GUJARAT TECHNOLOGICAL UNIVERSITY

Chandkheda, Ahmedabad

Sarvajanik College Of Engineering And Technology , Surat

Under Subject Of

DESIGN ENGINEERING 2-A

B.E. III , SEMESTER-V

ELECTRONICS & COMMUNICATION

Report On

Smart Blind Stick

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FLOW

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Introduction

- Vision is the most important part of human physiology as 83% of information human being gets from the environment is via sight.
- Presently, blind people use a white stick as a tool for directing them when they move or walk.
- Here, we develop a tool which can serve as a blind stick being more efficient and helpful than the conventional one.

Motivation

- The mobility of blind people in unknown environment seems impossible without external help, because they don't have any proper idea about their surroundings. So, we are developing a smart walking stick which helps them to know about their surroundings and also guide them during travelling.

❖Main aim of our project:

- 1. Blind people finding of way through a complex environment
- 2. The orientation and navigation for these people in unknown environment seems possible
- 3. Blind peoples are fearless or comfortable about independent mobility or travel

Advantages & Disadvantages

ADVANTAGES

- Having feature to left & right turn alarm signal.
- Obstacle detection with indication support.
- Dig information with indication alarm.
- Simple to use & low cost

DISADVANTAGES

- Limited & fixed route to follow daily routine.
- Till now, GPS can't attach in it due to 40 meter to change coordinate as to follow the path/ new path.
- Little sensor support in these fields

Working and prototype

1. Components required:-

- WOODEN STICK / PLASTIC STICK
- ARDUINO UNO
- ULTRASONIC SENSORS
- BUZZER
- BATTERY
- SWITCH
- LEDS

Working & prototype

1. ***Ultrasonic Sensor:-***

A Transducer can measure distances using ultrasonic waves. It consists of two parts, transmitter and receiver. The transmitter emits the ultrasonic waves. The receiver detects the reflecting signals from the objects. The ultrasonic sensors work based on a principle which called “The Time of flight” using the speed of sound. A rang of pulses between (20 KHZ to 200 KHZ) is emitted by the sensor. When the pulse impacts an object and then reflected; therefore, the receiver of the sensor will be able to detect this signal. The time difference between the outgoing signal and the reflected signal known as (Δt) and the speed of sound at 20o c is equal to 343.5m/s.

Working & prototype

2. ***Arduino:-***

A microcontroller chip is based on Atmega328p microchip. It's an open source board. The board has 14 digital pins, 6 analogue pins and can be powered by USB cable or 9v external battery

Working & prototype

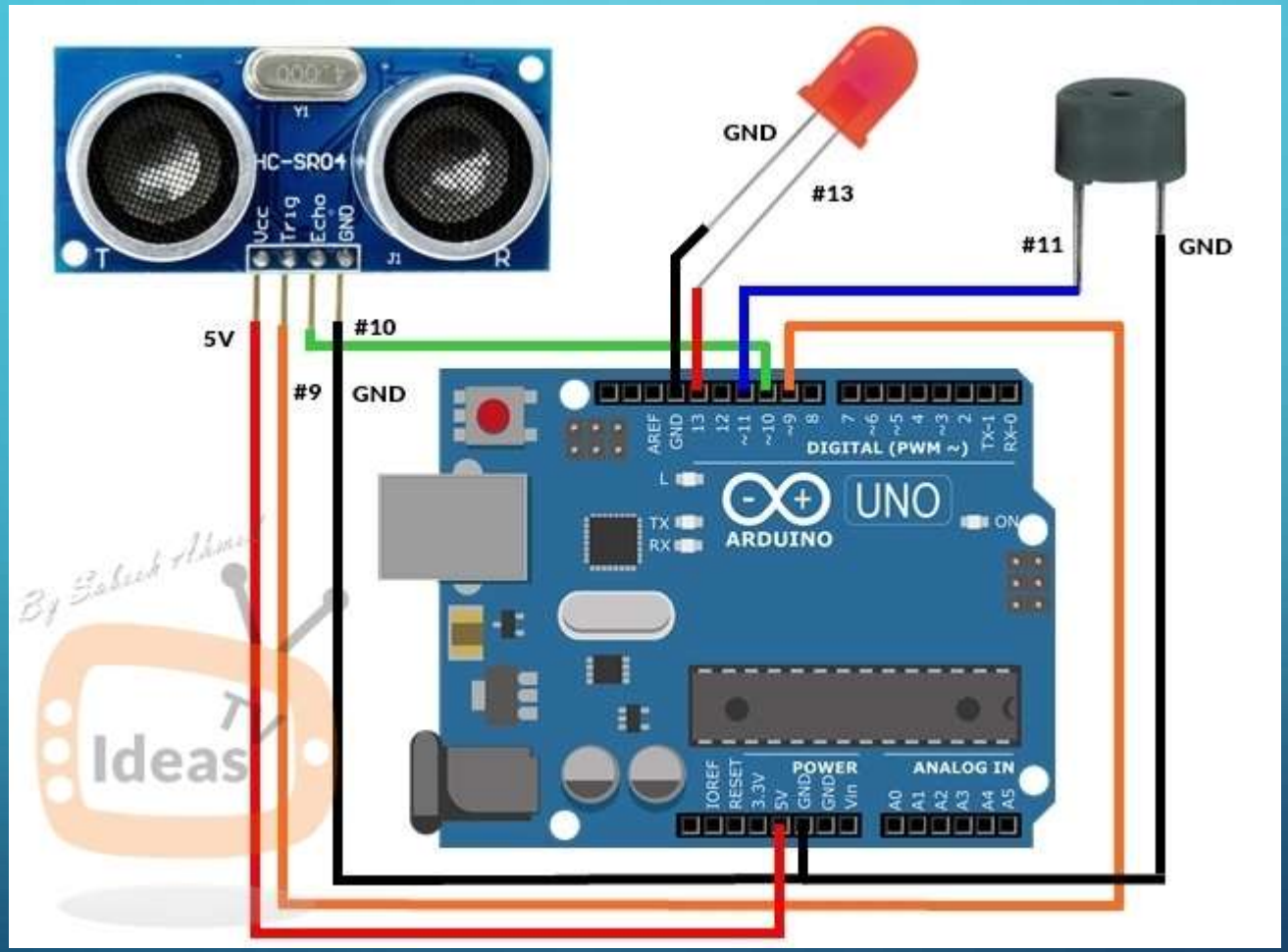
3. Buzzer:-

A "piezo buzzer" is basically a small speaker which will be connected directly to an Arduino. "Piezoelectricity" is an impression where certain crystals can deform once electricity is applied to them. By applying an electrical signal at the proper frequency, the crystal will create sound.

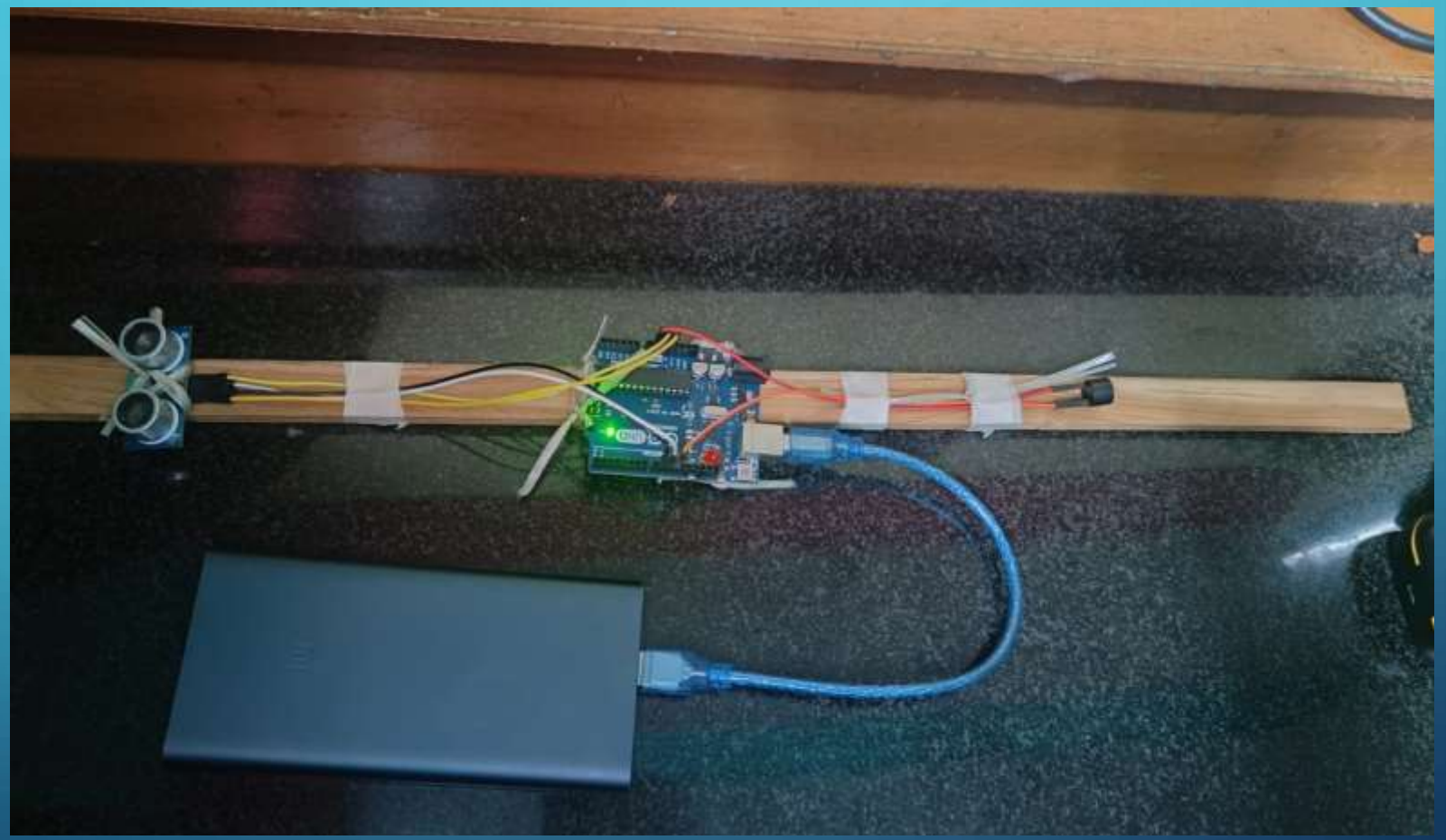
4. Vibrating motar:-

A vibratory motor is actually a motor that's improperly balanced. In alternative words, there's an off-centered weight attached to the motor's rotational shaft that causes the motor to wobble. The amount of wobble may be modified depending on the amount of weight can be attached, the weight's distance from the shaft, and the speed at which the motor spins

CIRCUIT DIAGRAM

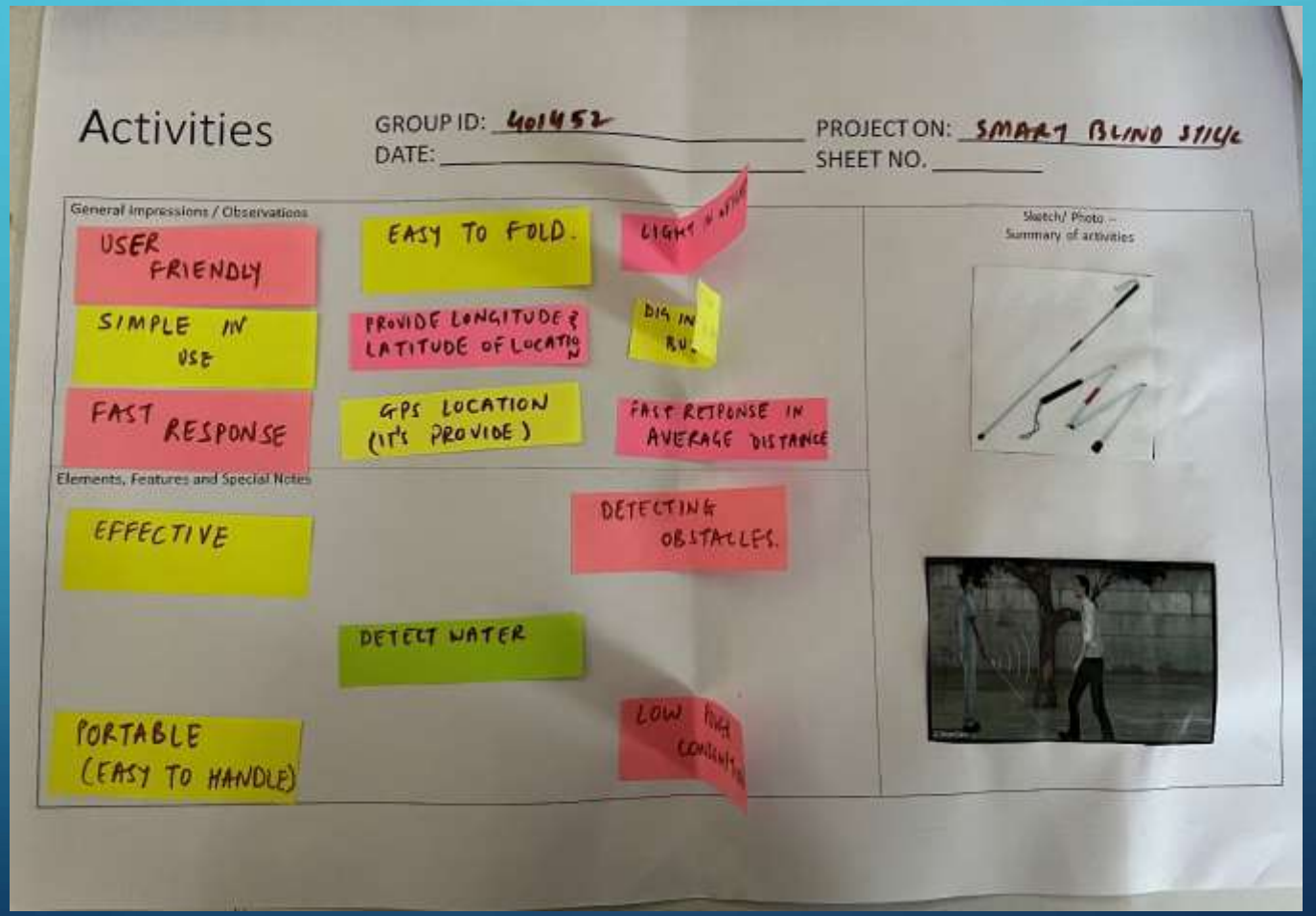


PROTOTYPE

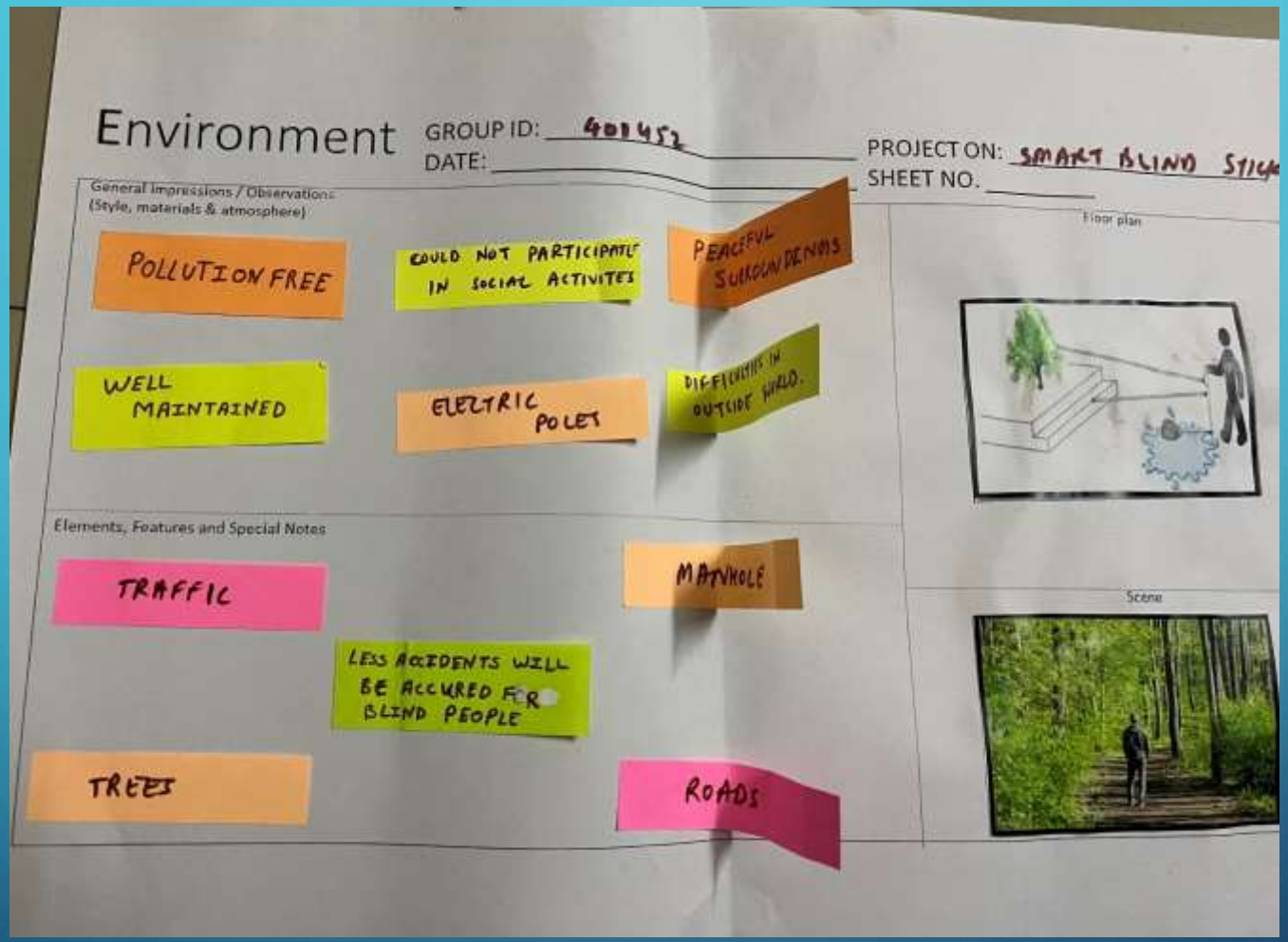


Aeiou canvas & mind mapping

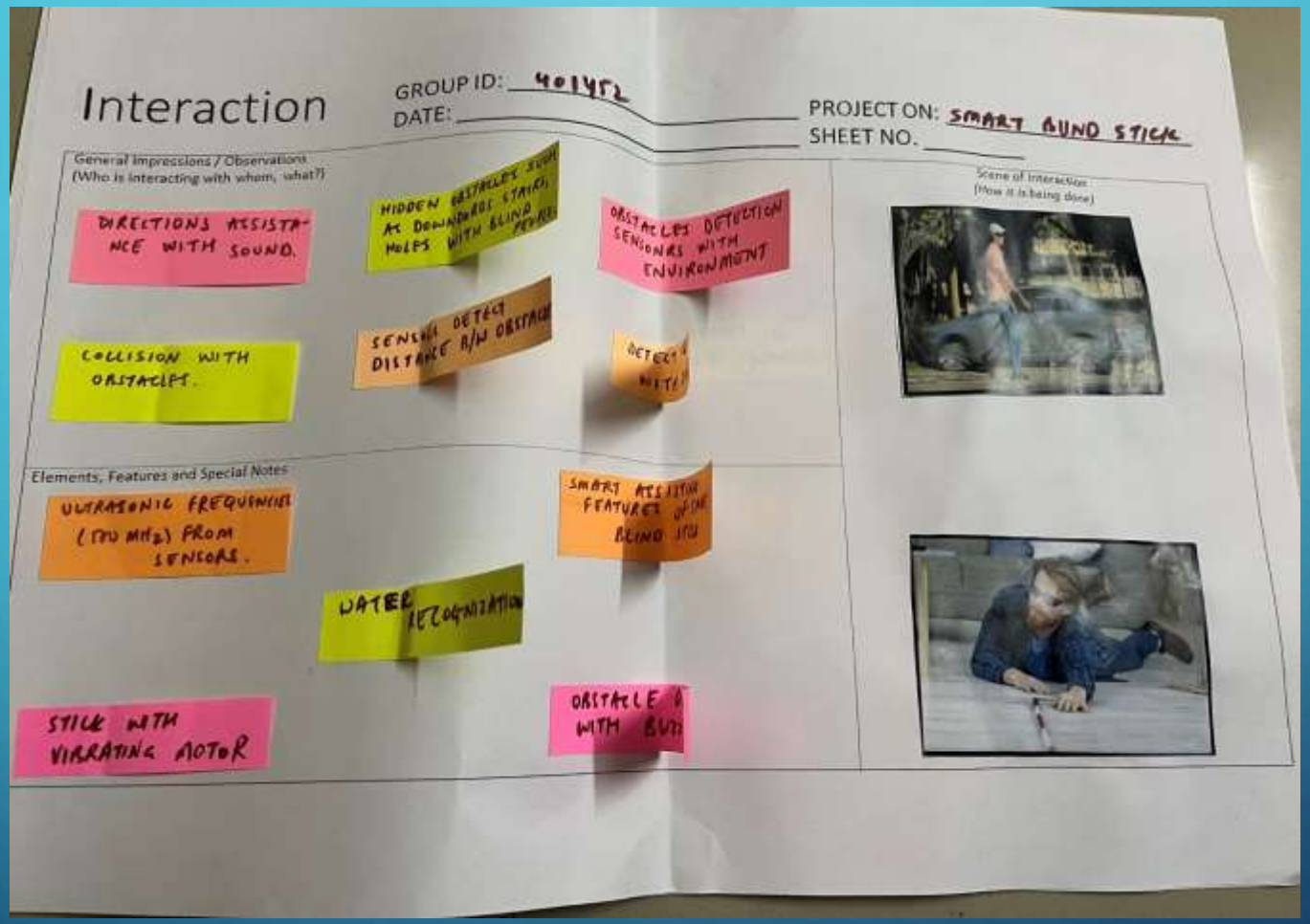
- Activity



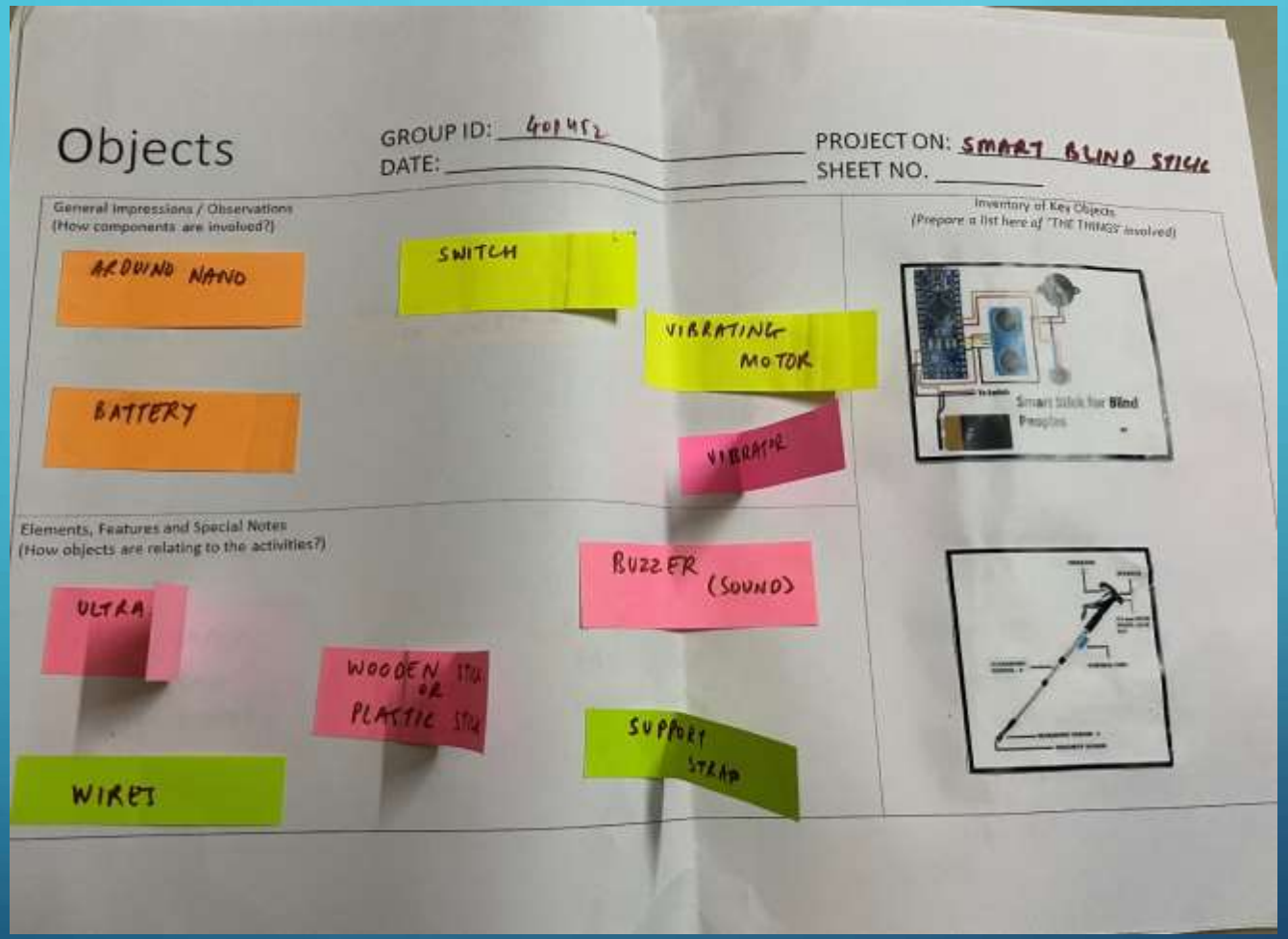
- Environment



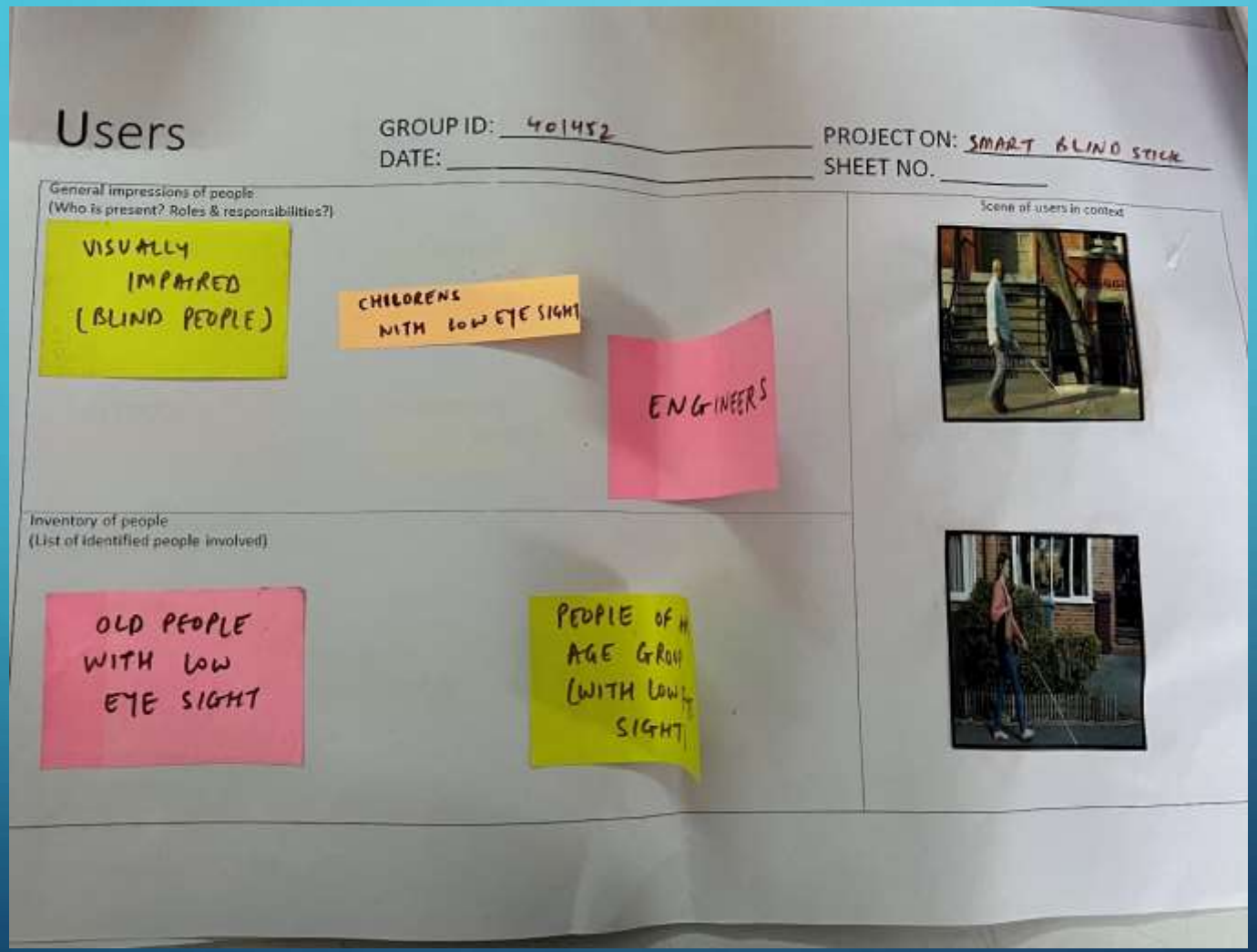
- Interaction



- Object


Objects
GROUP ID: 40145
DATE:
PROJECT ON: SMART BLIND STICK
SHEET NO.
General Impressions / Observations
(How components are involved?)
ARDUINO NANO
SWITCH
VIBRATING MOTOR
BATTERY
VIBRATOR
Inventory of Key Objects
(Prepare a list here of 'THE THINGS' involved)
Elements, Features and Special Notes
(How objects are relating to the activities?)
BUZZER (SOUND)
ULTRA
WOODEN STICK OR PLASTIC STICK
SUPPORT STRAP
WIRES

- User


Users
GROUP ID: 401452
DATE:
PROJECT ON: SMART BLIND STICK
SHEET NO.
General impressions of people
(Who is present? Roles & responsibilities?)
VISUALLY IMPAIRED (BLIND PEOPLE)
CHILDRENS WITH LOW EYE SIGHT
ENGINEERS
Scene of users in context
Inventory of people
(List of identified people involved)
OLD PEOPLE WITH LOW EYE SIGHT
PEOPLE OF H AGE GROU (WITH LOW SIGHT

AEIOU SUMMARY

DOMAIN NAME: OBSTACLE DETECTION SYSTEM FOR BLINDS

ACTIVITIES:

- USER FRIENDLY
- EFFECTIVE
- PORTABLE (EASY TO HANDLE)
- LOW POWER CONSUMPTION
- SIMPLE IN USE
- FAST RESPONSE
- EASY TO FOLD
- DETECTING OBSTCLES

OBJECTS:

- WOODEN STICK / PLASTIC STICK
- ARDUINO NANO
- ULTRASONIC SENSORS
- BUZZER
- BATTERY
- SWITCH
- VIBRATING MOTOR

ENVIRONMENT:

- LESS ACCIDENTS WILL BE ACCRUED FROM BLIND PEOPLE
- POLLUTION FREE
- WELL MAINTAINED
- PEACEFUL SURROUNDINGS

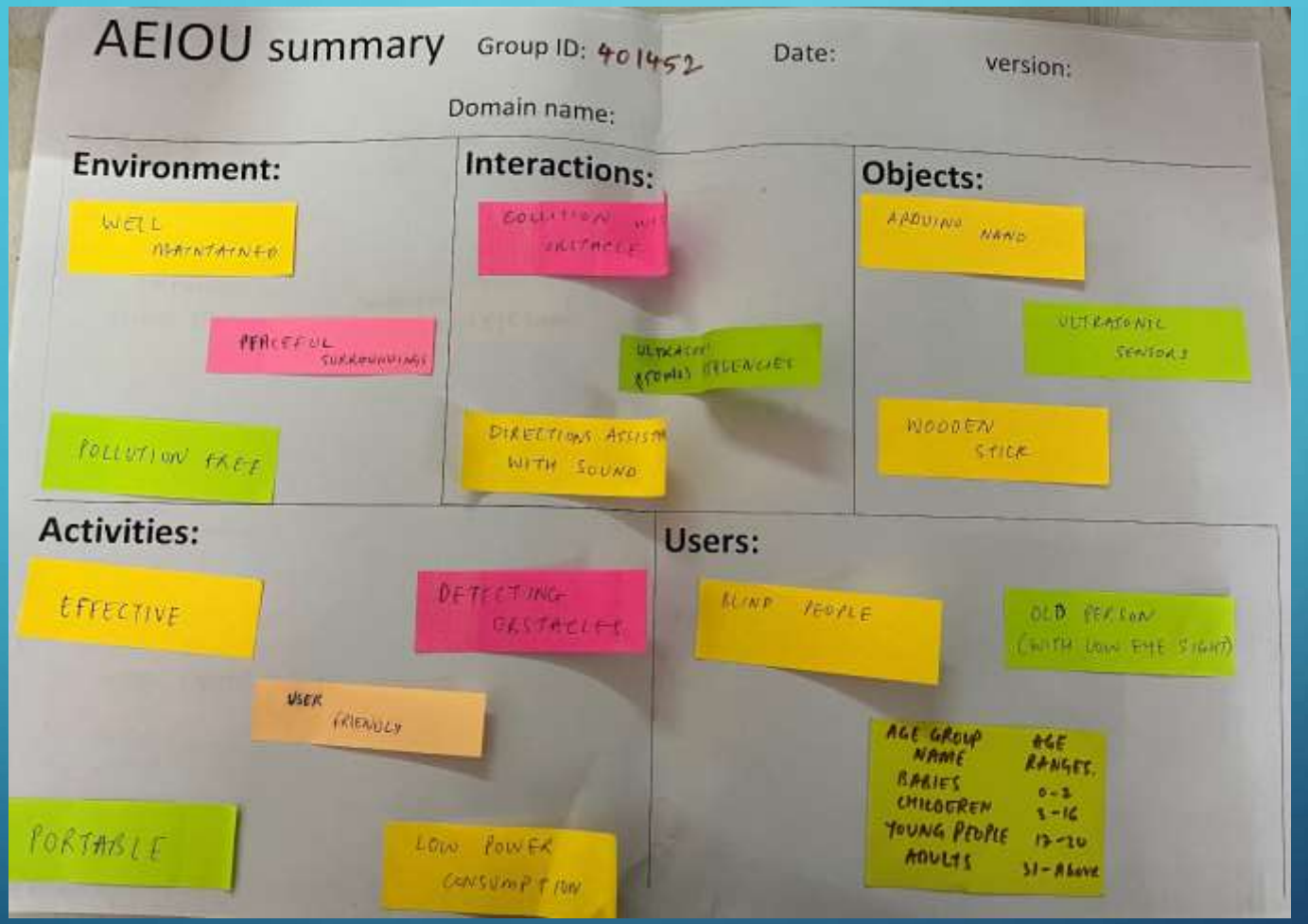
INTERACTIONS:

- DIRECTIONS ASSISTANCE WITH SOUND
- OBSTACLES DETECTION SENSORS WITH ENVIRONMENT
- HIDDEN OBSTACLES SUCH AS DOWNWARDS STAIRS,HOLES WITH BLIND PEOPLE
- ULTRASONIC FREQUENCIES(500 MHz) FROM SENSORS
- SENSORY ASSISTING FEATURES OF SMART BLIND STICK .

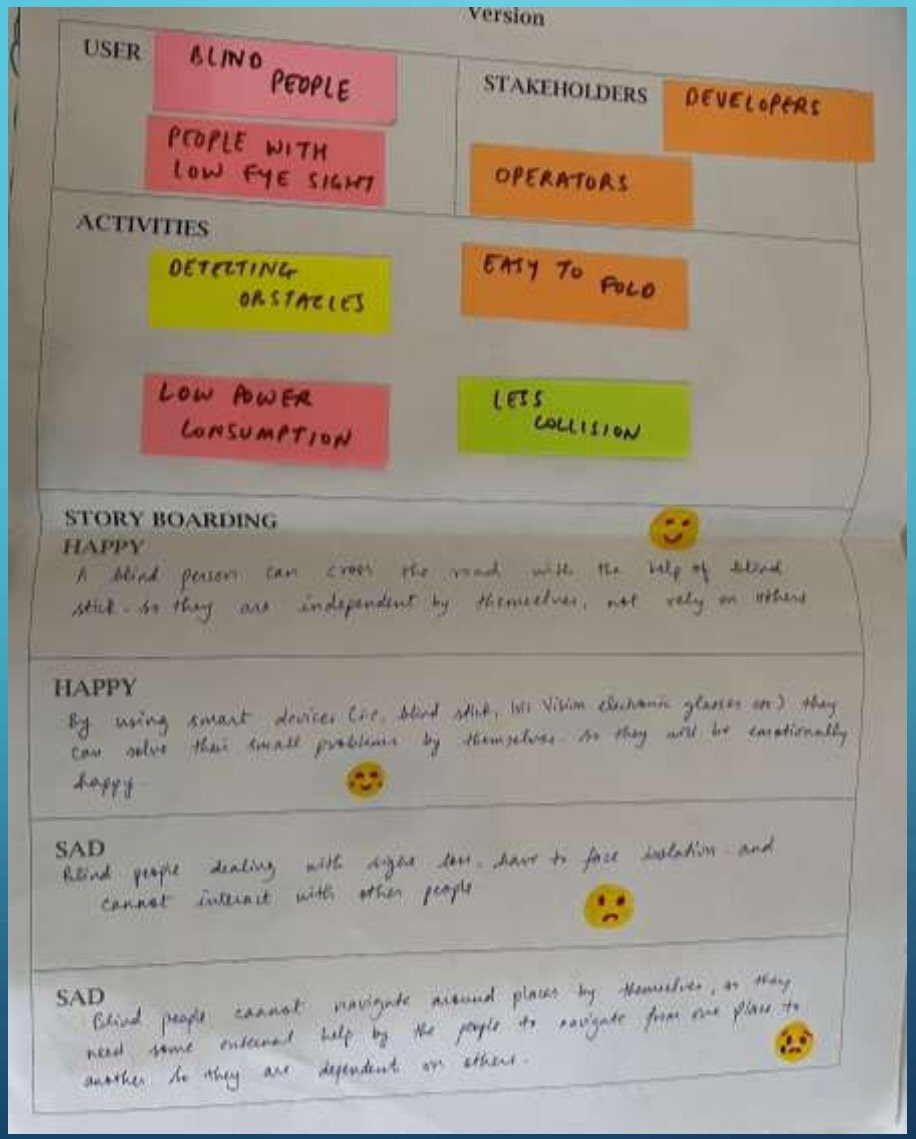
USERS:

- VISUALLY IMPAIRED (BLIND PEOPLE)
- OLD PEOPLE WITH LOW EYE SIGHT
- PEOPLE OF ANY GROUP AGE (WITH LOW EYE SIGHT)
- ENGINEERS

AEIOU SUMMARY

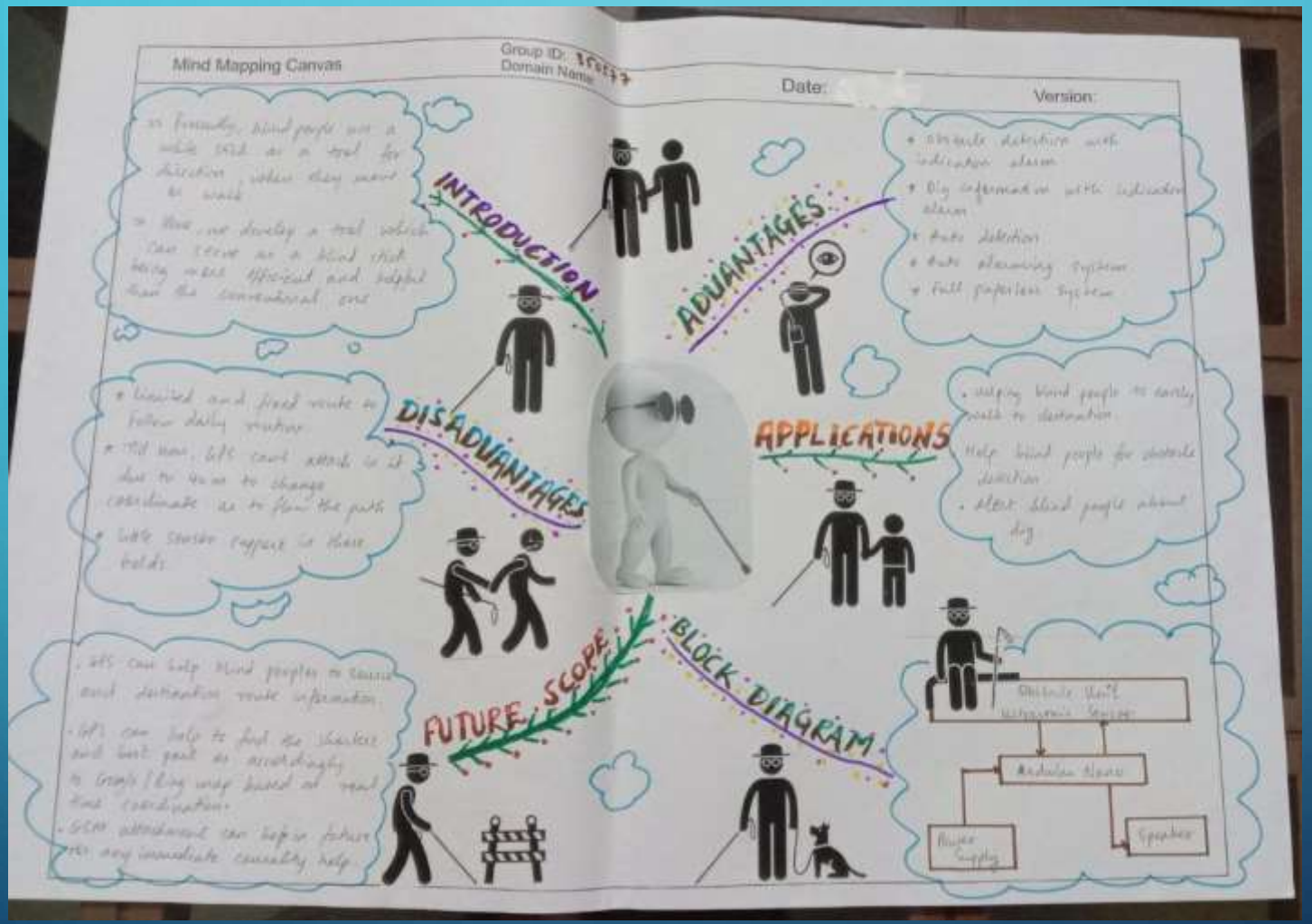


Empathy mapping



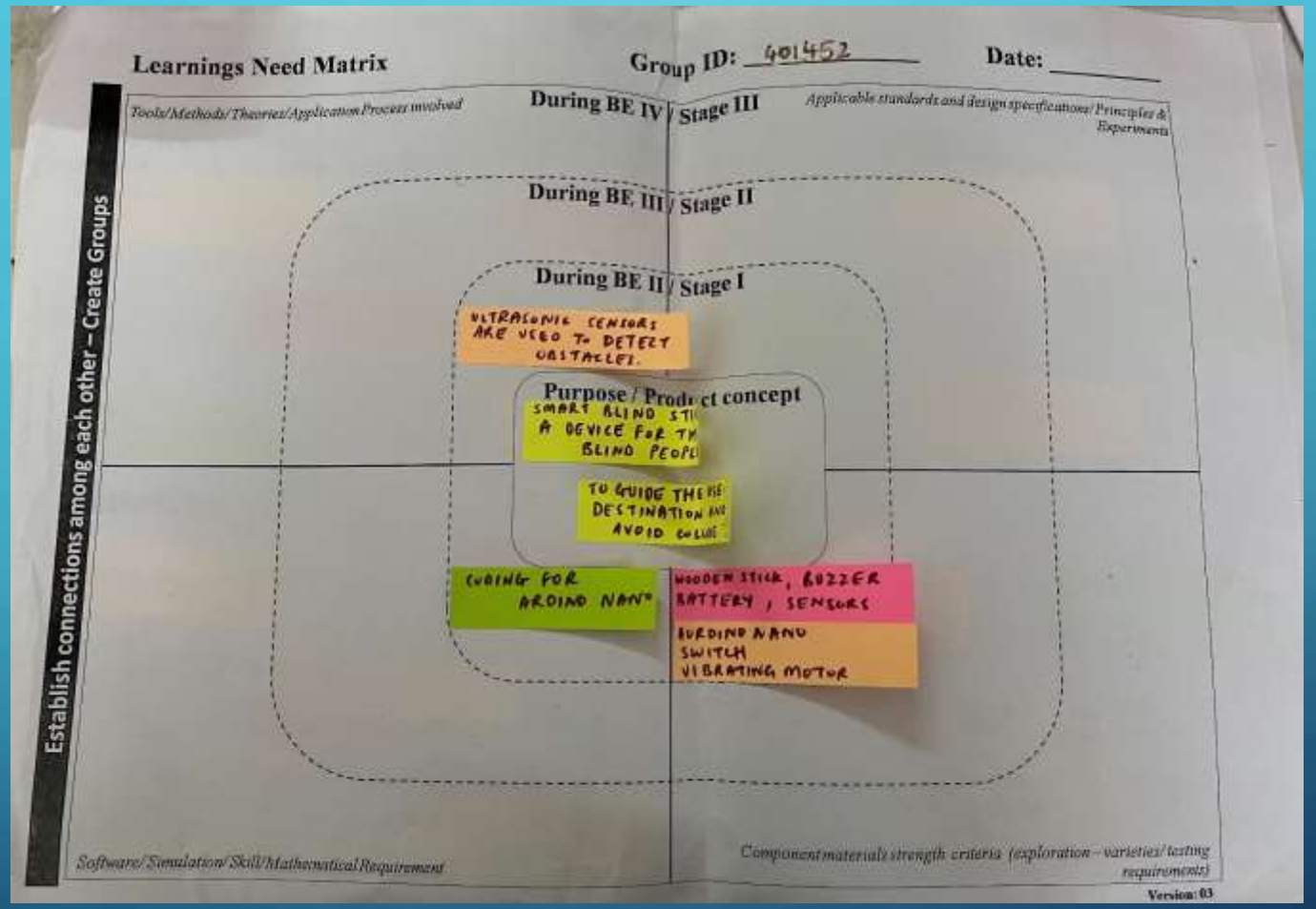
Ideation canvas

Mind map


Mind Mapping Canvas
Group ID:
Domain Name:
Date:
Version:
INTRODUCTION
ADVANTAGES
DISADVANTAGES
APPLICATIONS
FUTURE SCOPE
BLOCK DIAGRAM

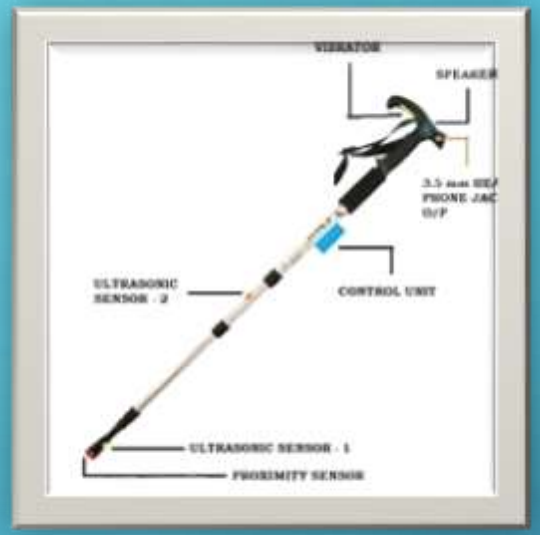
Product development canvas

LEARNING NEED MATRIX



Future scope

- It can be further enhanced by using VLSI technology to design the PCB unit
- using the global positioning system (GPS), and their current position and guidance to their destination will be given to the user by voice.
- GPS can help blind peoples to source destination route information.
- Adding voice assistance feature for guidance
- Adding vibrating motors to the circuit for blind and deaf people



Summary

- Humans are not disabled. A person can never be broken. Our built environment, our technologies, is broken and disabled. We the people need not accept our limitations, but can transfer disability through technological innovation.
- This system offers a low-cost, reliable, portable, low-power consumption and robust solution for navigation with obvious short response time. Though the system is hard- wired with sensors and other components, it's light in weight.
- After going through different stages of design engineering, we have learnt lot of things which has helped us in making our project in a very innovative and user-friendly manner . Through the process of empathy mapping, mind mapping , ideation and product development canvases, we have learnt about users' needs and their problems.

Refrences

- Mohd Helmy Abd Wahab, Amirul A. Talib, Herdawatie A.Kadis, Ayob rohuri, A.Noraziah, Roslina M. Sidek, Ariffin A "Smart cane: assistive cane for visually impaired people" UCSI, Vol.8 Issue 4, July 2011
- Yuan, D.; Manduchi, R., "Dynamic environment exploration using a virtual white cane", in Computer Vision and Pattern Recognition, CVPR 2005 IEEE Computer Society Conference, 2005.
- F. van der Heijden, P.PL Regtien, "Wearable navigation assistance a tool for the blind" MEASUREMENT SCIENCE REVIEW, Volume 5, Section 2, 2005
- Larisa Dunal, Guillermo Peris Fajames, Victor Santiago Praderas, Beatriz Defez Garcia, Ismael Lengua Lengua, "Real-Time Assistance Prototype-a new Navigation Aid for blind people 978-1-4244-5226-2/10/526.00 2010 IEEE. 1998.

THANK YOU!!!!