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## **What is URAI?**

A system designed to provide alerts, predict, and prevention against pickpocketing incidents.



## The Problem



Pickpocketing continues to be a significant concern in cities around the globe. The Metropolitan Police in London reported a concerning 276,000 instances of pickpocketing in 2022, marking a 7% increase from the previous year (Metropolitan Police, 2023). Over in New York City, the NYPD noted a similar trend, with reported incidents rising by 8% to 33,000 cases during the same period (NYPD, 2023). The situation was no different in Paris, where pickpocketing claims rose by 5%, reaching 85,000 incidents (Préfecture de Police, 2023). Spain, specifically Barcelona, often regarded as the 'pickpocketing capital of the world,' has seen a staggering 10% rise in such crimes, with the Spanish National Police reporting over 120,000 instances of pickpocketing in 2022 (Spanish National Police, 2023). These escalating numbers highlight the urgent need to implement adequate preventive measures to ensure the safety and security of individuals and their belongings.

This crime also imposes significant psychological distress on victims, leading to fear, anxiety, and feelings of violation, which can deter their participation in public life. Additionally, areas with high pickpocketing rates necessitate the diversion of valuable law enforcement resources from combating violent or organized crimes to managing petty thefts. This heightened crime rate can also negatively impact tourism, causing economic losses and tarnishing an area's reputation. In a bid to curb pickpocketing, increased surveillance could potentially infringe on citizens' privacy rights, creating a delicate balancing act between security and privacy.

This signifies that traditional law enforcement strategies may be inadequate to tackle this growing menace, underlining the need for innovative, tech-driven solutions to anticipate and prevent such crimes.

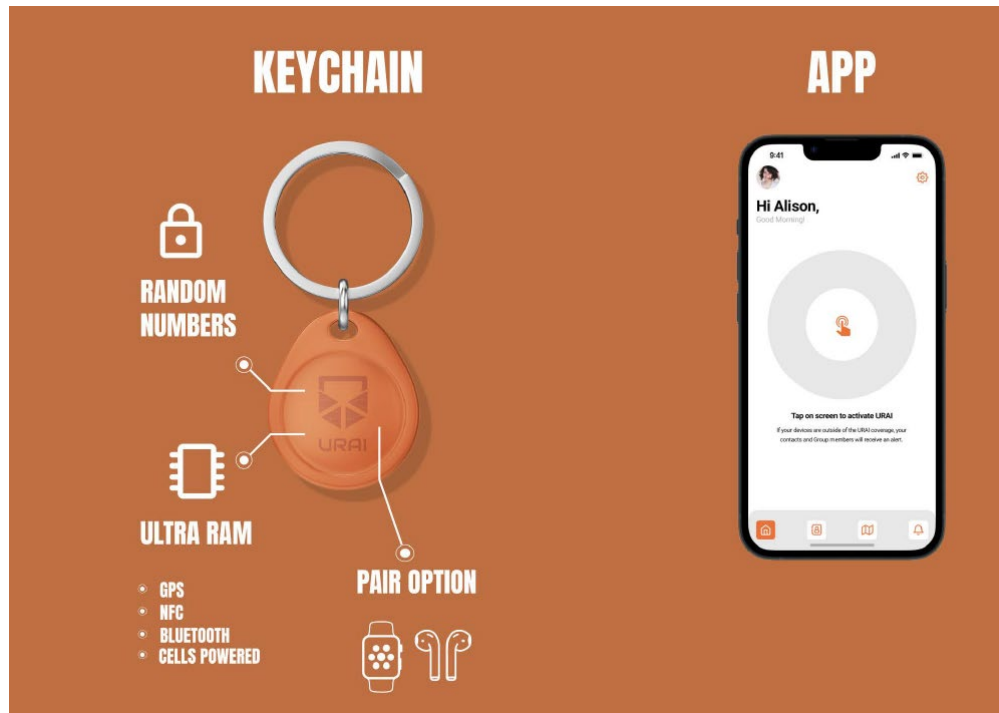


## **The Challenge**

How might we create a system with AI & Attract tech to alert, prevent & predict when tourist and locals are being pickpocketed on public infrastructures?



## Hardware and software



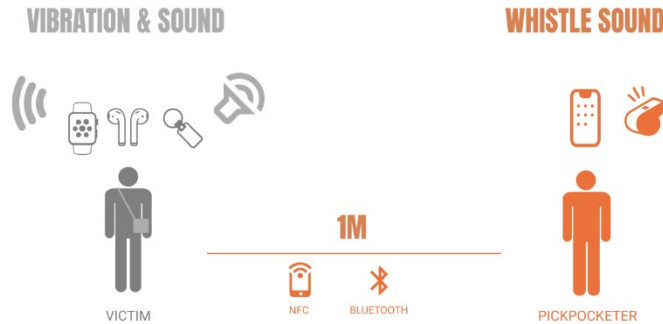
### Why URAI?

Addressing the escalating issue of pickpocketing calls for innovative solutions. Our proposed resolution involves developing a technologically advanced keychain equipped with groundbreaking technologies: Random Power and Ultra RAM.

Random Power is a unique technology that enables the generation of encrypted numbers that are distinct for every individual across the globe using our product. This capability offers a significant enhancement in security compared to existing market solutions like AirTags and Tiles. It allows a high level of privacy and minimizes the risk of cracking or hacking, which is paramount in a world where digital security is increasingly under threat.

Incorporated into this keychain is Ultra RAM technology, which offers a crucial advantage: cost efficiency. Ultra RAM enables the keychain to possess independent functionalities like GPS, NFC, and Bluetooth without incurring significant expenses. These features collectively facilitate precise tracking and connectivity, making the keychain an effective deterrent to pickpocketing.

This cutting-edge keychain transcends traditional tracking tools by offering enhanced security and functionality at a reduced cost, providing a promising solution to curb the menace of pickpocketing. By leveraging the unique strengths of Random Power and Ultra RAM technologies, we are poised to introduce a novel, effective approach to personal security and loss prevention.



## ALERT

Pickpocketing often remains unnoticed until it's too late, resulting in delayed responses and aggravated consequences. Our solution, the URAI keychain, ingeniously addresses this issue by providing instant alerts when the user's belongings have been tampered with or stolen.

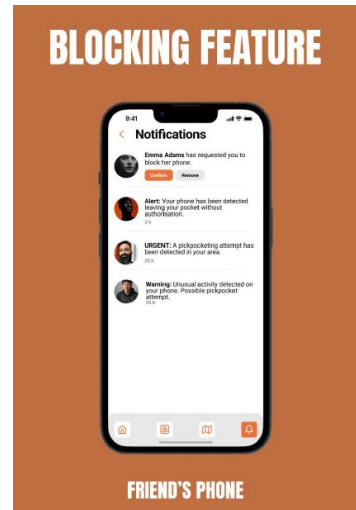
The URAI keychain integrates a unique Alert function that triggers a loud whistle sound on the user's mobile device during a pickpocketing incident. This alarm extends beyond just the mobile phone, spanning across various personal electronic devices, such as earphones and smartwatches, enhancing the chance of immediate detection. The keychain itself is also designed to vibrate when unauthorized access is detected, which proves useful when attached to wallets, purses, or other personal items.

This dual-function Alert system serves to notify the victim promptly and deter the pickpocket simultaneously. The sudden, intrusive sound startles and disorients the pickpocket, inducing anxiety and often causing them to abandon their illicit action, potentially leading to the recovery of the stolen item.

Moreover, the distinctive whistle sound plays a crucial role in public safety. It serves as a universal alert signal, notifying bystanders of a theft taking place in their vicinity. Such public notification can mobilize assistance for the victim while encouraging heightened vigilance among those nearby, thereby reducing the likelihood of further incidents.

The Alert function's immediate notification is pivotal, enabling victims to swiftly respond to the theft, increasing the probability of retrieving their stolen item before it can be hacked or disassembled. This quick response mechanism could prevent substantial financial loss and protect private data, providing a critical edge in combating pickpocketing.

By fostering a community response to theft and creating a deterrent effect on pickpocketers, the URAI keychain's Alert function adds a layer of public safety. It doesn't merely offer individual protection but also promotes collective vigilance and responsiveness, contributing to safer communities. The URAI keychain, thus, transforms the dynamic from reactive to proactive in the face of theft, empowering individuals to actively safeguard their belongings and privacy.



## PREVENT

The URAI keychain also provides proactive prevention mechanisms to mitigate the aftermath of pickpocketing, leveraging unique features within its integrated app.

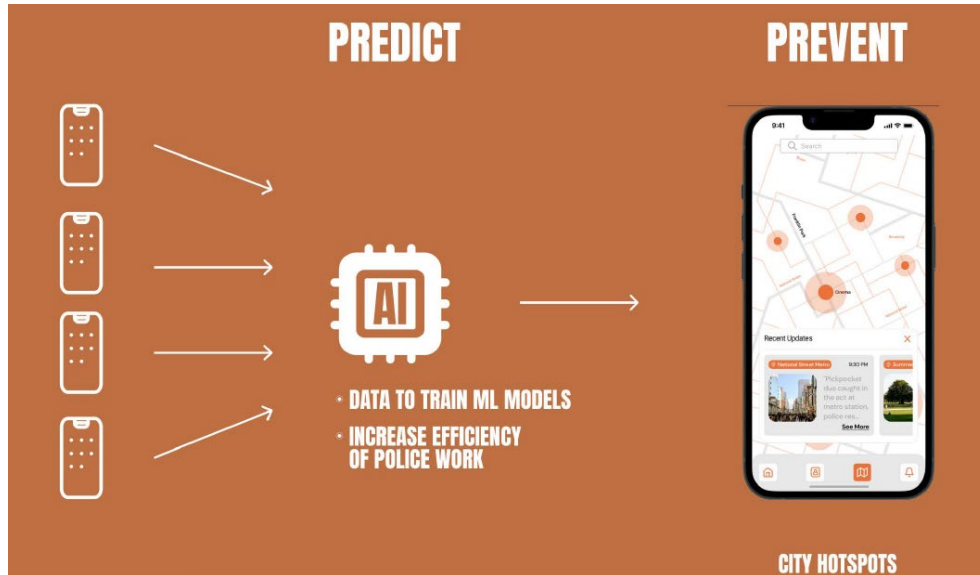
The first line of defense is the 'Prevent Turn Off' function. This feature requires the user to input a special pin code, set up within our app, to switch off the phone. In the event of theft, the perpetrator will be unable to turn off the device, thus enabling continuous location tracking.

Building on this, URAI deploys an intelligent 'Selfie' function. This feature is activated when someone attempts to turn off the phone. A photograph is automatically taken, instantly capturing the face of the potential pickpocket, which is then transmitted to our centralized server. This photo evidence can significantly aid law enforcement agencies in their investigations, enhancing the prospects of identifying and apprehending the perpetrator.

Finally, the URAI app offers a 'Connect with Friends and Family' feature. Users can pre-designate trusted contacts within the app. In the unfortunate event of pickpocketing, these chosen individuals are immediately notified, allowing them to assist by blocking, deleting, or logging off sensitive accounts linked to the stolen device. Moreover, this timely notification alleviates the concerns of friends and family who might be worried when they cannot reach the user.

By offering these comprehensive preventative measures, the URAI keychain goes beyond merely alerting users of theft; it also significantly aids in theft prevention, investigation, and the protection of personal information. It's a robust tool designed to empower users and make our communities safer from the threat of pickpocketing.





## PREDICT(AI)

The AI-powered URAI keychain doesn't just collect data for immediate prevention and alert purposes; this collected data also holds potential for several broader applications.

Firstly, this data can contribute to the development of safer urban environments. Local governments and city planners can leverage this wealth of data to better understand crime hotspots and trends, thereby informing policies and urban development strategies that deter crime.

Secondly, the aggregated data could serve as a valuable resource for academic research. Criminologists and sociologists might utilize this data to gain deeper insights into urban crime patterns, leading to more effective prevention strategies and public safety policies.

Thirdly, the data collected could aid law enforcement agencies in allocating their resources more efficiently. By understanding where and when pickpocketing incidents are most likely to occur, they can strategically deploy patrols, potentially preventing crimes before they occur.

Finally, this data can help create public awareness campaigns about pickpocketing hotspots and high-risk times. Through education, individuals can make more informed decisions about their safety, reducing the chances of becoming a pickpocketing victim.

Therefore, the data generated from the URAI keychain, enabled by AI, offers far-reaching benefits beyond the immediate users of the device. It can be a strong tool for building safer cities, contributing to academic research, enhancing law enforcement strategies, and driving public education on personal security.



## Further development

The AI-powered URAI keychain, with its unique ability to collect and analyze data, proves to be a formidable tool in an array of safety and security applications beyond just deterring pickpocketing.

For instance, the keychain can leverage as a powerful deterrent against harassment. Its instant alert feature allows users to trigger a loud whistle sound in uncomfortable or threatening situations. This immediate audio alert serves not only to disconcert potential harassers but also to draw the attention of others in the vicinity. The response could range from individuals stepping in to help to initiate a law enforcement intervention, thereby considerably enhancing personal safety.

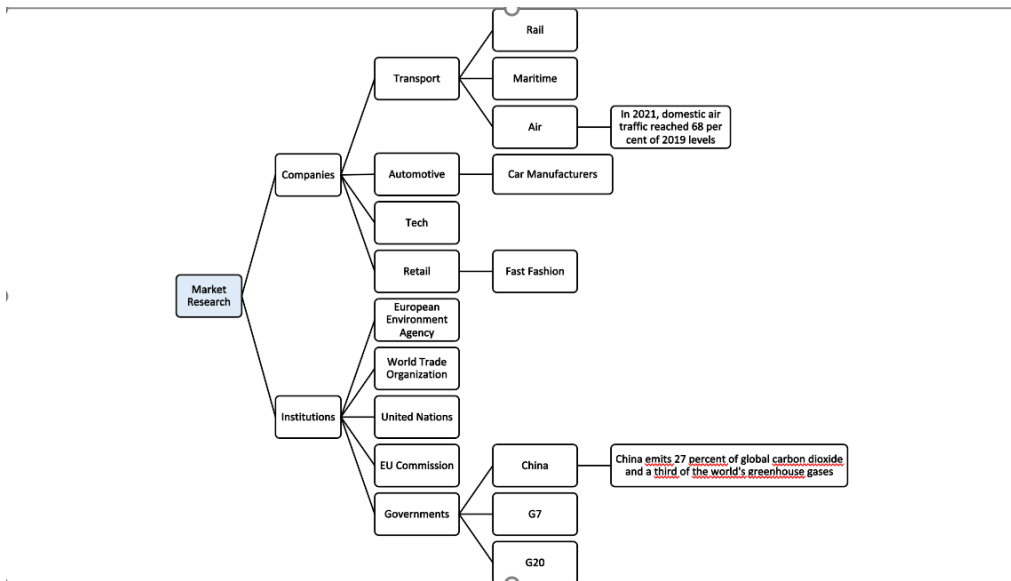
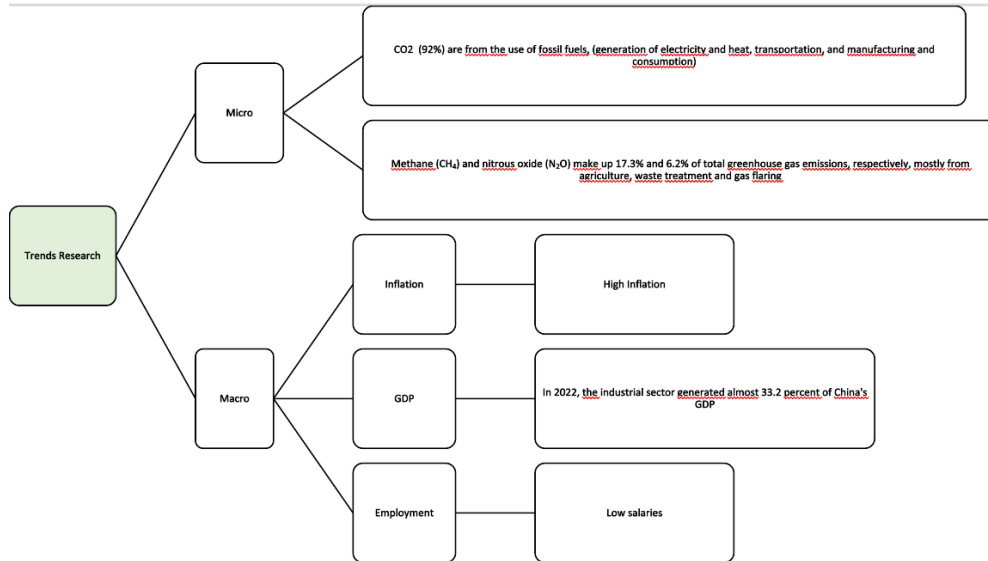
Moreover, the URAI keychain can also be instrumental in mitigating the challenges associated with missing children or pets. Attaching the keychain to a child's backpack or a pet's collar becomes a tracking device that can provide real-time location updates. This feature significantly expedites the search process in an unfortunate event where a child or a pet goes missing. Instantly triggered alerts and location data can drastically reduce the time to locate the missing individual or pet, minimizing risk and emotional distress for everyone involved.

As the URAI keychain collects and analyses data over time, it can be further used to predict patterns and trends. For example, it could help identify areas where harassment incidents are more frequent or determine familiar places and times when children or pets tend to go missing. These insights could inform community safety measures and preventive action and offer a valuable dataset for sociological and criminological research.

In summary, the capabilities of the URAI keychain go far beyond preventing pickpocketing. It has the potential to revolutionize personal safety, facilitate research, influence urban safety planning, and boost law enforcement efficiency, thus significantly contributing to building safer, more secure communities.



# Our Project Journey



Goal – Target → 9.1

*Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all*

## Stage 1

As we embarked on our research journey to address the challenges underpinning Sustainable Development Goal (SDG) 9: Industry, Innovation, and Infrastructure, our explorations led us into the heart of essential macro and microeconomic trends.

A pressing global issue that surfaced was the escalating CO<sub>2</sub> emissions problem. The Global Carbon Project (2022) estimates a 1.5% annual growth of global CO<sub>2</sub> emissions from fossil fuels and industry over the past decade. The National Oceanic and Atmospheric Administration (NOAA) corroborates the severity of this trend, pointing out that atmospheric CO<sub>2</sub> levels are at their highest in 800,000 years, indicating an urgent need for effective remedial action.

Greenhouse gas emissions from the agricultural sector also emerged as a significant concern. As per the United Nations' Food and Agriculture Organization, agriculture is responsible for approximately 18% of the total release of greenhouse gases worldwide, a statistic that calls for immediate and significant reduction measures in line with the Intergovernmental Panel on Climate Change (IPCC)'s recommendations.

With these overarching trends serving as our backdrop, we delved deeper into markets such as the Transport, Automotive, Technology, and Car sectors. The International Energy Agency (IEA) points out that the transport sector alone accounted for nearly 24% of direct CO<sub>2</sub> emissions from fuel combustion in 2020, highlighting the immense potential for introducing sustainable innovations in these areas.

At the same time, we examined the goals and policies of influential global institutions,

Such as the European Union (EU) and the World Trade Organization (WTO). We took note of initiatives like the European Green Deal, which proposes a path for the EU to become climate-neutral by 2050.

In line with SDG 9, our aim is to address gaps in existing industries and infrastructures, specifically those contributing significantly to CO<sub>2</sub> and greenhouse gas emissions. By integrating emerging technologies, we hope to build resilient infrastructure and promote inclusive and sustainable industrialization, all while fostering innovation.

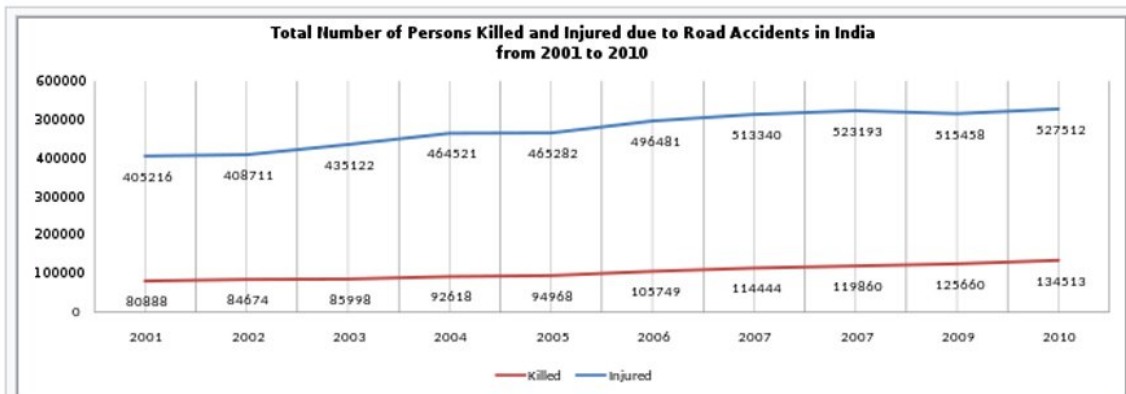
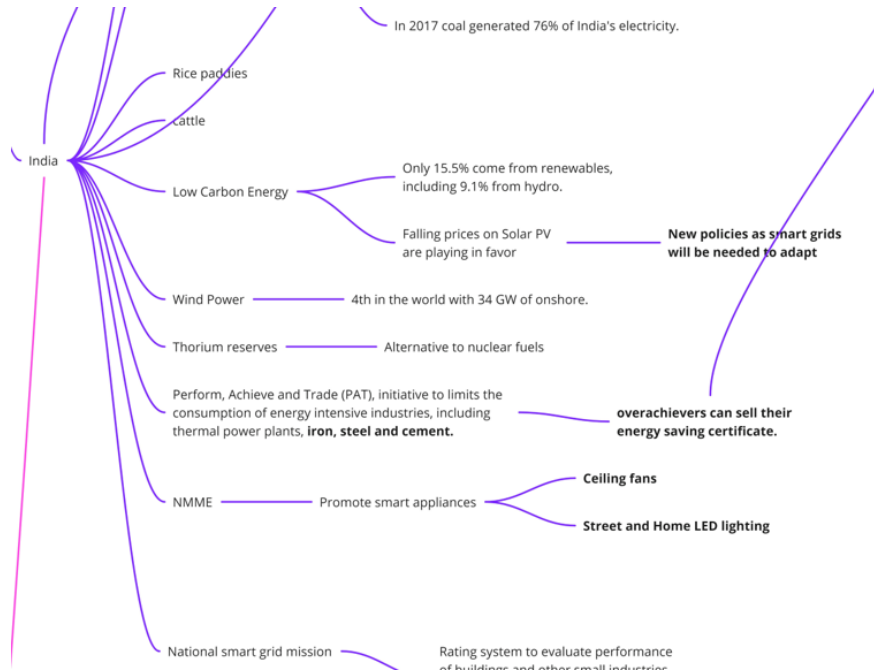
Our vision is not confined to formulating a solution that satisfies a specific market need. Instead, we aim to craft an innovation that intertwines with environmental responsibility and sustainability principles, aligns with global institutional goals, and makes a positive, tangible impact on reducing global carbon emissions.

Our challenge reflects SDG 9: to create a solution that promotes sustainable industries, fosters innovation, contributes to building resilient infrastructure, and ultimately helps society and the environment navigate toward a sustainable future.

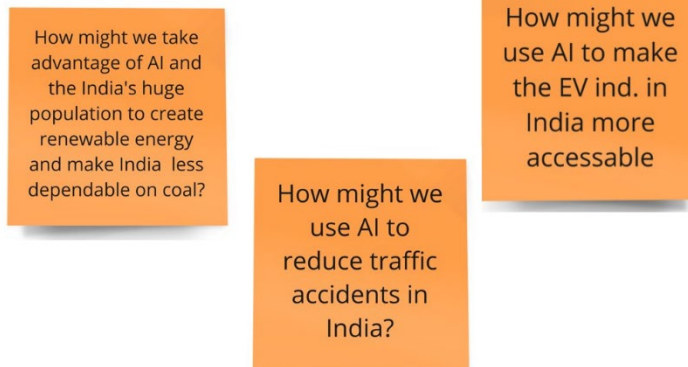
After conducting extensive research into macroeconomic trends, market specifics, and the institutional landscape, we focused on Sustainable Development Goal (SDG) 9.1. This target emphasizes the development of "reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all."



# Stage 2



Total number of persons killed and injured due to road accidents, from 2001 to 2010



As we refined our research further, we focused on India, a country brimming with potential yet facing unique challenges. India, with its vast population of over 1.3 billion people, as per the United Nations estimates in 2022, poses fascinating possibilities, particularly regarding sustainable energy production and transportation.

One of the challenges India confronts is its extensive reliance on coal for energy production. According to the International Energy Agency's (IEA) report 2022, nearly 70% of India's electricity comes from coal-fired power plants. The country is tasked with transitioning towards more renewable energy sources, such as wind, solar, and hydro, to meet international standards, including the European Union's Net Zero initiative to achieve zero carbon emissions by 2050.

The transition to Electric Vehicles (EVs) is another avenue India is exploring to reduce carbon emissions. However, despite the government's ambitious plans to make EVs more commonplace, as stated in the National Electric Mobility Mission Plan 2020, the penetration of EVs in the Indian market is still relatively low.

The primary reason for this is the high cost of EVs, making them inaccessible to many of the Indian population, as per a report by BloombergNEF (2022), electric cars only accounted for less than 1% of the total car sales in India.

Moreover, India also faces a severe problem with traffic accidents. The World Health Organization's Global Status Report on Road Safety 2018 estimates that over 150,000 people die each year due to road accidents in India, making it one of the countries with the highest number of traffic-related fatalities globally. Traffic-related fatalities globally.

Based on these findings, we posed three key questions to guide our solution development process:

1. How might we leverage AI and India's massive population to promote renewable energy production, thereby reducing India's dependence on coal?
2. How might we employ AI to make the EV industry more accessible and affordable to the broader Indian population?
3. How might we utilize AI to lessen the number of traffic accidents in India?



## Stage 3

After comprehensively understanding ATTRACT's technology, we revisited our initial concepts as we found them challenging to implement. We launched into further brainstorming sessions and comprehensive research to generate new ideas, aware of the potential applications of ATTRACT's technologies.

One revised idea aimed at addressing the significant issue of transportation accidents in India. We proposed employing the PoSICs-2 technology to monitor the movement and behavior of vehicles and pedestrians, the data from which AI would analyze. This data could be used to restructure city organization, such as installing traffic lights at critical locations. According to the Global Status Report on Road Safety 2018 from the World Health Organization, India recorded over 150,000 fatalities due to road accidents in a single year. Despite the gravity of this problem, we had to abandon this idea because we felt that PoSICs-2 technology might need more time to be ready for such a large-scale implementation.

A second proposal focused on waste management. We planned to leverage PoSICs-2 technology to detect better and classify waste, aiming to increase recycling rates. Globally, only 9% of all plastic waste has been recycled, according to a report published by the United Nations Environment Programme 2018. However, we decided against this idea due to its large scale and testing constraints.

We also contemplated ideas in the realm of education for developing countries. However, seeing a precise application of ATTRACT's technology in this area was challenging.

Finally, we arrived at two promising ideas. The first involved detecting road damage early by placing PoSICs-2 sensors on buses to gather real-time data. This idea can be particularly impactful in developed countries where aging infrastructure is a concern. The American Society of Civil Engineers gave the United States infrastructure a grade of D+ in 2017, reflecting the pressing need for such a solution. This technology could enable repairs before minor damage becomes a significant safety hazard, avoiding accidents and costly repairs.

The second idea aimed to tackle pickpocketing, a pervasive problem worldwide. According to a study conducted Barcelona, one of the most touristic cities globally, recorded over 300 pickpocketing incidents per day. Our idea was to develop a solution using Random Power and Ultra-RAM technology to improve city safety and deter pickpocketing.

These concepts resulted from our diligent effort to leverage ATTRACT's technology effectively and tackle significant societal challenges. Each idea we generated was scrutinized, keeping feasibility, scalability, and the potential for positive societal impact in mind.



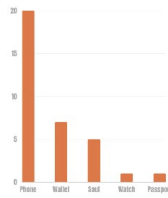
# Final Stage

## SURVEY

Have you or someone you know ever been a victim of pickpocketing in a public space?

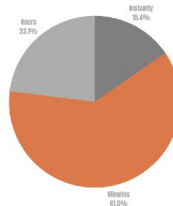


What things did the pickpocket steal from you?

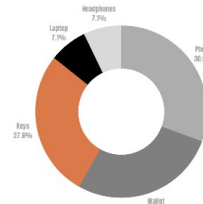


## SURVEY

How quickly did you realize that you had been pickpocketed?

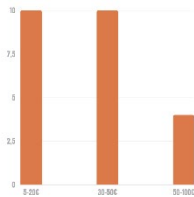


What kind of items do you carry with you when you leave the house?

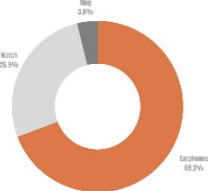


## SURVEY

Would you be willing to invest in anti-theft technology or accessory or gadget for yourself if it could prevent pickpocketing incidents?

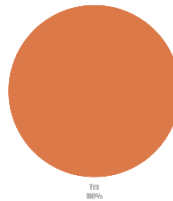


Besides your phone and laptop, do you own any other smart devices (smart watches, fitness trackers, earbuds, etc)?

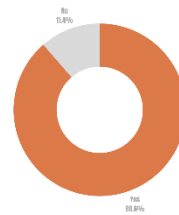


## SURVEY

Does your phone have a case on it?



Do you believe that pickpocketing may harm a city's reputation and economy?





SURVEY

How would you describe your overall feeling of safety while commuting in public spaces?

"Anxious"

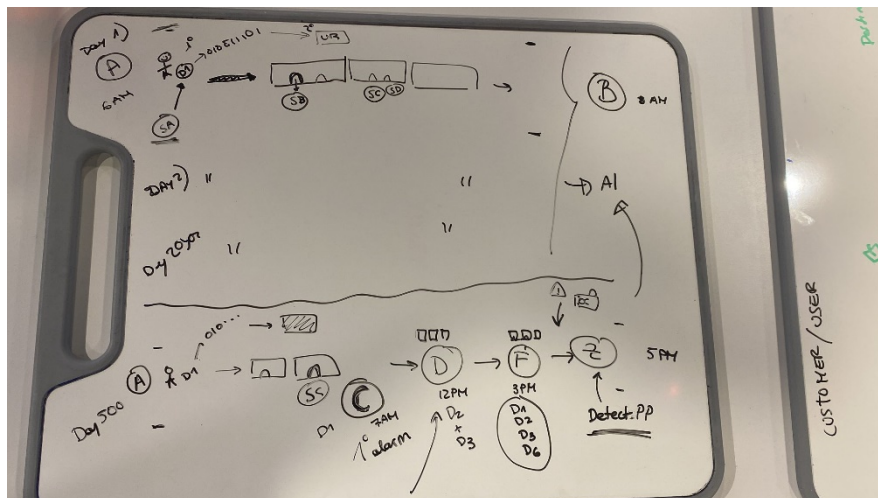
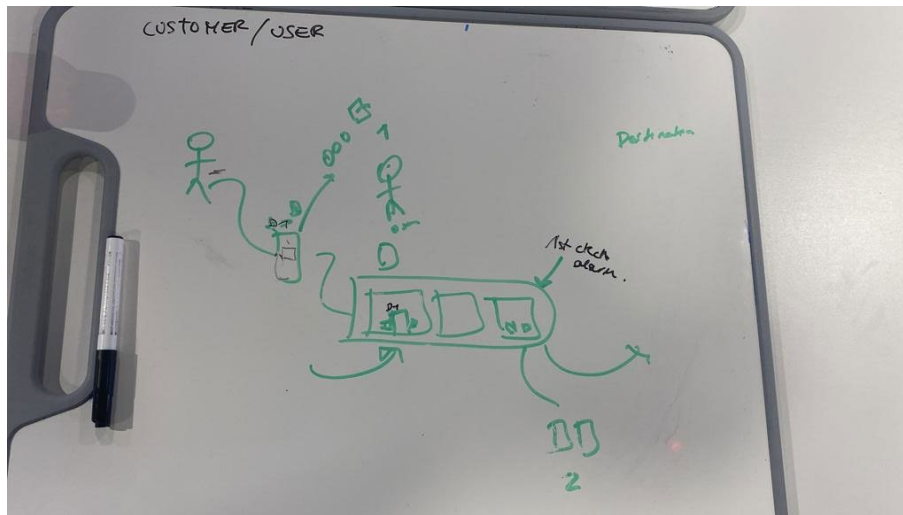
"Always alert"

"Very unsafe, I travel with a lock on my bag now"

"Relatively safe"

"Not safe, at least in Barcelona"

"Stressed. I hold them so tight, especially in L metro lines"



Having identified pickpocketing as a pervasive and significant security issue worldwide, we embarked on an exploratory journey to conceive a feasible solution incorporating AI and ATTRACT technology. Our initial concept involved installing sensors at metro entrances and assigning random numbers to mobile phones entering the metro train. Using machine learning algorithms, the AI would then detect unusual device movements indicative of pickpocketing and immediately alert security personnel.

According to a study by Barkly (2022), pickpocketing constitutes around 40% of reported crimes in major cities, underlining the severity of this problem. Further research by the Transport Security Administration revealed that public transport systems are frequent hotspots for such crimes, making them an apt context for our solution.

Guided by teacher feedback, we delved deeper into user experiences by conducting surveys and interviews. We managed to gather feedback from 36 respondents and conduct eight in-depth interviews to understand potential users' personal experiences and perceptions around pickpocketing. Most of our respondents had experienced pickpocketing firsthand, and we discovered a typical behavioral pattern - they all carry something in public spaces.

Given these insights, we iterated on our solution to make it more user-centric. We envisioned a device that users could carry which would connect to their phones.

The need for cost-effective solutions also became evident during our research. Many potential users do not own theft-prevention devices like Apple's AirTags because of their high cost.

However, ATTRACT technology's affordability could bridge this gap, making our solution accessible to a broader audience.

Digging deeper into the pickpocketing problem, we recognized the crucial role of immediate actions in preventing and responding to pickpocketing incidents. Firstly, by alerting nearby individuals, victims can receive immediate help and potentially dissuade the thief. Secondly, victims can recover their stolen items more quickly if they act swiftly.

Thus, our revised solution incorporated an alarm feature - a loud whistle sound that would activate if a theft were detected. This feature was designed to draw immediate attention to the incident and deter the thief.

Next, we turned our attention to the post-theft recovery process. A common challenge faced by victims of phone theft is the inability to track or lock their phones once the thief switches them off. To address this, we integrated a feature into our solution to prevent thieves from turning off stolen phones.

Lastly, we recognized victims' potential difficulties using features like 'Find my Phone' or iCloud to track, lock, or wipe their stolen phones. Some victims might forget their passwords, while others might find the process too complex, particularly under stress. We addressed this problem by designing a simplified, intuitive process within our app, enabling users to protect their data in the event of a theft swiftly.

In conclusion, by conducting thorough research and persistently iterating on our solution based on user feedback, we have developed an innovative solution tailored to potential users' actual needs and effectively addresses a widespread and significant security issue.



## Challenges we faced

Our journey into the project was not without its challenges. The initial stage was particularly daunting as we had to navigate a terrain filled with advanced technology and a broad spectrum of research without a clear sense of direction.

Our first significant challenge was comprehending the technology at CERN. Given its advanced and complex nature, understanding it was a tough task.

However, we had the advantage of having teammates from UPC, who were more familiar with this technology. We leveraged their knowledge and understanding, which helped demystify the technology and provide a base from which we could approach our research.

Another hurdle was the realization that our initial ideas did not align well with the available technology and were challenging to implement. This discovery led us to redo our research entirely and devise an entirely new set of ideas. To address this challenge, we went back to the drawing board and embarked on a renewed brainstorming session. We made sure to maintain a clear focus on aligning our ideas with AI technology and its potential applications while exploring the various possibilities.

We also encountered a significant point of confusion around the scope of our project. We received varied advice from different instructors – while some advised us to envision a project that might be realizable in 5-10 years, others suggested that our ideas would take too long to implement. To tackle this, we held extensive discussions within our team and finally decided to strike a balance by focusing on a significant problem and proposing a feasible solution that could be implemented in a reasonable timeframe.

Another challenge was the difficulties we faced in trying to interview key institutional stakeholders such as the police or Patrulla Barcelona. The necessity of specific authorizations meant that these valuable insights were beyond our reach. To manage this issue, we explored alternate sources of information. We relied heavily on published reports, articles, and statistics from credible sources. We also sought insights from residents, other community groups, and experts in the field through surveys and informal discussions.

Facing and overcoming challenges required a combination of effective communication, adaptability, and problem-solving.

Understanding ATTRACT's advanced technology posed an initial challenge. To tackle this, our teammates from UPC shared their technical insights, and we supplemented this with self-study through online resources.

When our initial ideas didn't align with the available technology, we pivoted strategically. We revisited our brainstorming sessions, focusing on blending AI technology with ATTRACT's potential, resulting in more feasible and impactful ideas.

Confusion about the project's scope required clear project management. After discussing the different advice, we developed a balanced timeline that amalgamated ambitious yet realistic goals.

Finally, we held regular team meetings to discuss progress and potential solutions, fostering a sense of shared responsibility. This process transformed our challenges into learning opportunities, enabling us to continue progressing on our project.



## Appendix

### 1. *Interview Questions*

# Interview Questions

## Research Question

Pickpocket experiences

## Introduction

We are students working to solve pickpocket using technology.

## Warm Up Questions:

- What is your name?
- Where are you From?
- How long have you been living in Barcelona?

## General Questions:

- How frequently do you commute? (When, Where, How)
- What type of items do you carry with you when you leave your house?
- Have you ever been a victim of pickpocketing in a public space?
- When and where did the pickpocketing occur ( park, city, train stations, subways, buses, etc.)?
- If yes, how quickly did you realize you had been pickpocketed?
- What things did the pickpocket steal from you?
- What did the pickpocket look like? Can you describe their appearance?
- Did you see anyone else in the area who might have been working with the pickpocket?

- What items were taken from you?
- Have you reported the incident to the police? If so, what was their response?
- Did you notice anyone acting suspiciously prior to the incident?
- Do you have any other information that might help authorities identify the pickpocket?
- How has the incident affected you emotionally?
- Would you be willing to invest in anti-theft technology or accessory or gadget for yourself if it could prevent pickpocketing incidents?
- How much money would you be willing to spend on an anti-theft device to protect your personal belongings while commuting?
- Besides your phone and laptop, do you own any other smart devices (smart watches, rings, earphones, etc)?
- What type of charger do you use for charging your devices?
- Does your phone have a case on it?
- How would you describe your overall feeling of safety while commuting in public spaces?
- Do you believe that pickpocketing may harm a city's reputation and economy?

### Wrap-up Questions:

- Could we get in touch with you again?
- Could we validate our ideas with you? (Usability test)

## 2. Questionnaire Questions

### CBI4AI\_GROUP6

\* 必須の質問です

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- 1 ° Have you or someone you know ever been a victim of pickpocketing in a public space ( park, city, train stations, subways, buses, etc.)? \*

1 つだけマークしてください。

YES

NO

- 2 ° If Yes, How quickly did you realise that you had been pickpocketed?

\_\_\_\_\_

- 3 ° What things did the pickpocket steal from you? \*

\_\_\_\_\_

- 4 ° What kind of items do you carry with you when you leave the house? \*

\_\_\_\_\_

- 5 ° Would you be willing to invest in anti-theft technology or accessory or gadget for yourself if it could prevent pickpocketing incidents? \*

1 つだけマークしてください。

YES

NO

MAYBE

- 6 ° How much money would you be willing to spend on an anti-theft device to protect your personal belongings while commuting? \*

\_\_\_\_\_

- 7 ° Besides your phone and laptop, do you own any other smart devices (smart watches, rings, earphones, etc)? \*

\_\_\_\_\_

- 8 ° What type of charger do you use for charging your devices? \*

1つだけマークしてください。

Wireless charger

USB charger

- 9 ° Does your phone have a case on it? \*

1つだけマークしてください。

YES

NO

- 10 ° How would you describe your overall feeling of safety while commuting in public spaces? \*

\_\_\_\_\_

- 11 ° Do you believe that pickpocketing may harm a city's reputation and economy? \*

1つだけマークしてください。

YES

NO



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