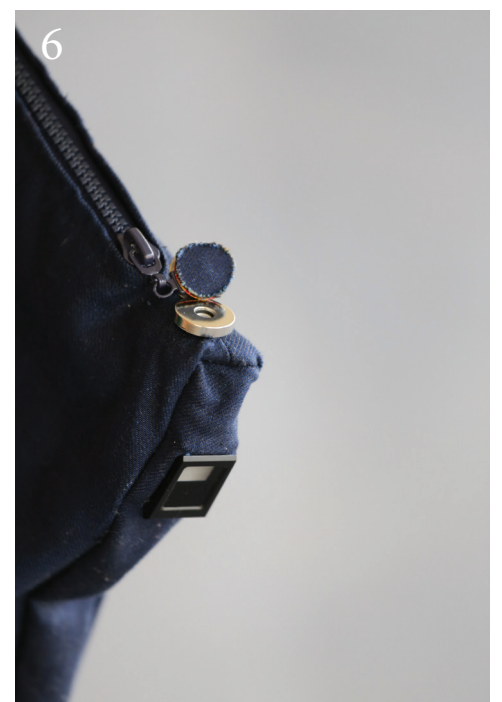
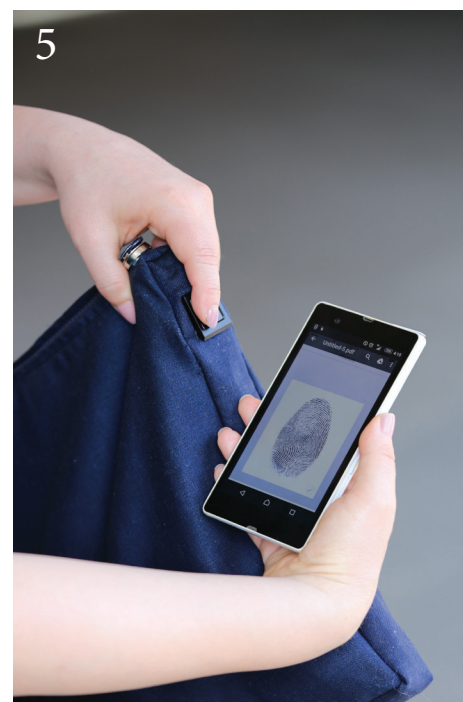
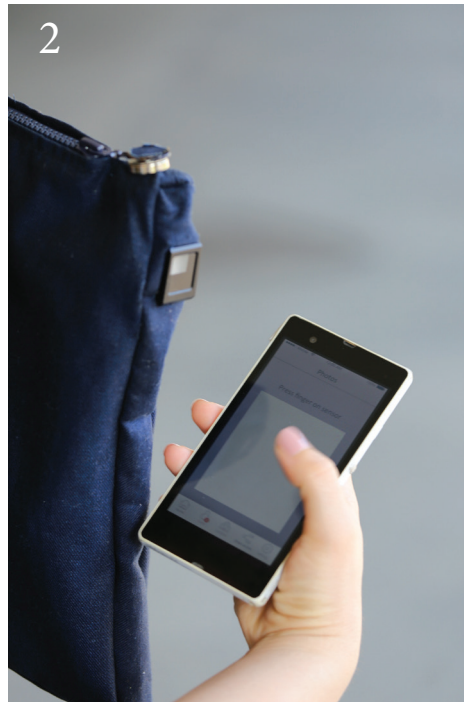
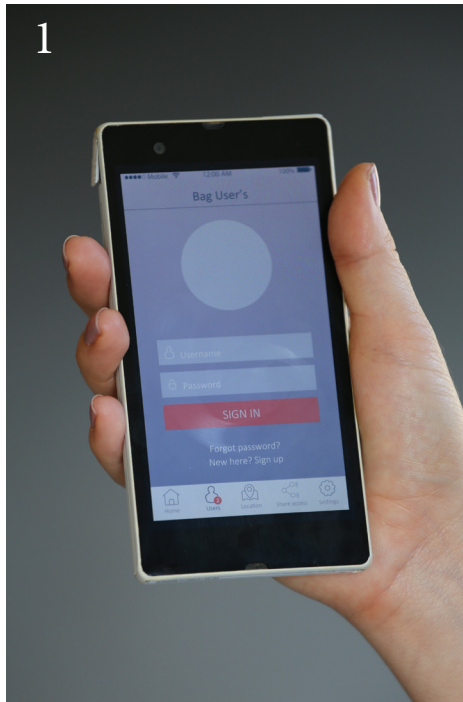
As a core feature of the product to keep safe personal belongings is individual.



USER EXPERIENCE

USER EXPERIENCE





1. Usage of the bag starts with downloading the app. In the application we have settings to set our bag by our own fingerprint and make it only for own usage.
2. App tells us to put finger to the sensor
3. By doing it we are personalising bag and sensor to react only to our
4. finger print
5. Proper connection of the app and sensor as well as scan of our fingerprint will appear in the app screen.
- 6.
7. Bag is unlocked and ready for usage.
8. In a case that Bag is stolen, via inserted GPS sensor it is possible to track the Bag from any device available to connect to the internet Cloud.

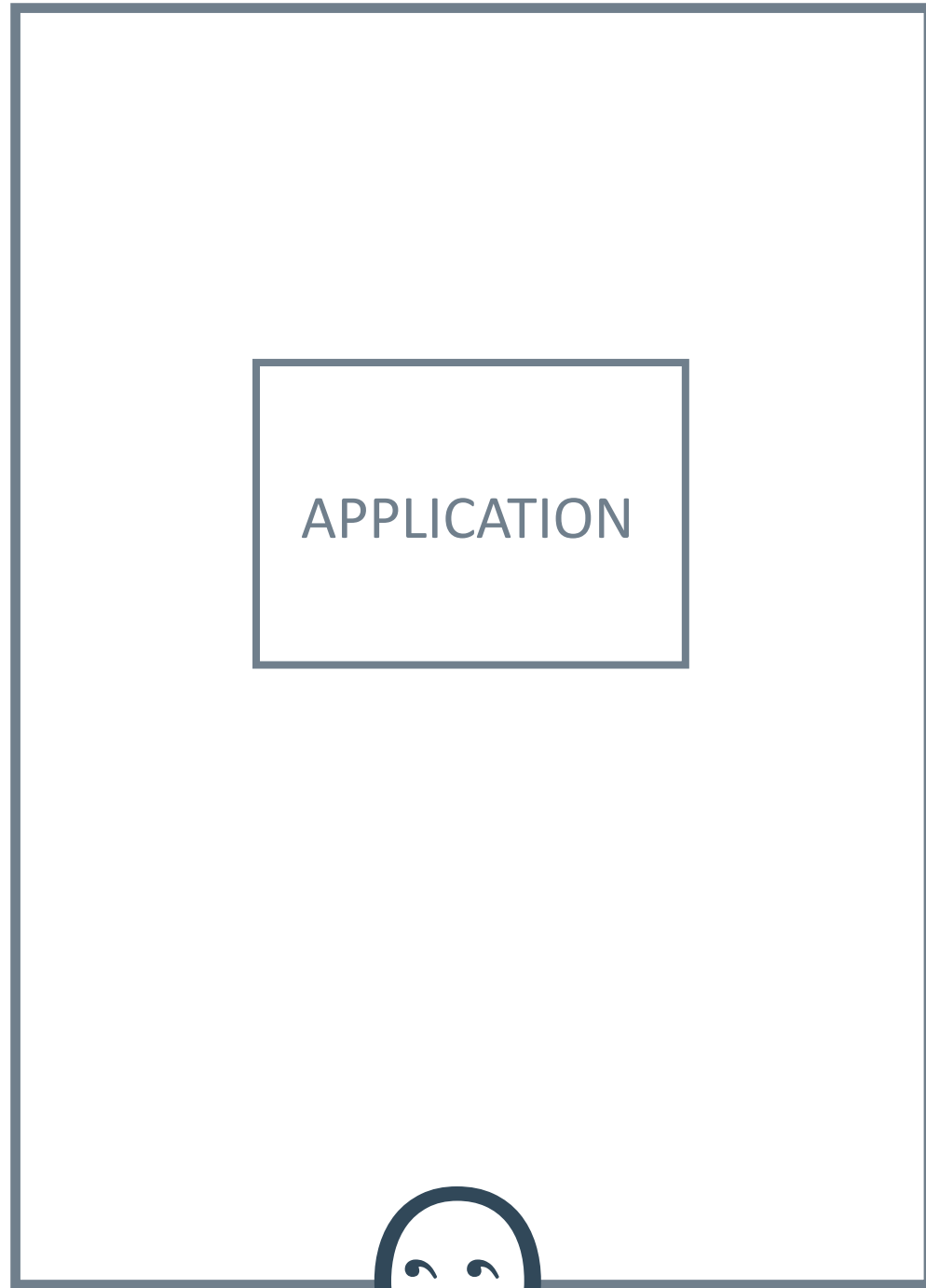
Additional characteristics

Its possible sharing Bag access with anyone for defined period of time which can be personally realized.

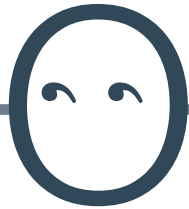
Bag cannot be cutted or burned.



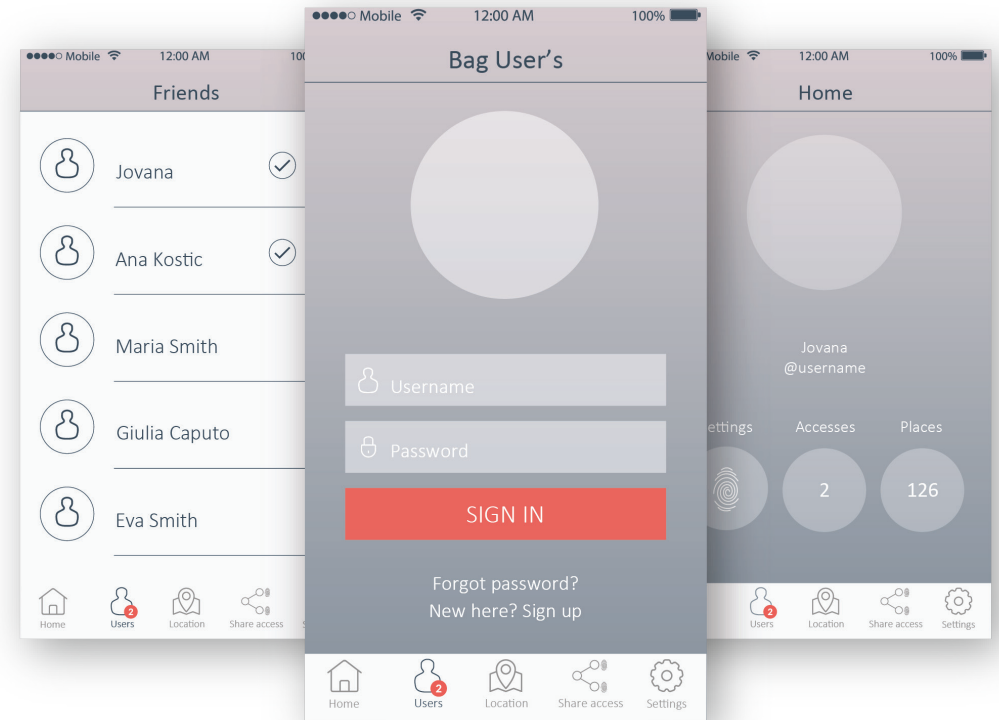


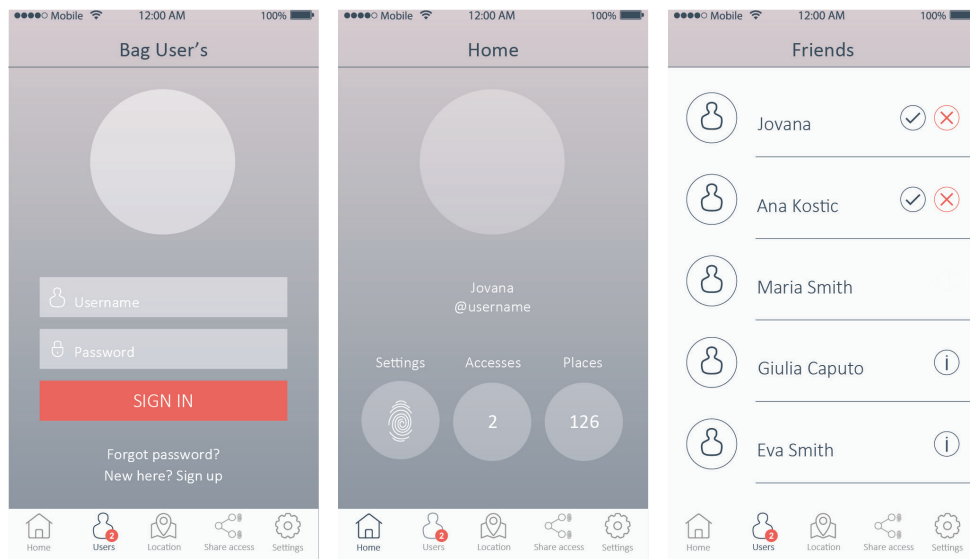


APPLICATION



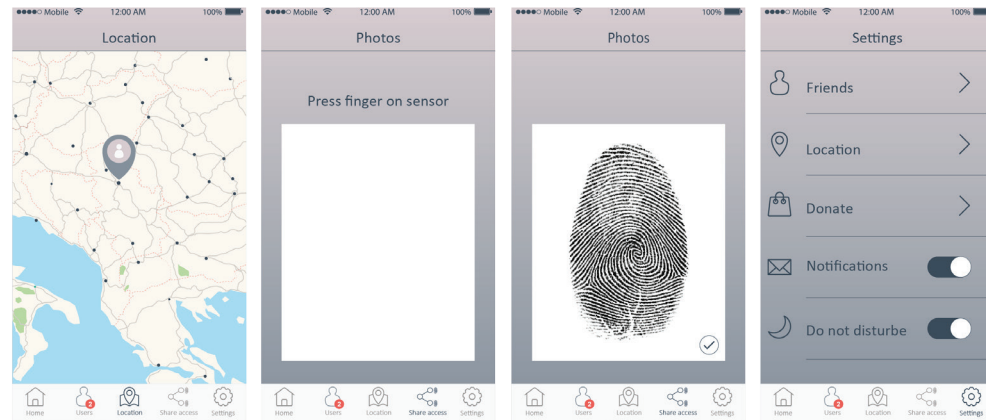
APPLICATION





Application is particularly used for setting the product in the first moment when Bag is started to be used.

Later on it has a purpose to manage Bag's features as sharing access or tracking.

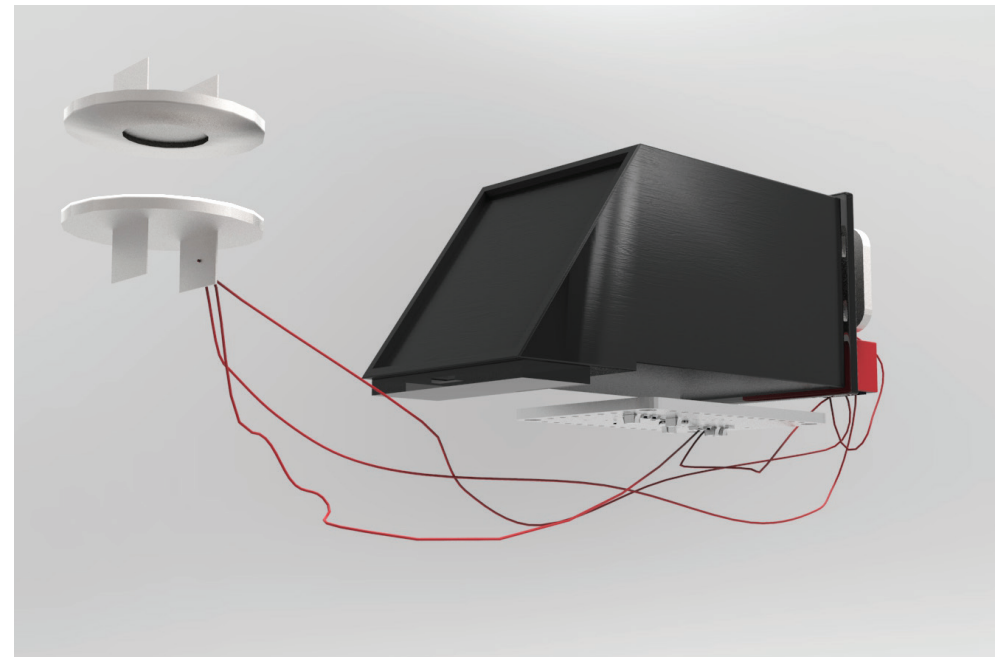


TECHNICAL SOLUTION



TECHNICAL SOLUTION OF FINAL DESIGN

Beside finding safe, secure and durable material for the bag, challenge was focused on mechanism which will provide safety and security. That mechanism is assembled of fingerprint sensor, electromagnet, GPS sensor and battery, all communicated by arduino motherboard.



gps sensor

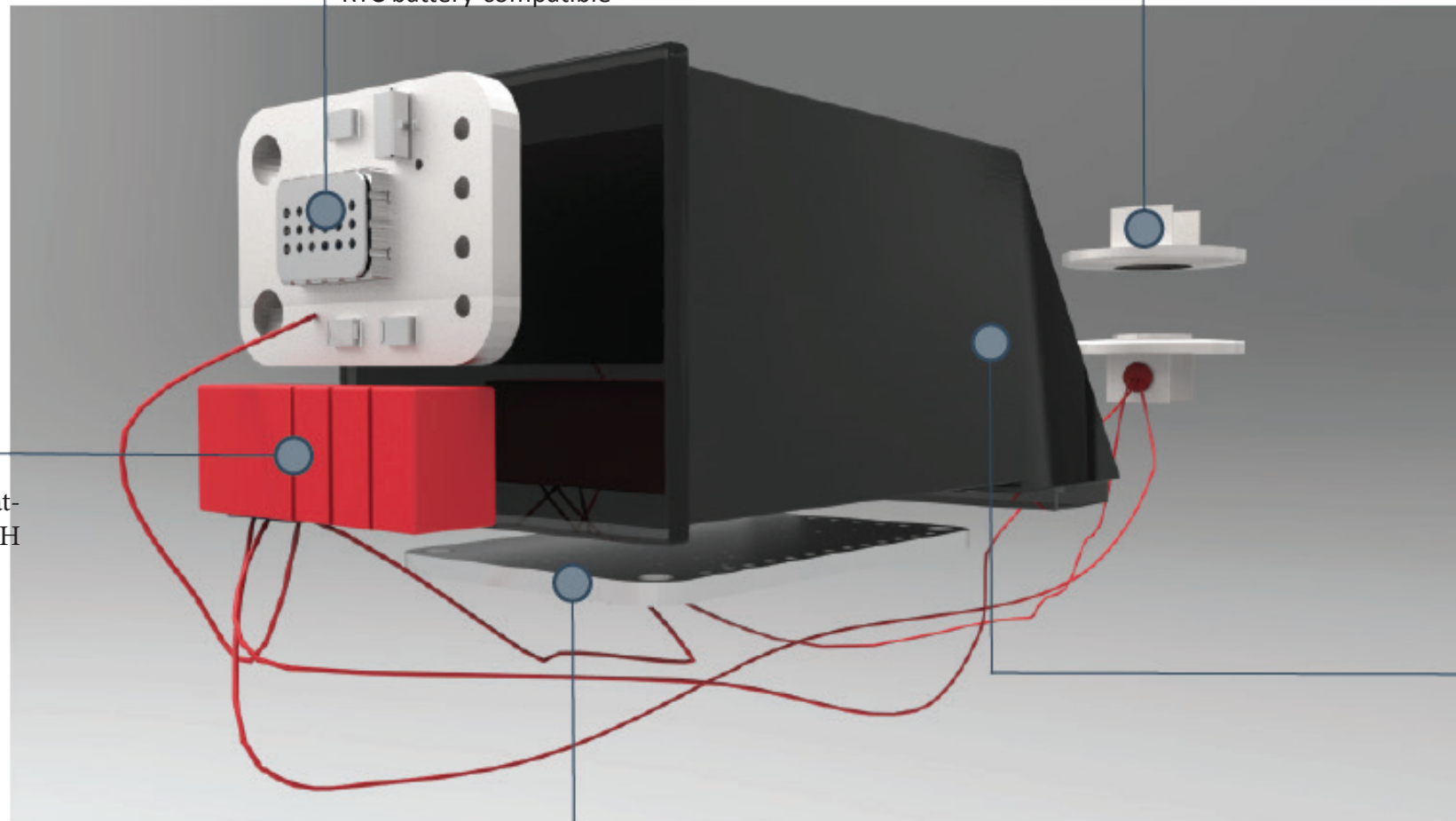
-165 dBm sensitivity, 10 Hz updates, 66 channels 12V friendly design and only -20mA current draw Breadboard friendly + two mounting holes
-RTC battery-compatible

electromagnet

12 VDC is standard voltage

battery

12V
1400mAh NiMH Battery 10 x 2/3A NiMH 1400mAh cells
16 AWG Wires



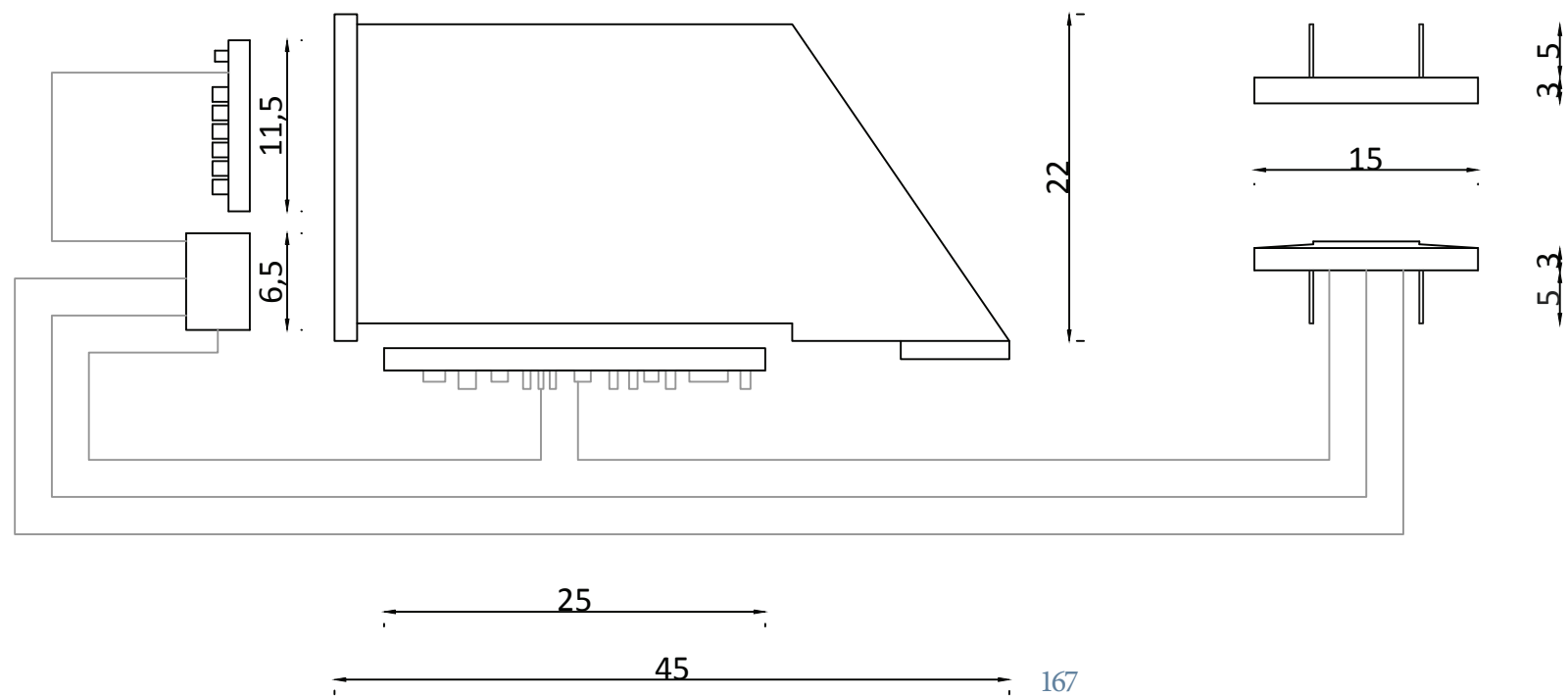
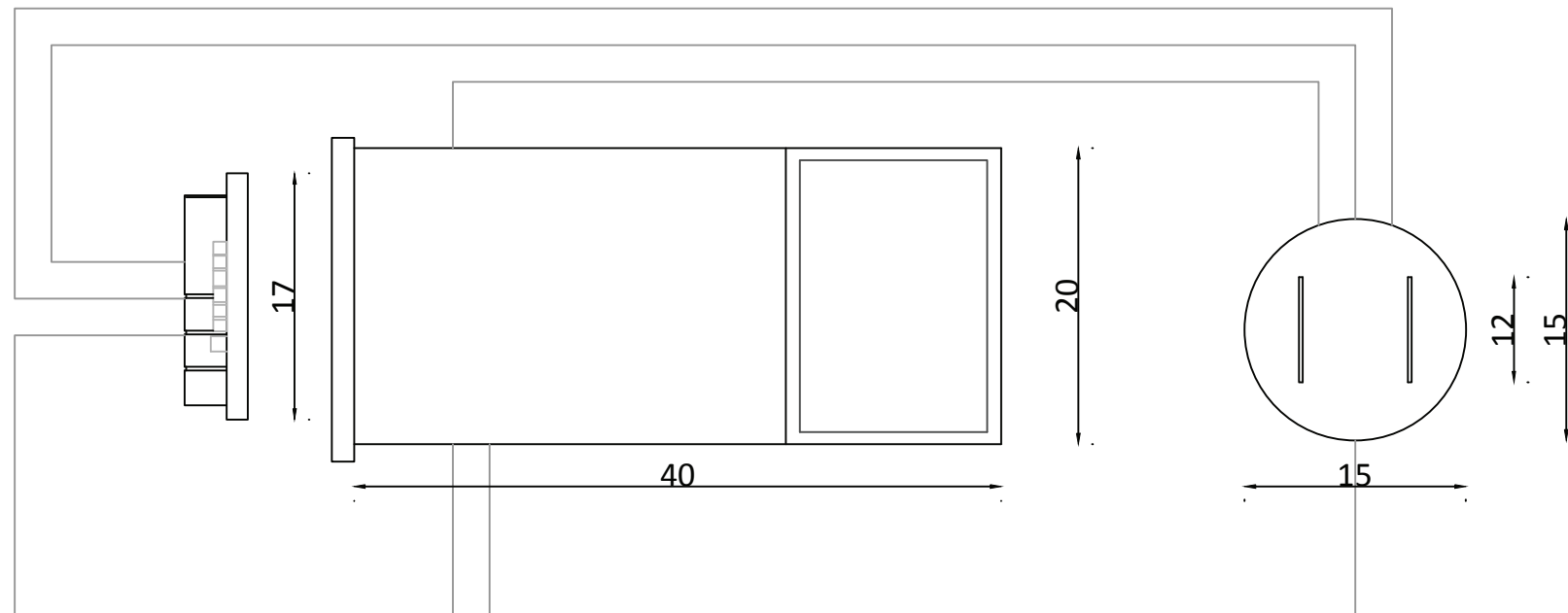
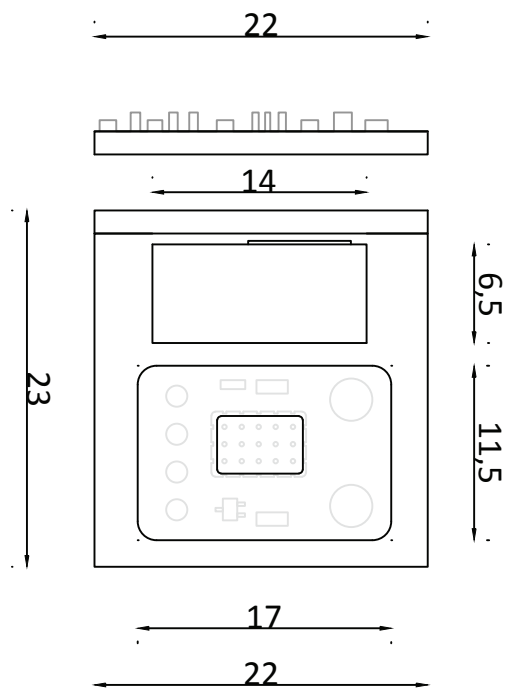
motherboard

Arduino nano

fingerprint sensor

Adafruit
Supply voltage: 6.0 - 12.0 V
Operating current: 120mA max
Peak current: 150mA max
Fingerprint imaging time: <1.0 seconds
Window area: 14mm x 18mm
Signature file: 256 bytes
Template file: 512 bytes
Storage capacity: 162 templates

dimensions are in mm
scale 2:1

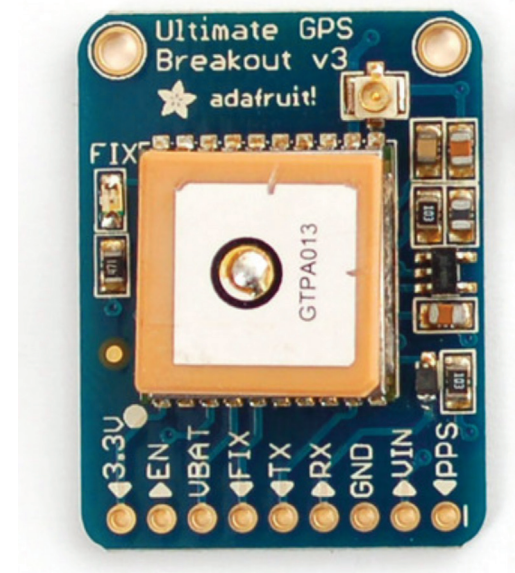


TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS

Ultimate GPS module

- 165 dBm sensitivity, 10 Hz updates, 66 channels 5V friendly design and only
- 20mA current draw Breadboard friendly + two mounting holes
- RTC battery-compatible
- Built-in datalogging
- PPS output on fix
- >25Km altitude
- Internal patch antenna + u.FL connector for external active antenna Fix status



The breakout is built around the MTK3339 chipset, a no-nonsense, high-quality GPS module that can track up to 22 satellites on 66 channels, has an excellent high-sensitivity receiver (- 165 dB tracking!), and a built in antenna. It can do up to 10 location updates a second for high speed, high sensitivity logging or tracking. Power usage is incredibly low, only 20 mA during navigation.



Battery

Product	12V 1400mAh NiMH Battery
Made of	10 x 2/3A NiMH 1400mAh cells
Connector	16 AWG Wires
Fit Models	RC airplanes, such as Wattage
Feature	Rapidly charges and has a long life cycle
Weight	8 Oz
Dimensions	2.3" (Long); 1.3" (Height); 1.1" (Height)



Electromagnet

Round, Rectangular and Bi-Polar Electromagnets are available in various shapes and sizes for a variety of applications. Can be used manually or in automated applications. A separate rectifier is not required as the rectifier is built into the electromagnet. 120 VAC Electromagnets will have residual magnetism when de-energized. This could be as much as 20 % of the holding force.

Flat-Faced magnets should only be used on flat, smooth material where the entire magnet face is in contact. Can be used in manually operated or automated applications.

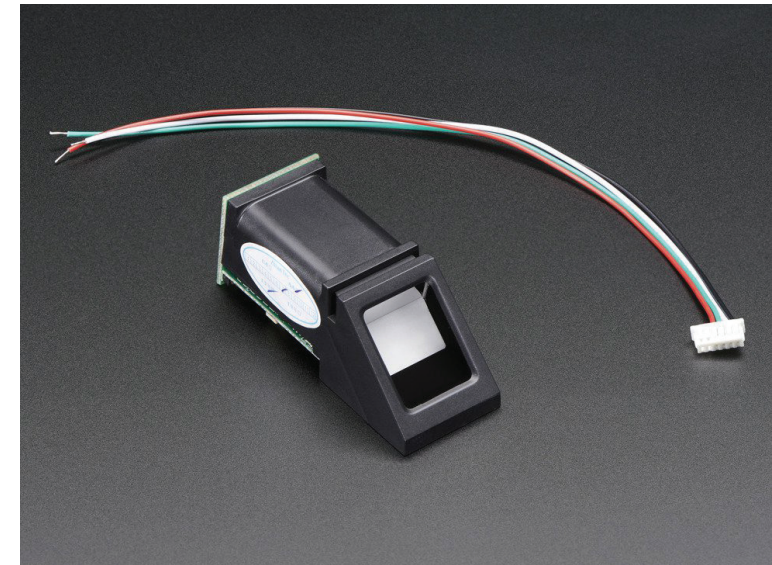
12 VDC is standard voltage. 24 VDC is optional at no cost. Other Voltages per quote.



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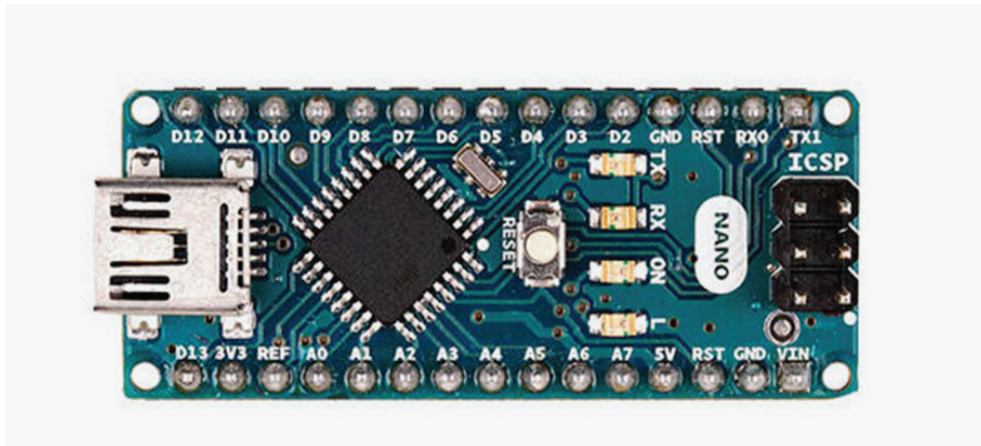
Fingerprint sensor Adafruit

Supply voltage: 3.6 - 6.0VDC
Operating current: 120mA max
Peak current: 150mA max
Fingerprint imaging time: <1.0 seconds
Window area: 14mm x 18mm
Signature file: 256 bytes
Template file: 512 bytes
Storage capacity: 162 templates
Safety ratings (1-5 low to high safety)
False Acceptance Rate: <0.001% (Security level 3)
False Reject Rate: <1.0% (Security level 3)
Interface: TTL Serial
Baud rate: 9600, 19200, 28800, 38400, 57600 (default is 57600)
Working temperature rating: -20C to +50C
Working humidity: 40%-85% RH
Full Dimensions: 56 x 20 x 21.5mm
Exposed Dimensions (when placed in box): 21mm x 21mm x 21mm triangular
Weight: 20 grams



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Arduino Nano



The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328 (Arduino Nano 3.x). It has more or less the same functionality of the Arduino Duemilanove, but in a different package. It lacks only a DC power jack, and works with a Mini-B USB cable instead of a standard one.

Technical specs

Microcontroller	ATmega328
Architecture	AVR
Operating Voltage	6 V
Flash Memory	32 KB of which 2 KB used by bootloader
SRAM	2 KB
Clock Speed	16 MHz
Analog I/O Pins	8
EEPROM	1 KB
DC Current per I/O Pins	40 mA (I/O Pins)
Input Voltage	7-12 V
Digital I/O Pins	22
PWM Output	6
Power Consumption	19 mA
PCB Size	18 x 45 mm
Weight	7 g
Product Code	A000005

Power

The Arduino Nano can be powered via the Mini-B USB connection, 6-20V unregulated external power supply (pin 30), or 5V regulated external power supply (pin 27). The power source is automatically selected to the highest voltage source.

Memory

The ATmega328 has 32 KB, (also with 2 KB used for the bootloader. The ATmega328 has 2 KB of SRAM and 1 KB of EEPROM.

Input and Output

Each of the 14 digital pins on the Nano can be used as an input or output, using `pinMode()`, `digitalWrite()`, and `digitalRead()` functions. They operate at 5 volts. Each pin can provide or receive a maximum of 40 mA and has an internal pull-up resistor (disconnected by default) of 20-50 kOhms. In addition, some pins have specialized functions:

Serial: 0 (RX) and 1 (TX). Used to receive (RX) and transmit (TX) TTL serial data. These pins are connected to the corresponding pins of the FTDI USB-to-TTL Serial chip.

External Interrupts: 2 and 3. These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value. See the `attachInterrupt()` function for details.

PWM: 3, 5, 6, 9, 10, and 11. Provide 8-bit PWM output with the `analogWrite()` function.

SPI: 10 (SS), 11 (MOSI), 12 (MISO), 13 (SCK). These pins support SPI communication, which, although provided by the underlying hardware, is not currently included in the Arduino language.

LED: 13. There is a built-in LED connected to digital pin 13. When the pin is HIGH value, the LED is on, when the pin is LOW, it's off.

The Nano has 8 analog inputs, each of which provide 10 bits of resolution (i.e. 1024 different values). By default they measure from ground to 5 volts, though is it possible to change the upper end of their range using the `analogReference()` function. Analog pins 6 and 7 cannot be used as digital pins. Additionally, some pins have specialized functionality:

I2C: 4 (SDA) and 5 (SCL). Support I2C (TWI) communication using the `Wire` library (documentation on the Wiring website).

There are a couple of other pins on the board:

AREF. Reference voltage for the analog inputs. Used with `analogReference()`.
Reset. Bring this line LOW to reset the microcontroller. Typically used to add a reset button to shields which block the one on the board.

Communication

The Arduino Nano has a number of facilities for communicating with a computer, another Arduino, or other microcontrollers. The ATmega328 provide UART TTL (5V) serial communication, which is available on digital pins 0 (RX) and 1 (TX). An FTDI FT232RL on the board channels this serial communication over USB and the FTDI drivers (included with the Arduino software) provide a virtual com port to software on the computer. The Arduino software includes a serial monitor which allows simple textual data to be sent to and from the Arduino board. The RX and TX LEDs on the board will flash when data is being transmitted via the FTDI chip and USB connection to the computer (but not for serial communication on pins 0 and 1).

A `SoftwareSerial` library allows for serial communication on any of the Nano's digital pins.

The ATmega328 also support I2C (TWI) and SPI communication. The Arduino software includes a `Wire` library to simplify use of the I2C bus. To use the SPI communication, please see ATmega328 datasheet.

Programming

The Arduino Nano can be programmed with the Arduino software (download). Select "Arduino Duemilanove or Nano w/ ATmega328" from the Tools

> Board menu (according to the microcontroller on your board).

The ATmega328 on the Arduino Nano comes preburned with a bootloader that allows you to upload new code to it without the use of an external hardware programmer. It communicates using the original STK500 protocol.

You can also bypass the bootloader and program the microcontroller through the ICSP (In-Circuit Serial Programming) header using Arduino ISP or similar.

Automatic (Software) Reset

Rather than requiring a physical press of the reset button before an upload, the Arduino Nano is designed in a way that allows it to be reset by software running on a connected computer. One of the hardware flow control lines (DTR) of the FT232RL is connected to the reset line of the ATmega328 via a 100 nanofarad capacitor. When this line is asserted (taken low), the reset line drops long enough to reset the chip. The Arduino software uses this capability to allow you to upload code by simply pressing the upload button in the Arduino environment. This means that the bootloader can have a shorter timeout, as the lowering of DTR can be well-coordinated with the start of the upload.

This setup has other implications. When the Nano is connected to either a computer running Mac OS X or Linux, it resets each time a connection is made to it from software (via USB). For the following half-second or so, the bootloader is running on the Nano. While it is programmed to ignore malformed data (i.e. anything besides an upload of new code), it will intercept the first few bytes of data sent to the board after a connection is opened. If a sketch running on the board receives one-time configuration or other data when it first starts, make sure that the software with which it communicates waits a second after opening the connection and before sending this data.

CONCLUSION

CONCLUSION

This project is made of devices and materials available in a market and available for purchasing. Electronic devices are selected based on price and based on open source items. Goal was to make a bag which will not overcome price of 100 euros without profit.

Futur goal is having a proper base for developing the Bag in a team of designers, engineers and developers to be able to implement smaller and "nicer" electronics to make usage even more comfortable and visually more attractive.



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