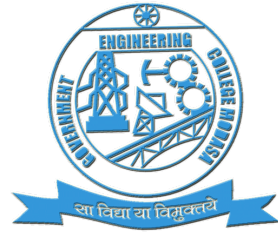




GUJARAT TECHNICAL UNIVERSITY

GOVERNMENT ENGINEERING COLLEGE MODASA

affiliated with GTU



A
Project Report
On
RAKSHAK

Prepared as a part of the requirements for the subject of
DESIGN ENGINEERING – II B
B. E. III, Semester – VI
(Information Technology)

Submitted by:
Group Id: 297259

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(Faculty Guide)

Prof. M B Chaudhary
Head of the Department

Academic year
(2020-2021)

Government Engineering College, Modasa

Department of Computer and Engineering and Information Technology

Academic Year 2020-21



CERTIFICATE

This is to certify that the Project entitled “Your DE Project Title ” has been prepared by Zeel Pathak (180160116081), Shakya Tilak (180160116100), Priya Patel (180160116071), Kinjal Suthar(180160116111) in the subject of DESIGN ENGINEERING - 2A under my guidance in partial fulfillment of the degree of Bachelor of Engineering in Information Technology (5th Semester) of Gujarat Technological University, Ahmedabad during the academic year 2020-21.

Date: / / 2020

Place: GEC, Modasa

Project Guide

Prof. Manisha Valera

Head of CE/IT Department

Prof. M B Chaudhary

ACKNOWLEDGEMENT

The satisfaction that accompanies the successful completion of any task would be incomplete without the mention of people whose ceaseless cooperation made it possible, whose constant guidance and encouragement crown all efforts with success.

We are grateful to our project guide Prof. Manisha Valera for the guidance, inspiration and constructive suggestions that helped us in the preparation of this project. We also thank our colleagues who have helped in successful completion of the project.

Zeel Pathak (180160116081)

Tilak Shakya (180160116100)

Priya Patel (180160116071)

Kinjal Suthar (180160116111)

ABSTRACT

In this project we are going to help the society and nation by using live images or videos and processing them using Artificial-Intelligence, Machine-Learning and Algorithm and can know the behaviour of a person and can spy on them and using this technology at defence and public places, using X-ray vision we can identify if any person is carrying any harmful things like weapons or not.....Thus in this way using the technology we can help the society and nation against the terror and crime by knowing them before they are going to happen.

TABLE OF CONTENTS

TITLE OF THE PROJECT	
CERTIFICATE	
ACKNOWLEDGEMENT	3
ABSTRACT	4
TABLE OF CONTENTS	5
CHAPTER 1 INTRODUCTION	6
1.1 Introduction to Concept/Idea	
CHAPTER 2 EVALUATION OF IDEA	7
2.1 Observation Record Sheet (AEIOU Framework)	
2.1.1 A- Activities	
2.1.2 E- Environment	
2.1.3 I- Interaction	
2.1.4 O- Objects	
2.1.5 U- Users	
2.2 Literature Review / Prior Art Search	
2.3 Modifications in Canvases after Observation Exercise	
2.4 Empathy Mapping / Framework	
2.5 Ideation Canvas / Framework	
2.6 Product Development Canvas / Framework	
CHAPTER 3 PREDESIGN	24
3.1 Design Specifications for first prototype	
3.2 Summary of Validation Process and refinement in the first prototype	
3.3 Learning Needs Matrix (LNM)	
3.4 Features / Functions of proposed system	
3.5 Fast prototype Model / Conceptual Plan Layout	
● CONCLUSION	31
● REFERENCES	31
● PLAGIARISM FREE CONTENT CERTIFICATE	32

Introduction

About Us:

We, Zeel Pathak (180160116081), Shakya Tilak (180160116100), Priya Patel (180160116071), Kinjal Suthar(180160116111) are a group of 4 members. Perusing BE (Information Technology) at present, we are working on our project **RAKSHAK**. It is our idea about how the present modern technology can help our nation in the defence sector.

Protecting the security of our nation-our people, our territory and our way of life- is my foremost mission and constitutional duty. As we enter the twenty-first century, we have an unprecedented opportunity to make our nation safer and more prosperous.

As in the case of national power, the military aspect of security is an important, but not the sole, component of national security. To be truly secure, a nation needs other forms of security. Authorities differ in their choice of nation security elements.

In the world of technology we can upgrade our defence system to the level of new technology. By using the technology in the right way we can fight with the harmful elements of the nation. Using high energy X-ray we can detect the weapons, this system is known as Dual energy X-ray. At the higher level, over 100KV , the absorbed energy primarily depends upon the density of material. Higher the density , the more energy is absorbed by the object and therefore darker the image.

In this project we are going to help the society and nation by using live images or videos and processing them using Artificial-Intelligence, Machine-Learning and Algorithm and can know the behaviour of a person and can spy on them and using this technology at defence and public places, using X-ray vision we can identify if any person is carrying any harmful things like weapons or not.....Thus in this way using the technology we can help the society and nation against the terror and crime by knowing them before they are going to happen.

Many different technologies we can use in this like Wifi detection technology, X-ray detection, Colour image detection technology etc. In Wifi detection technology wifi signals can be used to detect cans, laptops, batteries inside bombs, and liquid as well as guns. In the colour image detection technology we can use IR image, DWT Image fusion etc.

Objective of the project:

- To provide technology upgraded systems in the defence sector of the nation that fight with harmful elements of the society like sleeper cell, live bomb etc.
- Using the latest technology alerts the security force about the harmful element .
- Using these technologies nullifies them with the help of these instruments.

CHAPTER 2: EVALUATION OF IDEA

2.1 Observation Record Sheets (AEIOU Framework)

Various techniques and approaches have been proposed and developed in this field to detect hidden weapons carried by any person in a public place one of those techniques is **Colour Image detection** technology.

In our proposed technique for CWD we consider two types of image – a visual image and an IR image. Visual image is nothing but an RGB image which has three main colour components Red, Green and Blue. Since the human visual system is very sensitive to colours this image creates a natural perception of an object to human vision but not helps so much in the detection of concealed weapons. For this we consider IR images as second input. It basically depends on high thermal emissivity of the body.

Basically the infrared radiation emitted by the body is absorbed by clothing and then re-emitted by it, is sensed by the infrared sensors. Due to the difference in thermal emissivity we can realize the hidden object but since the background is almost black this image cannot help in CWD alone. Resize two input images: Since these two input images are taken from two different image sensing devices so they are of different size. So we first resize these two types of images because image fusion and other operations are not possible if the sizes are not the same. Combine two images: Perform the addition operation between visual and IR (visual + IR) images to get the I_v_IR image. But the resultant image does not give enough information. Then we complement the IR image (IIR_c) to remove the background darkness.

IR image lies the intensity between 0 to 255 intensity thus complement means subtracting all matrix component from 255 and we get complimented form or reverse form of the IR image. Then add visual image and complemented IR image (visual + complemented IR) and get a resultant image which is denoted by $I_v_IR_c$. Conversion of IR to HSV: Then we convert IR image into HSV colour model (IIR_HSV) because components of IR image are all correlated with the amount of light hitting the object, and therefore with each other, image descriptions in terms of those components make object discrimination difficult. Descriptions in terms of hue/lightness/saturation are often more relevant. Fused two images: After converting HSV model the image is now three components.

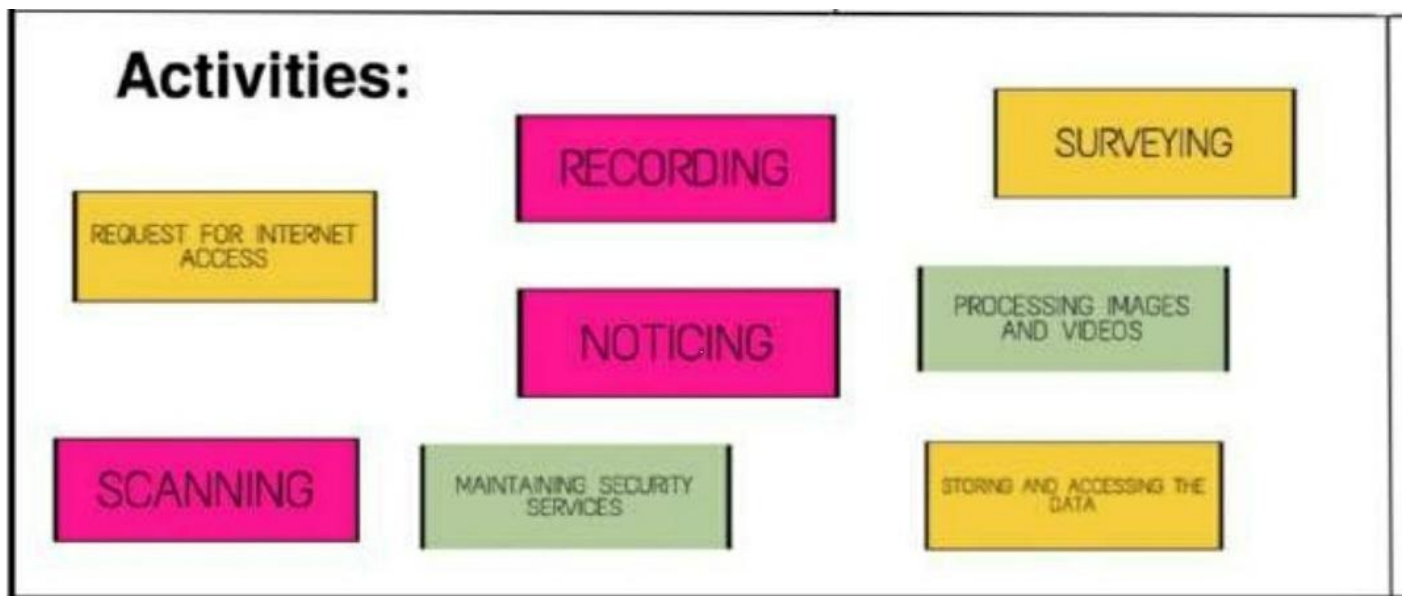
Now we can use fusion technique because two images have the same dimension with the same size and we use DWT fusion technique between HSV colour image (IIR_HSV) and combined image $I_v_IR_c$. Processing for showing the weapon clearly in the visual image: Then this fused image converted into gray scale image. Now we use Otsu's local thresholding technique for binarizing fused gray scale image. Then Extract the weapon portion by calculating all connected area component and remove too small component and also too large a component according to the area values.

To show the weapon in the actual RGB visual image we multiply the weapon's binary images with three dimensional RGB images. Basically the element wise multiplication is performed between two matrices. Now contour detection is used to detect edges of a weapon from the weapon binary image and we use a canny edge detector for detecting the edges. Then this binarized contour image is divided into three components and multiplied as before and we get contour with a visual RGB image where we can detect the concealed weapon under the person's clothes very clearly.

A-Activities

The activities that we did during framing our project where

- Surveying public places.
- Noticing the people's behaviour.
- Processing images and videos of doubtful people.
- Scanning in public places.
- Maintaining security services in public places and in defence areas.

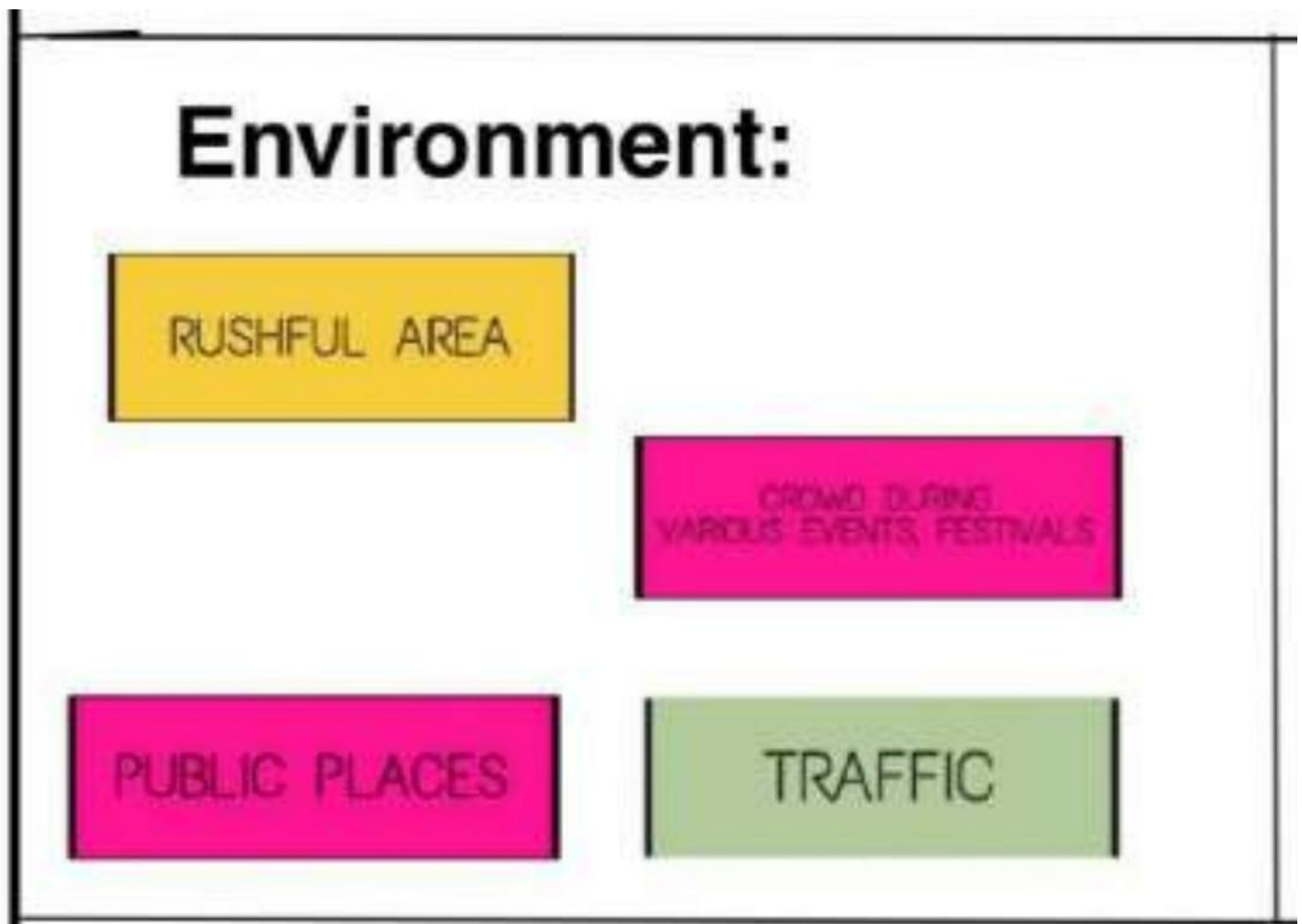


E- Environment

Environments include the entire arena where activities take place. What is the character and function of the space overall, of each individual's spaces, and the shared spaces.

Our system can be used in

- Public places
- Rushful area
- Traffic area
- Crowded place during festival

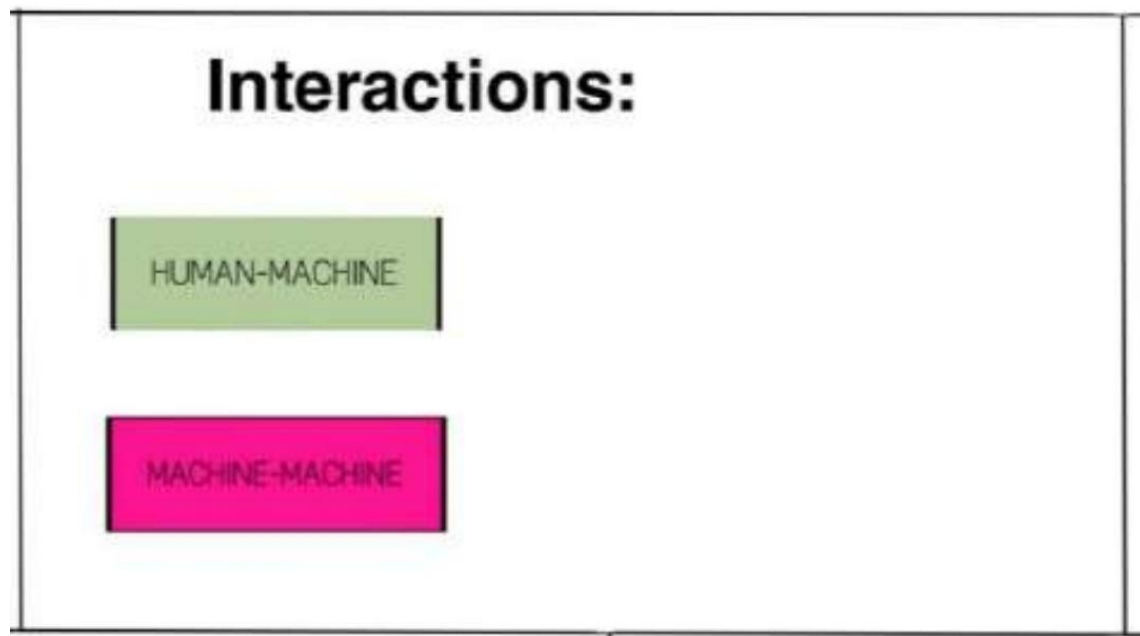


I-Interaction

Interaction between human and machine etc.... These are the building blocks of activities.

Here we include: -

- Interaction between Machine experts.
- Interaction between Machine to Machine.

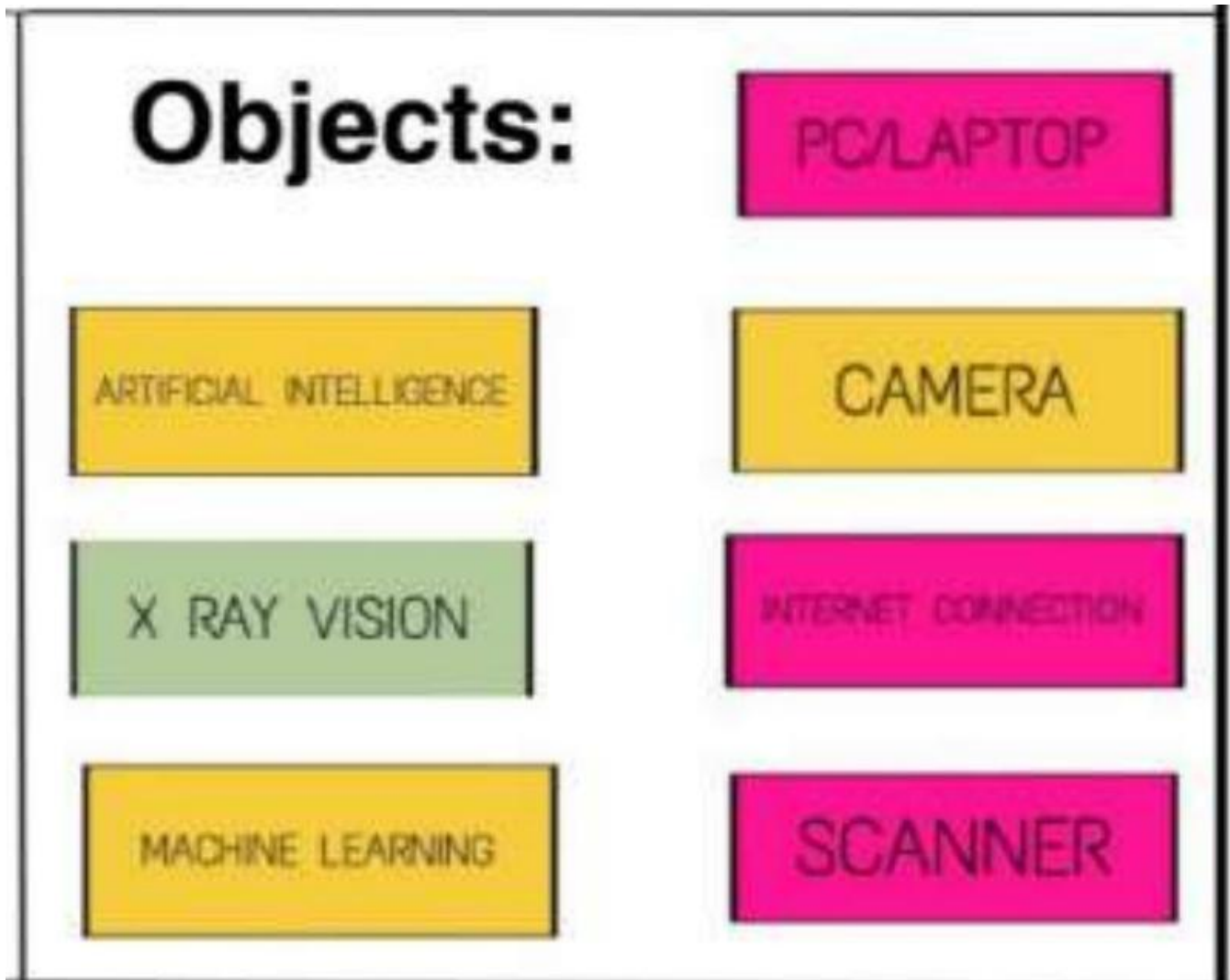


O-Object

What are the objects and devices people have in their environments and how do they relate to their activities?

In this part: -

- What components are Involved?
- How objects are relating to the activities?



Objects of our design are: -

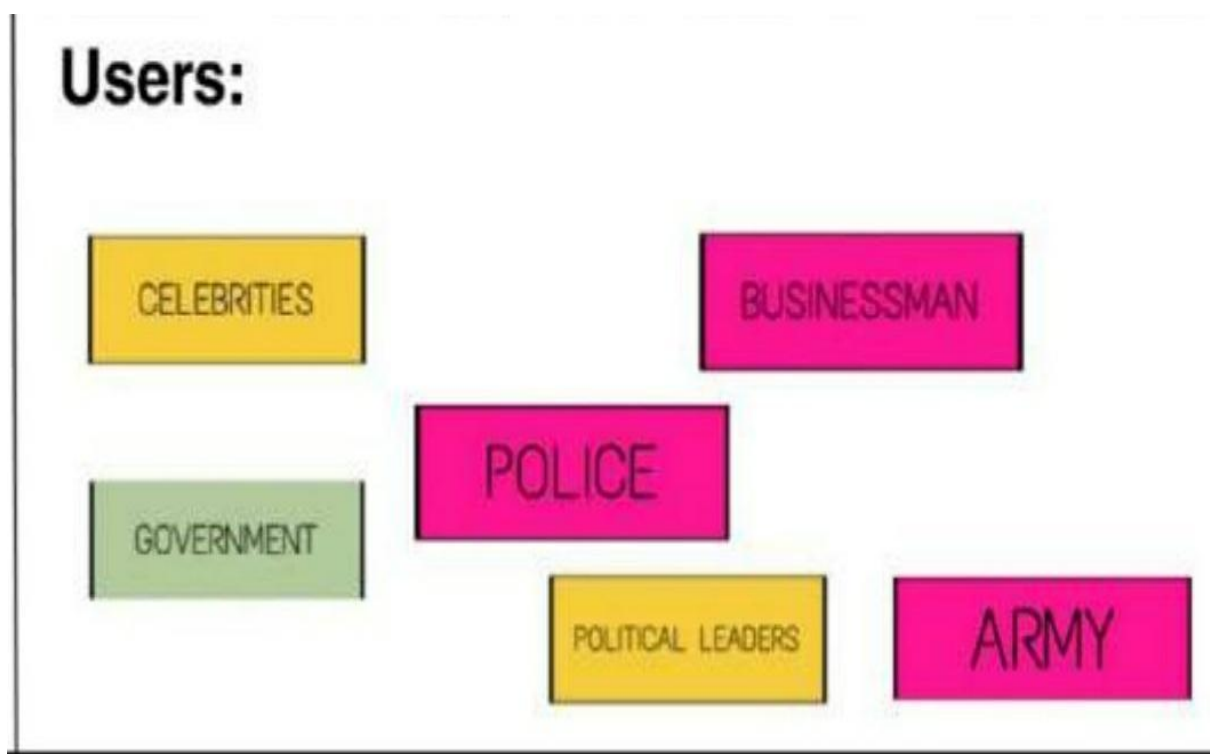
- Artificial intelligence.
- Camera to capture the pictures.
- X- Ray vision for scanning.
- High speed internet connection.

U-User

Users are the people who can use this system.

This part include: -

- Who can use this system?
- Purpose of the user.
- List the identified people involved.



User Included in our design are: -

- Army
- Police
- Government
- Political Leaders
- Celebrities

Literature Review:

Various techniques and approaches have been proposed and developed in this field to detect hidden weapons carried by any person in a public place one of those techniques is Colour Image detection technology.

In our proposed technique for CWD we consider two types of image – a visual image and an IR image. Visual image is nothing but an RGB image which has three main colour components Red, Green and Blue. Since the human visual system is very sensitive to colours this image creates a natural perception of an object to human vision but not helps so much in the detection of concealed weapons. For this we consider IR images as second input. It basically depends on high thermal emissivity of the body.

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Now we can use fusion technique because two images have the same dimension with the same size and we use DWT fusion technique between HSV colour image (IIR_HSV) and combined image $I_v_IR_c$. Processing for showing the weapon clearly in the visual image: Then this fused image converted into gray scale image. Now we use Otsu's local thresholding technique for binarizing fused gray scale images. Then Extract the weapon portion by calculating all connected area component and remove too small component and also too large a component according to the area values.

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Here below is the flow diagram of our proposed method.

Algorithm:

Step 1: Take a visual image (basically, RGB image) and an infrared (IR) image as input.

Step 2: Resize these two images so that they have the same size.

Step 3: Combine i.e. add resized Visual and IR image.

Step 4: Complement the IR image.

Step 5: Combine i.e. add resized Visual image and complemented IR image.

Step 6: Convert the visual RGB image to its HSV format.

Step 7: Perform DWT fusion on Step 5's combined image and Step 6's converted HSV image.

Step 8: Convert the fused image into its gray scale format.

Step 9: Binarize the Fused image.

Step 10: Detect the weapon from that image.

Step 11: Combine this detected weapon with visual image.

Step 12: For detecting the weapon clearly we find out the contour of the weapon.

Step 13: Then combine the contour of the weapon with visual image.

Step 14: End.

Empathy Mapping/ Framework

While performing our activities, we'd encounter many challenges.

Talking about the user of our design, we focused mainly on the defence sector of the nation, Security of the society.

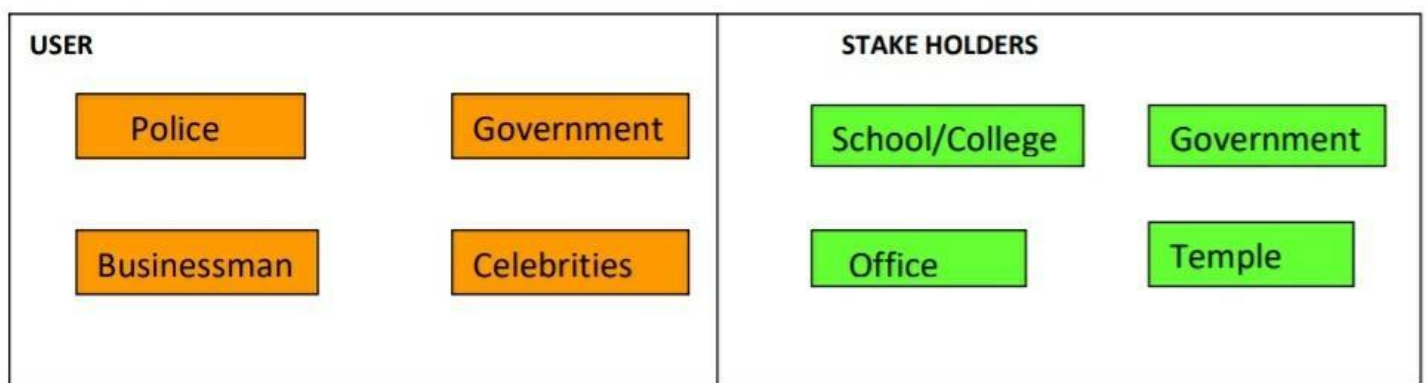
Here are the list of possible users and stakeholders of RAKSHAK.

Users: -

- Police
- Government
- Businessman
- Celebrities

Stakeholders: -

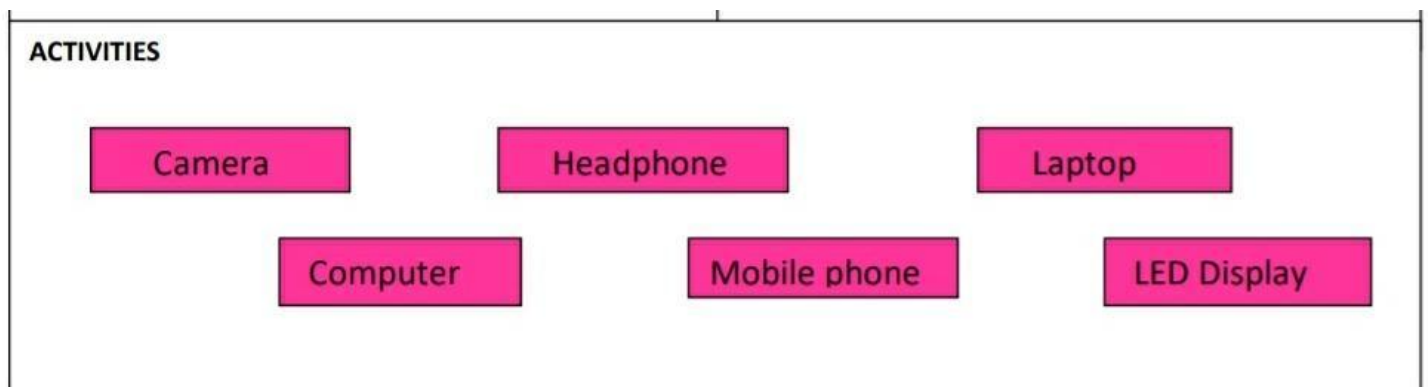
- School/College
- Government
- Office
- Temple



Activities: -

Using following components following activities will be performed: -

- Camera
- Headphone
- Laptop
- Computer
- Mobile phone
- LED Display



Empathy Mapping:

Design For

Design By

Date :

Version

USER	STAKE HOLDERS
<div>Police</div> <div>Government</div>	<div>School/College</div> <div>Government</div>
<div>Businessman</div> <div>Celebrities</div>	<div>Office</div> <div>Temple</div>

ACTIVITIES
<div>Camera</div> <div>Headphone</div> <div>Laptop</div> <div>Computer</div> <div>Mobile phone</div> <div>LED Display</div>

STORY BOARDING

HAPPY : The happy thing about this Project is that its gonna reduce the feeling of threat and terror from people's mind and gonna help all the peace keeping member of society to live there life peacefully without having any distraction or threat of any kind. The graph of threat in people will decrease exponentially.

HAPPY : The another happy thing about this is that this project is gonna help the government in a immense way because the government will have pre alarm for any suspicious thing and the security personals of government can take the required necessary action.

SAD : The only sad thing about this is that it will require persons having a immense knowledge of algorithms related to Machine learning and Artificial intelligence, which is very hard to have which will result in the delay of future updation of the software.

SAD : The another sad thing about this is that it is somehow have a cost in between intermediate range and will require maintainances over long period of time.

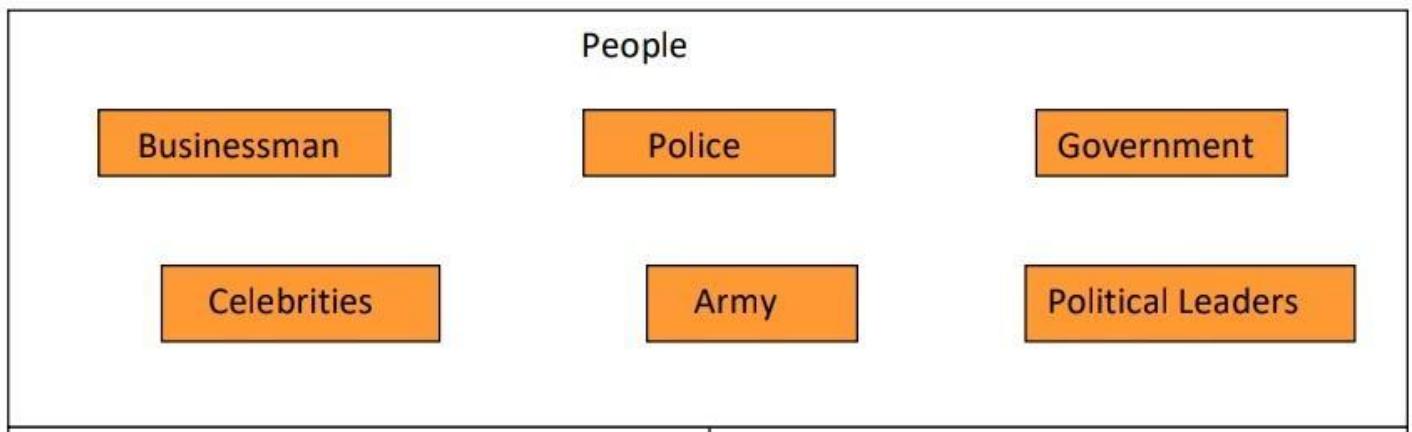
After mapping the Empathy chart, we came to the conclusion that the design is suitable to our goals with different aspects.

- The design Is suitable for daily use.
- It will definitely help people and security forces.
- It will be useful in the defence sector of the nation.

Ideation Canvas/ framework

Peoples Included in the idea of the design are:

- Police
- Government
- Businessman
- Celebrities
- Army
- Political Leaders



Situation locations and contexts

At following location our system can be used:-

- Hospital
- School
- College
- Office
- Mall
- Temple

Situation/Context/Location

Hospital

School/College

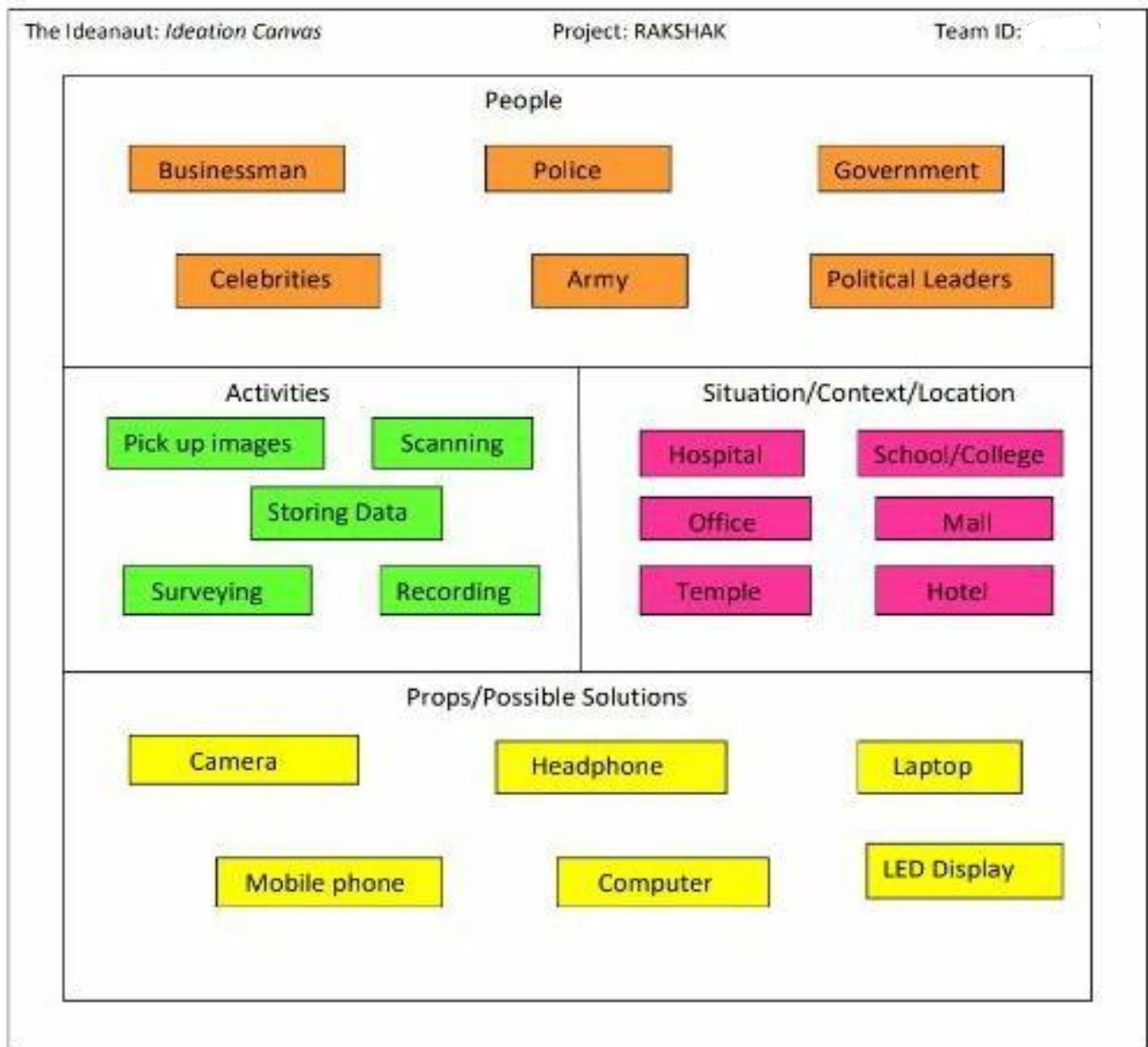
Office

Mall

Temple

Hotel

The Complete Ideation Canvas is shown below.



Product Development Canvas

Product Development Canvas		Team/Date/Version:
🔍 Purpose <small>What is the purpose of this product you're developing? Does it solve a problem, or it enhances a certain experience? Is it serving a need or it is trying to create a new need or tap an unmet need?</small>	👑 Product Experience <small>Define what your customer should feel like when he uses your product/service? What emotions, feelings would define his experience? Feeling of comfort, convenience, or feeling of buying more with less cost, increased or feeling of greater security, safety etc.</small>	📋 Customer Revalidation <small>Once you're finished with your features set, test with the customer. Give it the features, functions are useful. Speak to the customer's use.</small>
Security freedom terror free country	Safety Security Product Functions <small>Functions are a product's answer to user problems/needs. They do something that user wants. They are often verbs in nature. Every function is powered by many features. Multitasking is a function. Browser tabs is a feature that powers the multitasking feature. A function can have one or more features powering it. Functions are very generic in nature. Features are often more specific. Functions can be similar to product experience. Safety (product function) provides a feeling of safety (product experience).</small>	Satisfaction Protecton
People <small>Who is the key customer segment who will use this product/service or the end product of the concept you're evolving? Write here about them, describe them a little.</small>	Product Features <small>Product features are specific. One or more features are power a function. Android (feature), Airpods are features that power the safety function. Browser tabs, Apple's home button to multitask between apps are features powering the multitasking function. Each feature will have many components/sub components powering it. Sometimes a very popular component becomes a feature itself. Like car stereo is a major component and a feature at the same time powering the in-car entertainment function powering entertainment as a product experience.</small>	Reject, Redesign, Retain <small>Post customer validation, reject those functions or features that the customers didn't find useful. Redesign those that were partially useful and retain those that the customer liked. Retain all functions/features as expected.</small>
Government Defence Security-personals	Components <small>Components build up the features. For a laptop it will comprise a lot of convenient like bags, triggers etc. that go into making it. For a tabbed browser it will comprise of various chunks of code that will make the tabs work. In cases where the feature is a major component, you could list here the auxiliary components that are required to make the major component work. You can also list new adjustments and innovations you're planning here at the component level.</small>	GUI Bug Fixing
	Tracking Tracing ML, AL Laptop Algorithm CCTV Projector	

Purpose:

- For security of the nation
- Freedom the citizens
- Terror free country

People:

- Government
- Defence
- Security personals

Product function:

- Artificial Intelligence
- Security
- Machine Learning

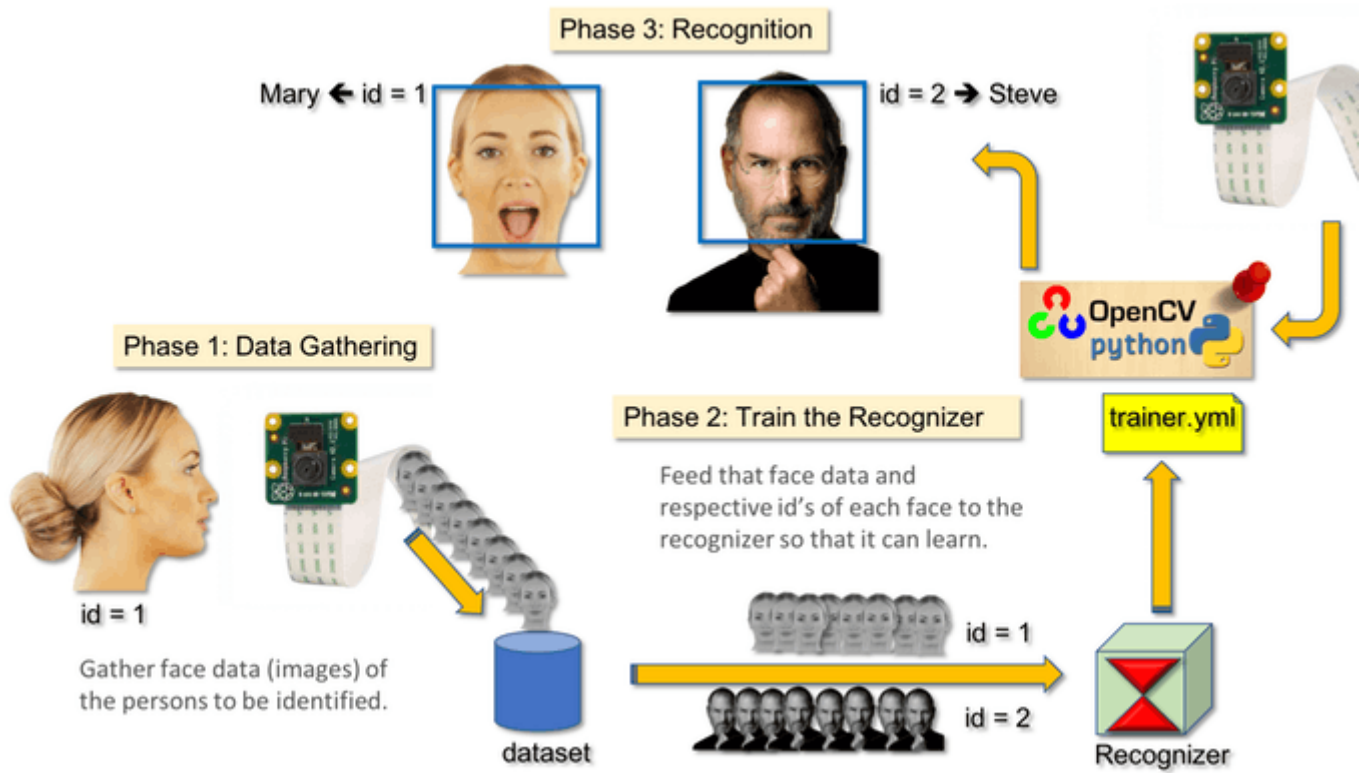
Product Features

- Tracking
- Tracing
- Machine learning
- Artificial Intelligence

Customer Validation

- Satisfaction
- Protection

Prototype mapping



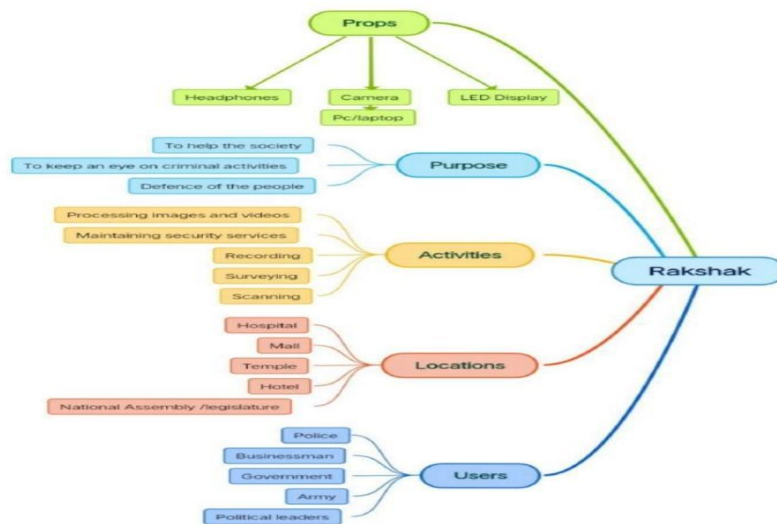
Working Prototype Video:

<https://youtu.be/wxewEDAo88Q>

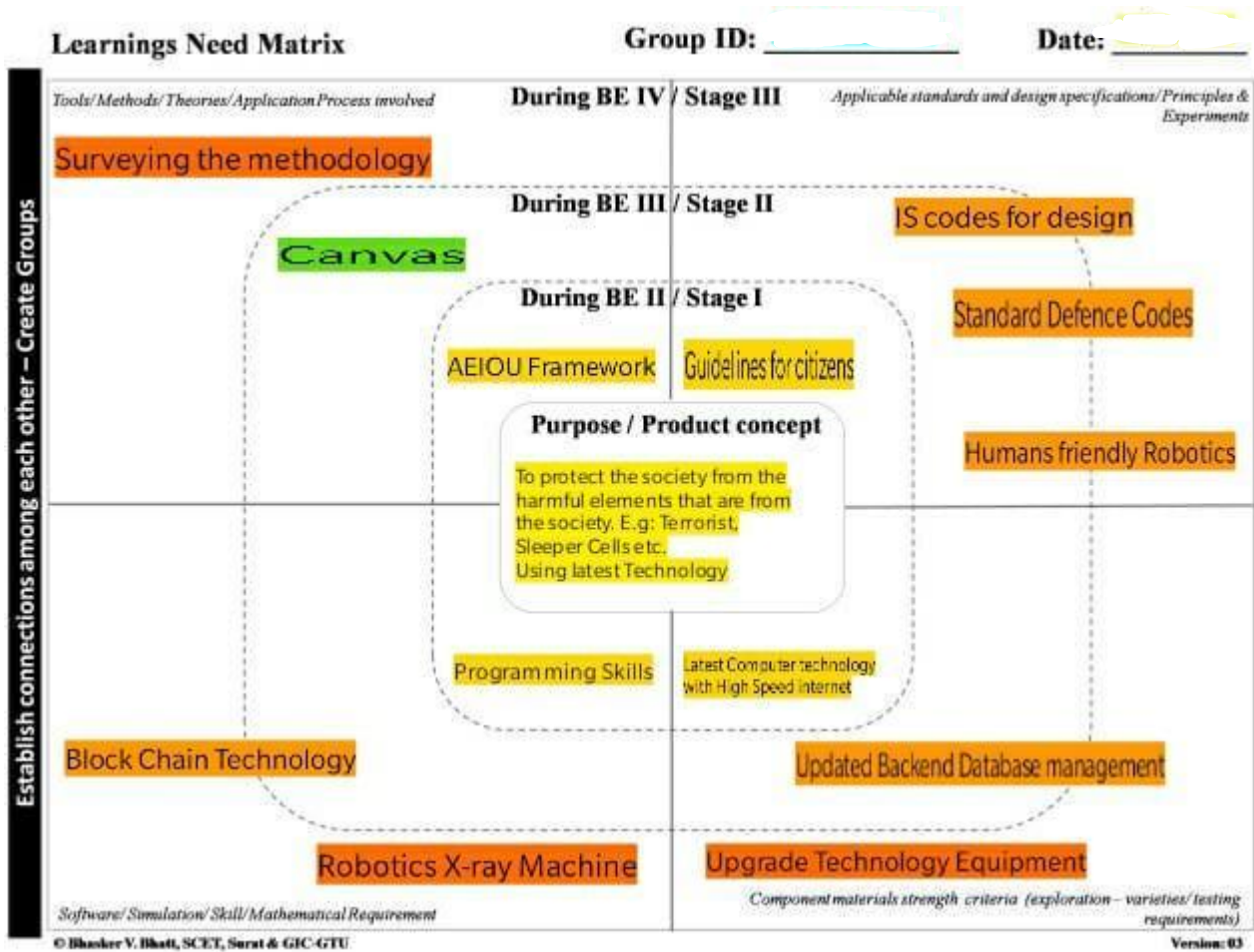
Overall mapping of idea/ design

Mind-map:

Group ID:251588



LNM Canvas:



AEIOU CANVAS:

AEIOU Summary :		Group ID. _____ Domain Name: Rakshak	Date: _____	Version: _____
Environment: <div><div>RUSHFUL AREA</div><div>CROWD DURING VARIOUS EVENTS, FESTIVALS</div><div>PUBLIC PLACES</div><div>TRAFFIC</div></div>	Interactions: <div><div>HUMAN-MACHINE</div><div>MACHINE-MACHINE</div></div>	Objects: <div><div>PC/LAPTOP</div><div>ARTIFICIAL INTELLIGENCE</div><div>CAMERA</div><div>X RAY VISION</div><div>INTERNET CONNECTION</div><div>MACHINE LEARNING</div><div>SCANNER</div></div>		
Activities: <div><div>REQUEST FOR INTERNET ACCESS</div><div>RECORDING</div><div>SURVEYING</div><div>NOTICING</div><div>PROCESSING IMAGES AND VIDEOS</div><div>SCANNING</div><div>MAINTAINING SECURITY SERVICES</div><div>STORING AND ACCESSING THE DATA</div></div>		Users: <div><div>CELEBRITIES</div><div>BUSINESSMAN</div><div>POLICE</div><div>GOVERNMENT</div><div>POLITICAL LEADERS</div><div>ARMY</div></div>		

Empathy Canvas:

Design For

Date :

Design By

Version

<div>USER</div> <div> <div>Police</div> <div>Government</div> <div>Businessman</div> <div>Celebrities</div> </div>	<div>STAKE HOLDERS</div> <div> <div>School/College</div> <div>Government</div> <div>Office</div> <div>Temple</div> </div>
<div>ACTIVITIES</div> <div> <div>Camera</div> <div>Headphone</div> <div>Laptop</div> <div>Computer</div> <div>Mobile phone</div> <div>LED Display</div> </div>	

STORY BOARDING

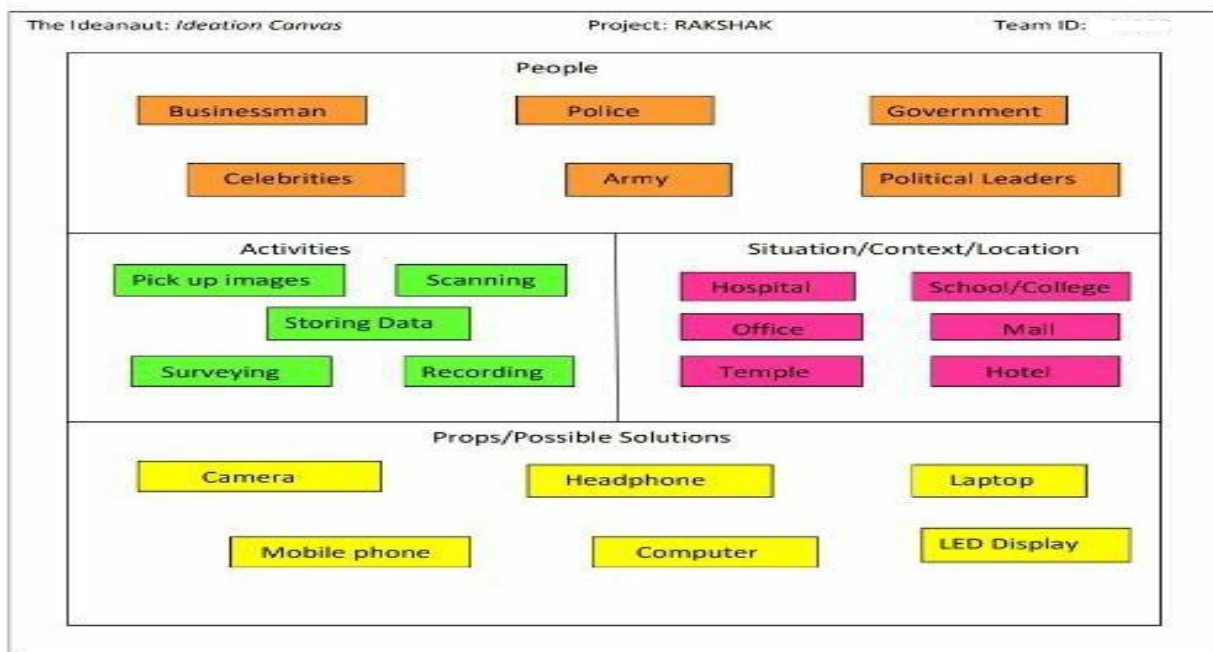
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Ideation Canvas:



Product development Canvas:

Product Development Canvas		Team/Date/Version:
<p>Purpose</p> <p>What is the purpose of this concept you're developing? Does it solve a problem, or it enhances a certain experience? Is it serving a need or it is trying to create a new need or tap an unmet need?</p> <p>Security</p> <p>freedom</p> <p>terror free country</p>	<p>Product Experience</p> <p>Define what your customer should feel like when he uses your product/service? (What emotions, feelings would define its experience? Feeling of comfort, convenience, or feeling of buying more with less cost conscious or feeling of greater security/safety etc.)</p> <p>Safety Security</p> <p>Product Functions</p> <p>Functions are a product's answer to user problems/needs. They do something that user wants. They are often verbs. In nature, Every function is powered by many features. Multitasking is a function. Browser tabs is a feature that powers the multitasking feature. A function can have one or more features powering it. Functions are very generic in nature. Features are often more specific. Functions can be similar to product experience. Safety (product function) provides a feeling of safety (product experience).</p> <p>ML Security AI</p> <p>Product Features</p> <p>Product features are specific. One or more features empower a function. Antivirus Brakes, Airbags are features that power the safety function. Browser tabs, Apple's home button to multitask between apps are features powering the multitasking function. Each feature will have many components/sub-components powering it. Sometimes a very popular component becomes a feature itself. Like car stereo is a major component and a feature at the same time powering the in-car entertainment function powering entertainment as a product experience.</p> <p>Tracking Tracing ML, AL</p> <p>Components</p> <p>Components build up the features. For a laptop it will comprise a list of component like bags, isipens etc. that go into making it. For a tabbed browser it will comprise of various chunks of code that will make the tabs work. In cases where the feature is a major component, you could list here the auxiliary components that are required to make the major component work. You can also list new adjustments and innovations you're planning here at the component level.</p> <p>Laptop Algorithm</p> <p>CCTV Projector</p>	<p>Customer Revalidation</p> <p>Once you're finished with your feature set, test with the customer. Ask if the features, functions are useful. Speak to the customer/user.</p> <p>Satisfaction</p> <p>Protecton</p> <p>Reject, Redesign, Retain</p> <p>Post customer validation, reject those functions or features that the customer didn't find useful. Redesign those that were partially useful and retain those that the customer liked with this level of functions/features as expected.</p> <p>GUI</p> <p>Bug Fixing</p>
<p>People</p> <p>Who is the key customer segment who will use the product/service or the end product of the concept you're pursuing? Write here about them, describe them a little.</p> <p>Government</p> <p>Defence</p> <p>Security-personals</p>		

Conclusion:

It was a wonderful learning experience for us while working on this type of project. This project took us through the various phases of project development and gave us real insight into the world of software engineering and web development. The joy of working and the thrill involved while tackling the various problems and challenges gave us a feel of the developers' industry. It was due to this project we came to know how professional website is designed. We also learned from our mistakes that given us experience and faced many challenges which will be helpful in our professional career.

Refrences:

- <http://de.gtu.ac.in/>
- <https://www.gecmodasa.ac.in/>
- <https://www.github.com/zeel-pathak>

PLAGIARISM REPORT:



GUJARAT TECHNICAL UNIVERSITY GOVERNMENT ENGINEERING COLLEGE MODASA affiliated with GTU A Project Report On RAKSHAK Prepared as a part of the requirements for the subject of DESIGN ENGINEERING – II A B. E. III, Semester – V (Information Technology) Submitted by: Group Id: 251588 Sr. Name of student Enrollment no. 1. Zeel Pathak 180160116081 2. Priya Patel 180160116071 3. Tilak Shaky 180160116100 4. Kinjal Suthar 180160116111 Prof. Amit Parmar (Faculty Guide) Prof. M B Chaudhary Head of the Department Academic year (2020-2021) Government Engineering... (only first 800 chars shown)



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