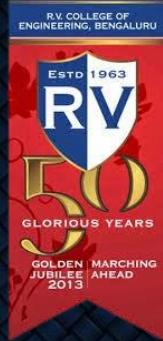




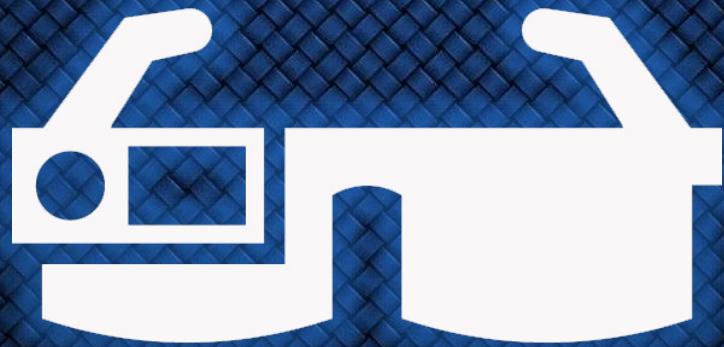
R.V. COLLEGE OF ENGINEERING

Department of Electronics and Communication



WEARABLE ELECTRONICS

Multipurpose Smart Glasses



Phase II

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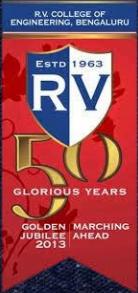
INTRODUCTION

- ❖ This project is an attempt to create a multipurpose smart glass that interfaces with a smartphone for a wide range of applications.
- ❖ It is powered by an Arduino microcontroller and contains a Bluetooth module, OLED display, a camera and a pulse sensor.
- ❖ It is capable of relaying information from a smartphone to the screen over Bluetooth.
- ❖ A wide variety of applications can be developed for the device.



OBJECTIVE

- ❖ Assemble the mentioned components in a compact case.
- ❖ Construct an eye piece consisting of a partially reflecting plane glass, and assemble the Head-up Display (HUD).
- ❖ Attach the case to a pair of ordinary glasses and thus make a smart glass.
- ❖ Demonstrate a few applications of the project.

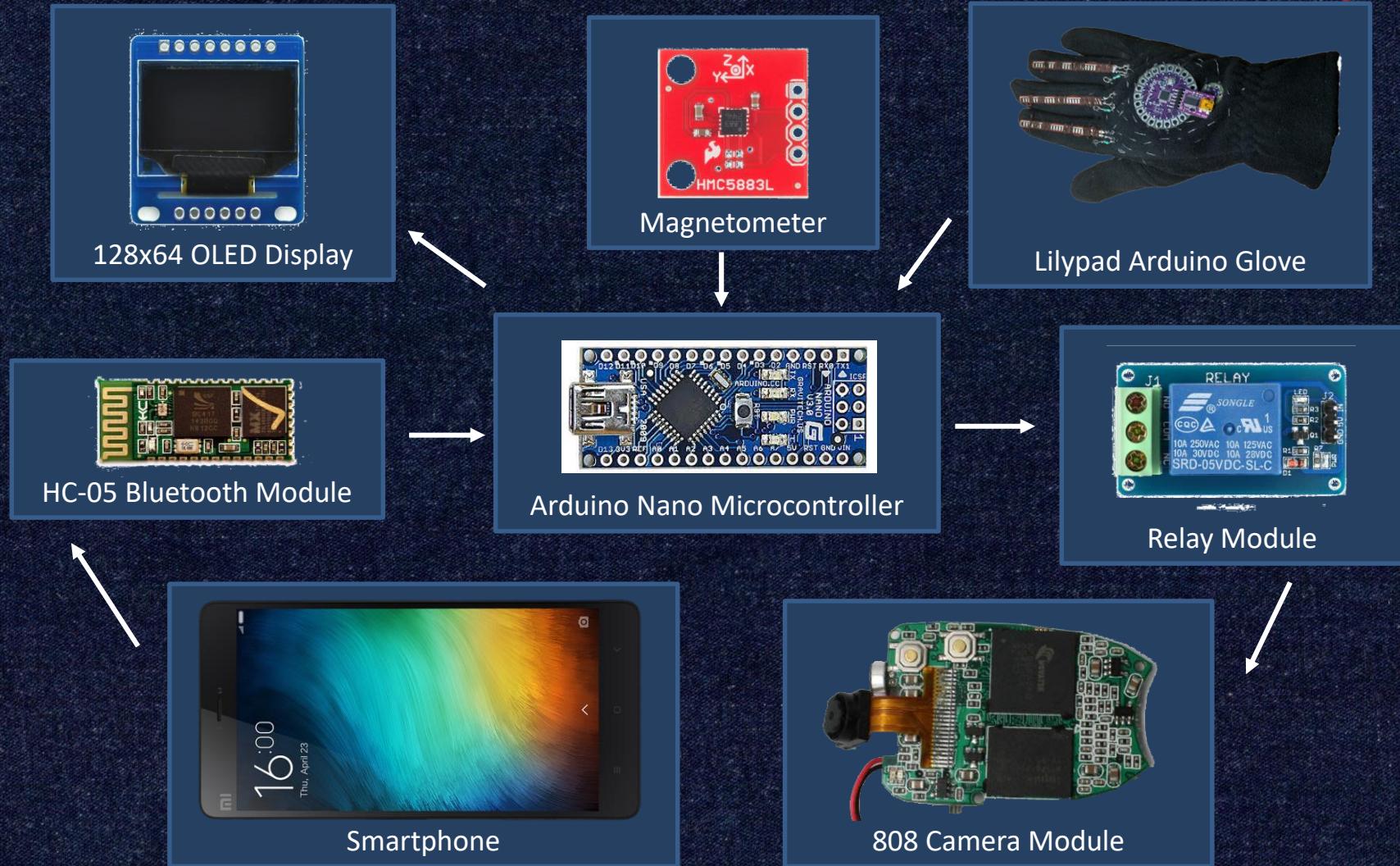


LITERATURE SURVEY

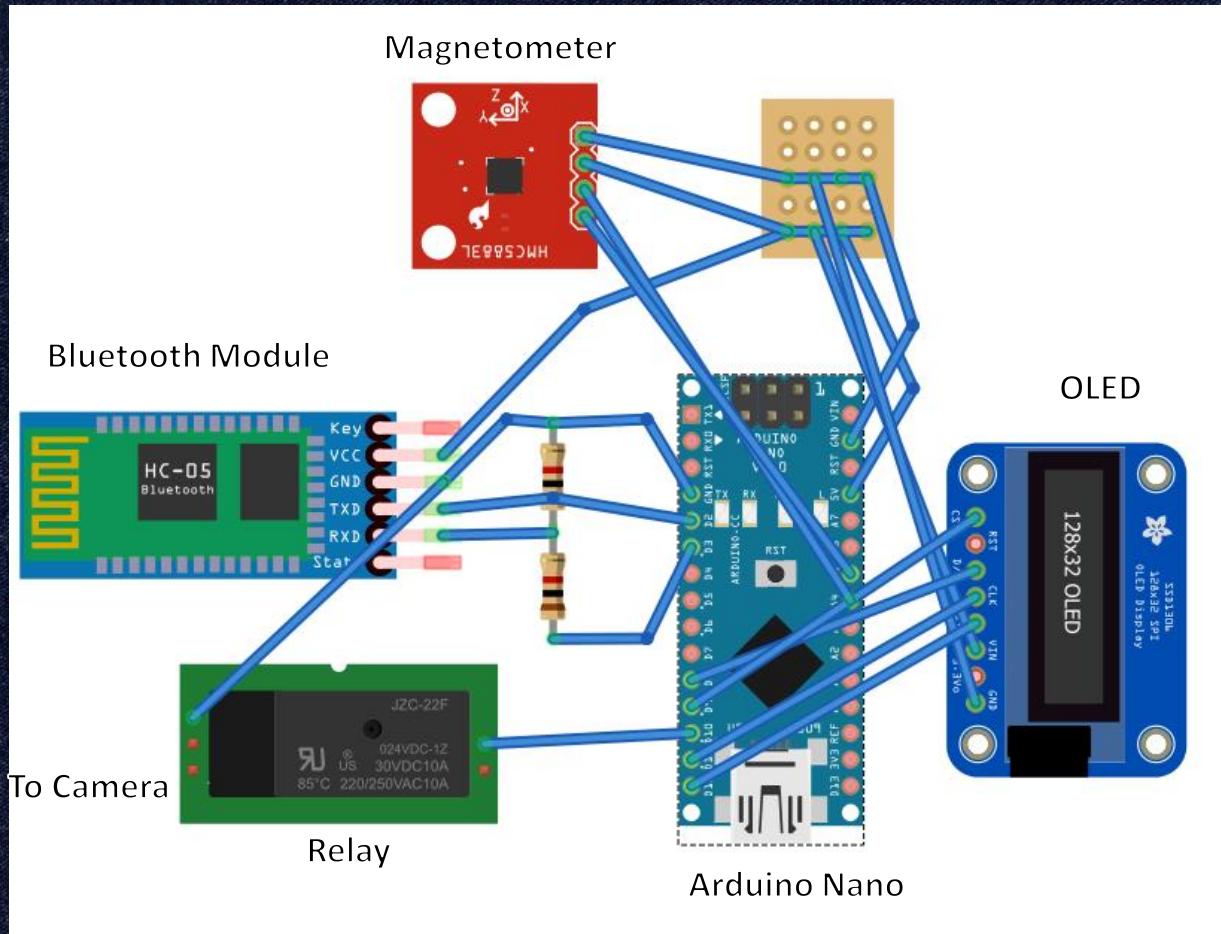
- ❖ The maturing field of wearable electronics aims to interweave computing and interfacing devices that are easy to operate ,into everyday life.[1]
- ❖ Smart glass is one such device which makes life much easier.
- ❖ Smart glasses are products that are mounted on the head like normal glasses. They provide the user with information and technological possibilities, e.g., to take pictures or record video.[2]
- ❖ Most researches show that the average owners use their phone for three hours and sixteen minutes a day and almost four in ten users admitted to feeling lost without their device.[3]
- ❖ It is difficult to find a device that has a wide range of applications, user friendly and cost effective.
- ❖ The design proposed aims at satisfying all of the above mentioned criteria.



BLOCK DIAGRAM

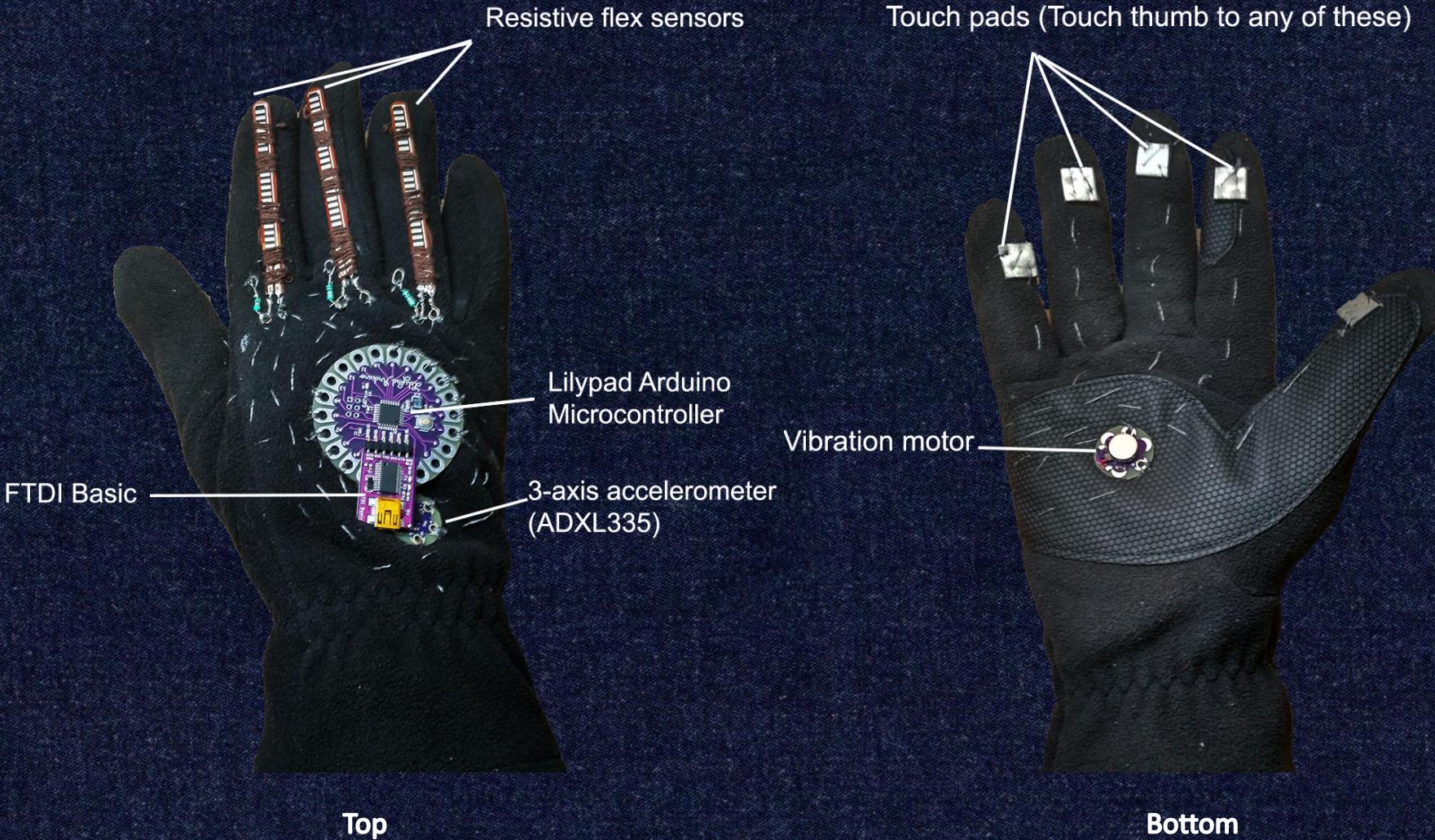


CONNECTION DIAGRAM



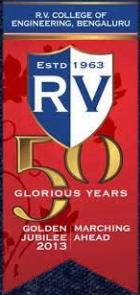


ARDUINO GLOVE





EYEPIECE



- The eyepiece is a cuboidal enclosure made of 2mm thick acrylic sheets.
- The OLED display is mounted on one end, and there is a plane mirror on the opposite side.
- An OHP sheet placed at 45 degrees to the front and back sides produces an image the of reflection of the screen in the mirror.

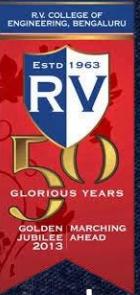




CONSTRUCTION

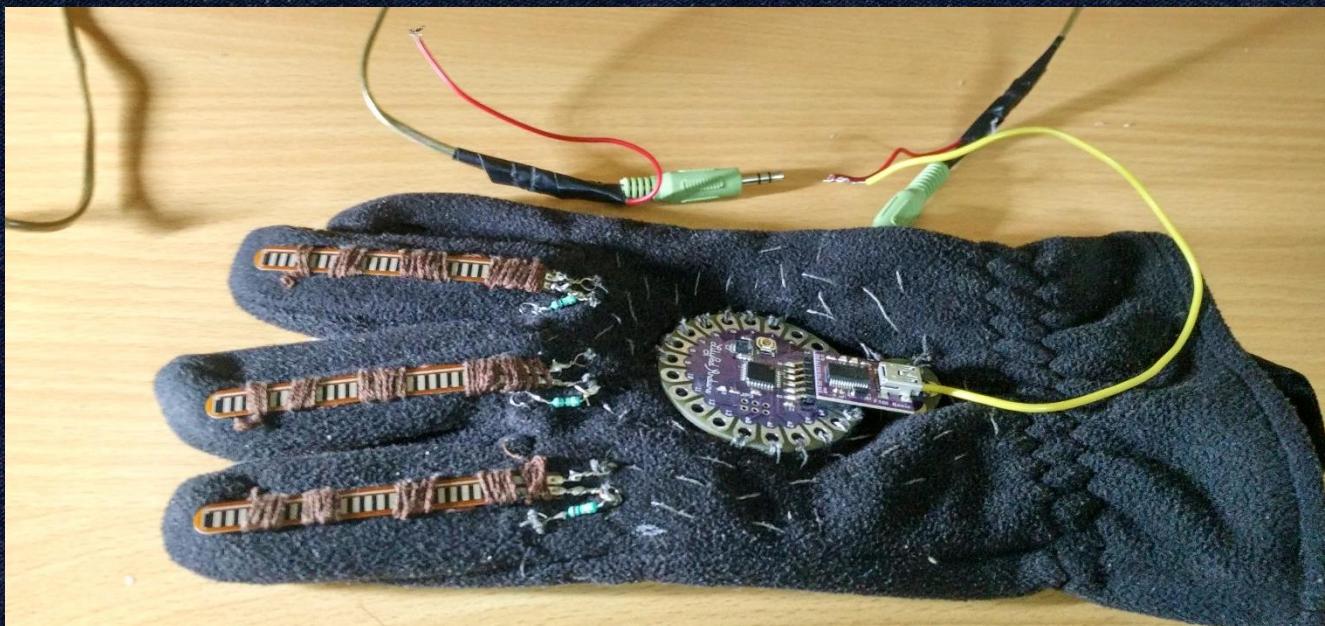
- The circuit is placed in a cardboard box, with the display at the front and a pair of glasses in the side.
- Power is provided via a regular USB port.
- A 3.5 mm jack and another wire connect to the glove to power it and receive serial data from it.





CONSTRUCTION

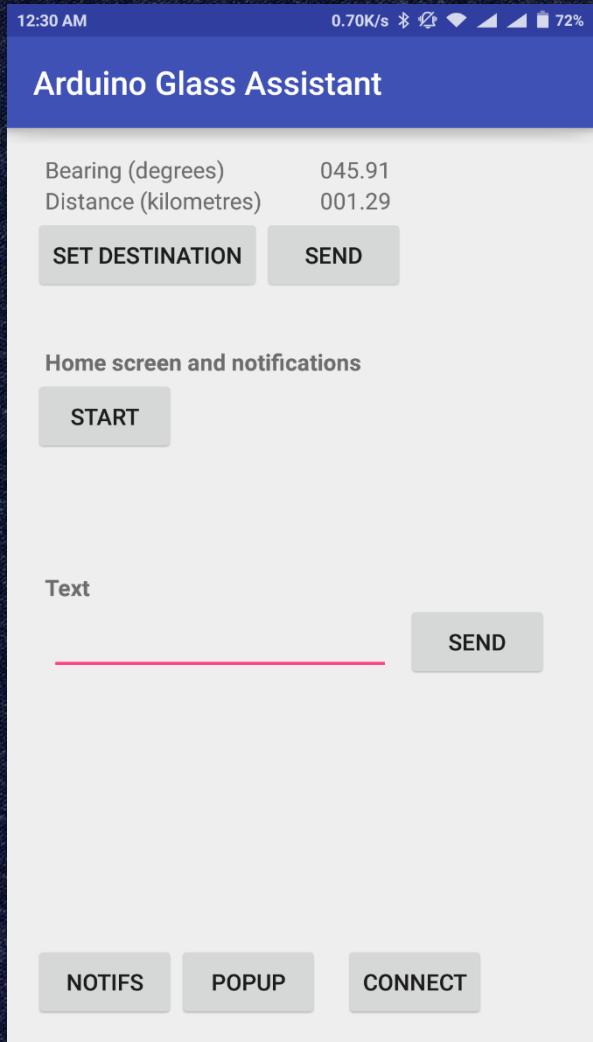
- The 3.5mm jack provides a 5V power supply line to the lilypad Arduino from the main Arduino.
- A single wire connects the TX pin of the glove to the RX pin of the main Arduino.





ANDROID APP

- A custom app is created which transmits data to the Arduino over bluetooth.
- The app helps in the working of the following features:
 - Navigation
 - Notification mirror
 - Text display





CAMERA

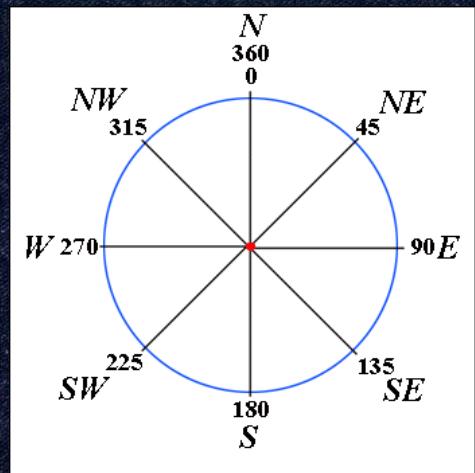
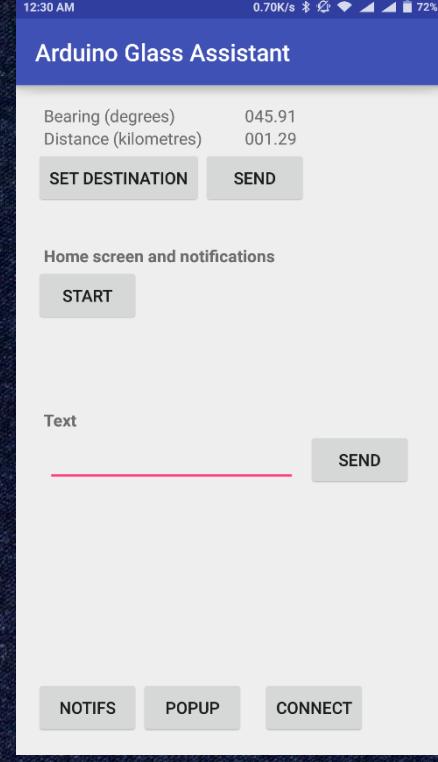
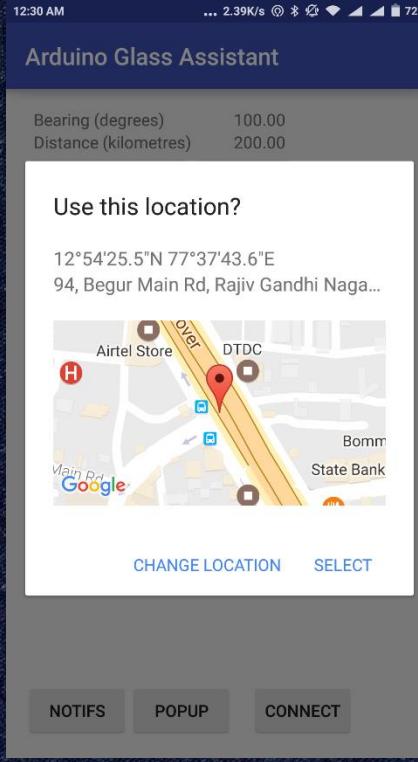
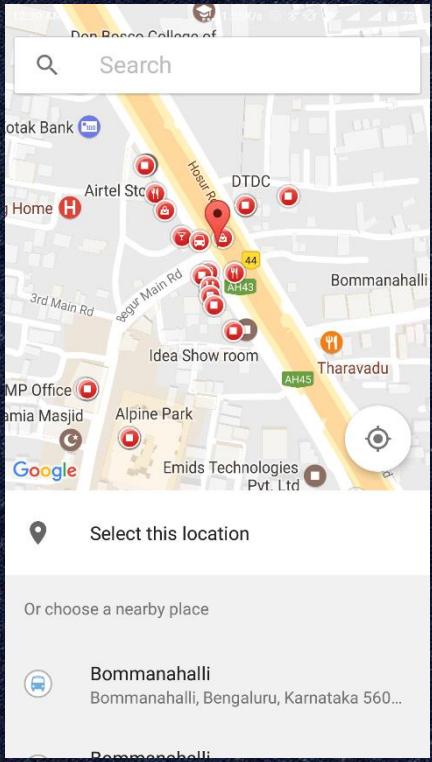
- The 808 camera module can take pictures in 720x480 resolution, and also videos at 30 fps.
- The capture is controlled by the glove's flex sensors.



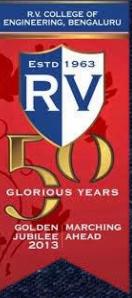


NAVIGATION

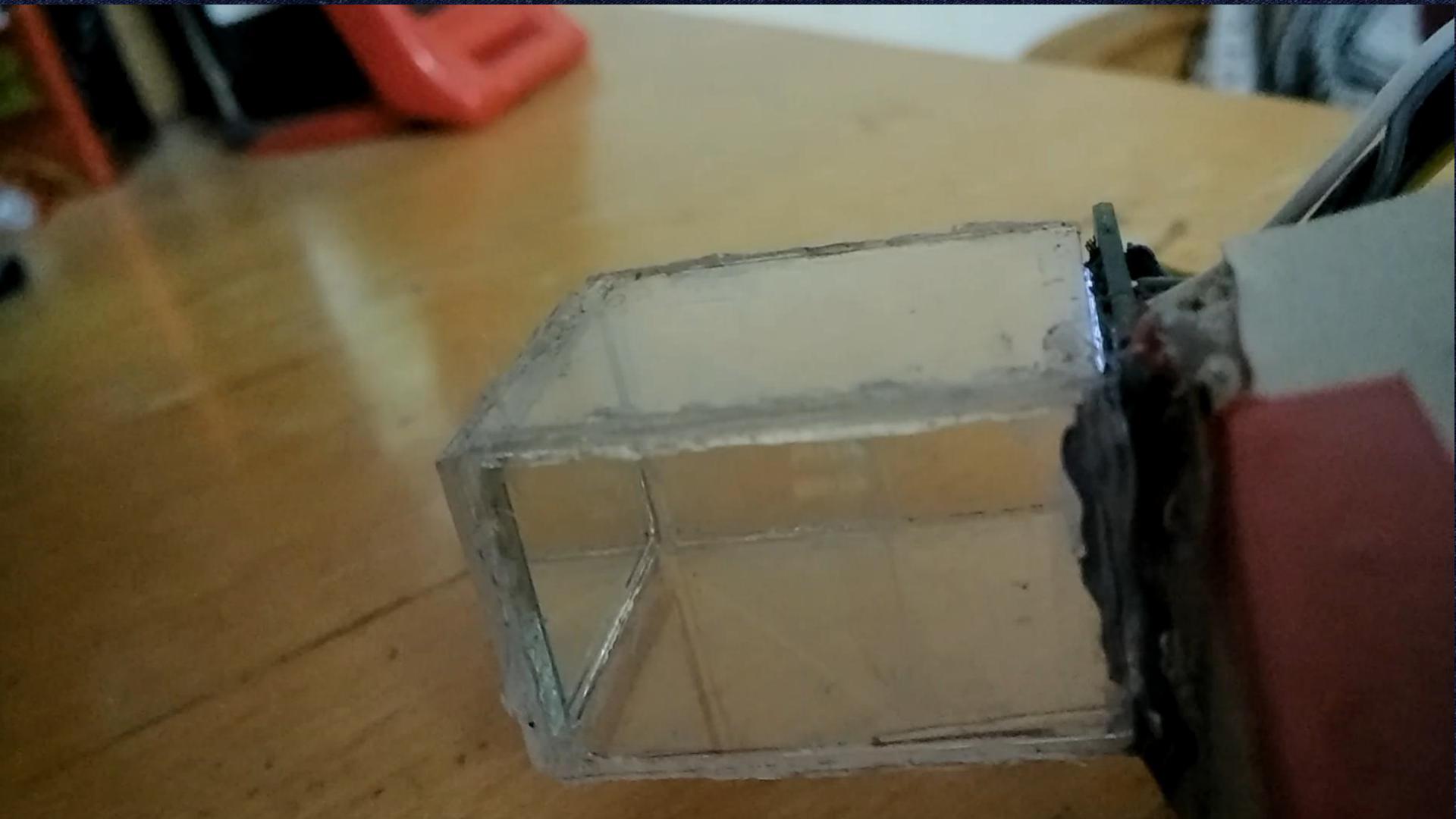
Transmits the angular bearing and distance from the current location to a destination selected from the app.



Degrees on a compass



NAVIGATION



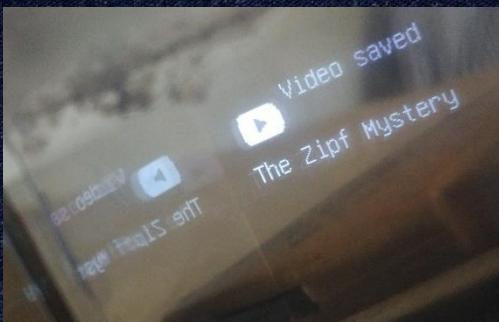


NOTIFICATIONS

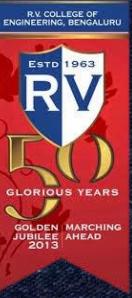
- This mode allows the app to copy and forward any notifications that the phone receives. Certain apps have special icons:



Incoming Call



Youtube video being saved



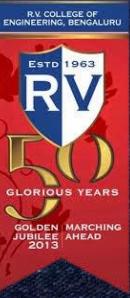
NOTIFICATIONS

WhatsApp message

 Self study
Rahul Jois: We'll
I not get signal

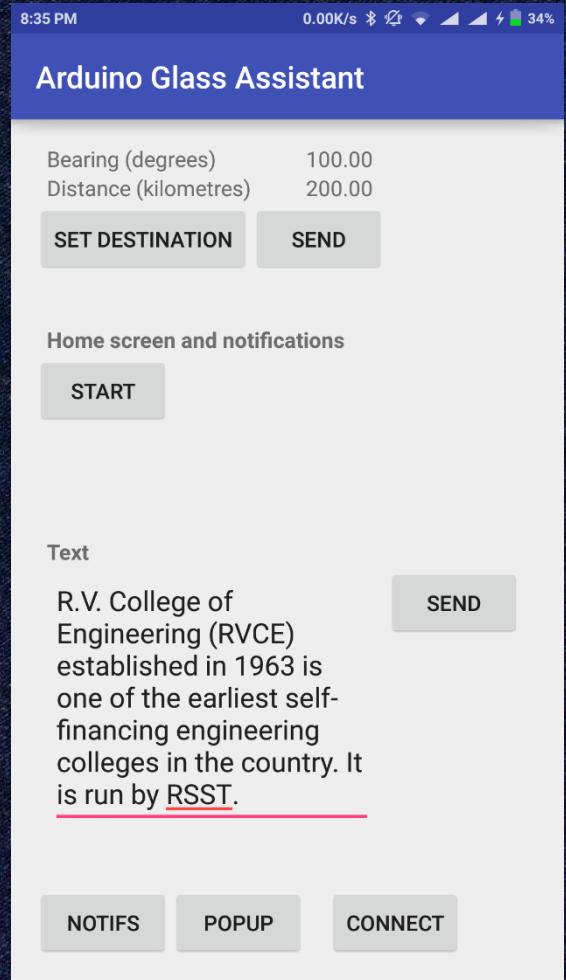
Text message

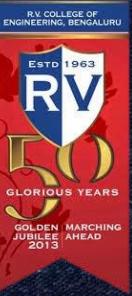
SMS Rahul Jois
[2] Self Study Ph
ase Two



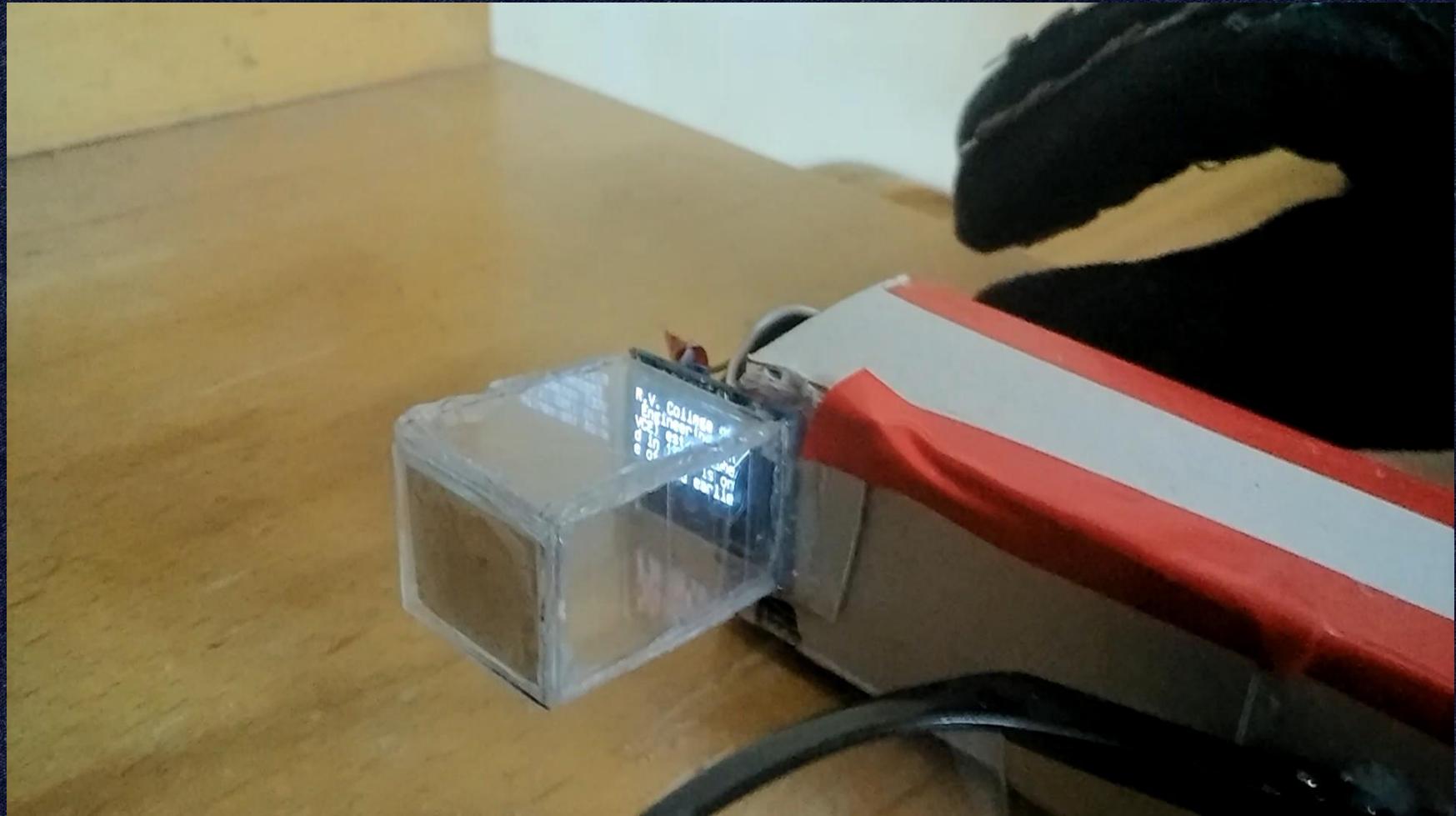
TEXT DISPLAY

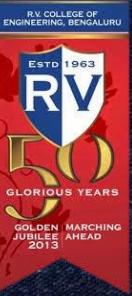
- Text of up to 160 characters long can be send to the glass.
- The message is split into two parts of 80 characters each.
- The first touch sensor toggles between the pages.





TEXT DISPLAY





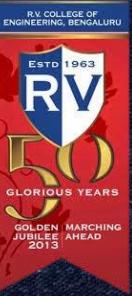
FUTURE WORK

- Merge all applications into one program by using an external memory module.
- Make the model lighter and more portable.
- Add a built in rechargeable battery pack.
- Add push buttons on the side for input, rather than a full glove.
- Design a strap so that the module can be mounted on any pair of glasses.



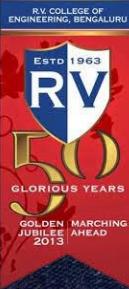
FURTHER APPLICATIONS

- It can be used for medical applications by connecting sensors to detect and display parameters like temperature, pulse, blood pressure, etc.
- It can be linked to a bluetooth multimeter, and thus provide an extremely convenient way of reading parameters from a circuit without having to look away from the work. This helps improve productivity.
- A microphone can be added to send voice mails or interact with Google Now to perform actions on the phone by voice command.



CONCLUSION

- The planned module (Arduino based smart glasses) was built according to the planned specifications.
- A few applications of the glove were programmed and demonstrated.
- Further applications were listed out.
- Problems in the the module were identified, and solutions were listed.



REFERENCES

- [1] Khadija Sidiya and Nouf Alzanbagi, "***Google glass and Apple Watch - will they become our learning tools?***", 12th IEEE Learning and Technology Conference, 2015
- [2] Gyeonghoon Kim and Hoi-Jun Yoo, "***A low-power and real-time augmented reality processor for the next generation smart glasses***", IEEE Hot Chips 27 Symposium, 2015
- [3] Stuart Elder and Alex Vakaloudis, "***A technical evaluation of devices for smart glasses applications***", IEEE Conference Publications, 2015
- [4] Roderick McCall and Benoît Martin, "***Text entry on smart glasses***", IEEE 8th International Conference on Human System Interactions (HSI), 2015