

# ECE 6372:Final Project Mini Proposal

**Project Title:** *Gesture recognition interface for remote access of a service robot*

**Virtual Company Name:** Sigma Six

## Team Info:

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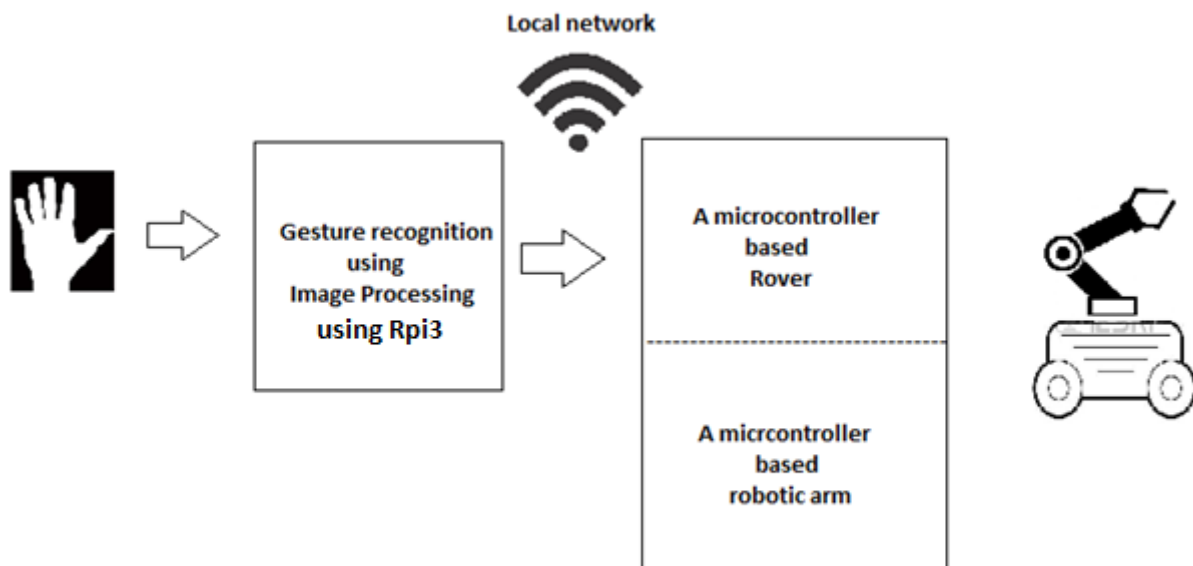
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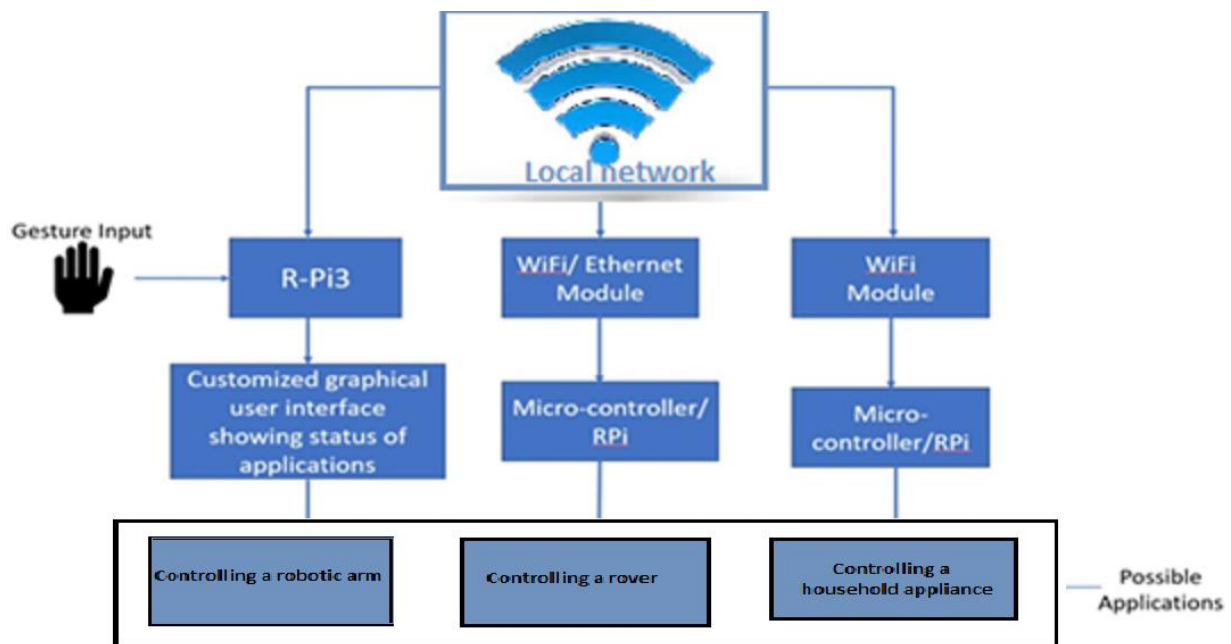
## Summary:

Robots have the potential to support elderly and disabled people and make them feel independent in doing their daily household activities. There have been many assistive robots developed throughout the world. But statistically the usage of such systems has been found to be very less compared to other household robots (like vacuum cleaners, floor cleaners). This is due to the high technology implementation and complex equipment to build the service robot. Therefore, we have come up with an idea to develop a cost effective basic version of a service robot to help the disabled to pick light weighted items based on hand gesture recognition (implemented using image processing). The robot involves a rover connected with a robotic arm that moves in different directions to pick items based on the persons hand gesture. The functionality and efficiency of this implementation could be extended further in future. Controlling the robot using gesture recognition makes it helpful for the disabled to pick items remotely.

## Functional Diagram:



## Descriptive Diagram:



## Description:

### *Gesture detection:*

This involves a system (Rpi3) that detects hand gestures based on image processing. A camera module interfaced with the raspberry pi takes the hand gestures which are then compared using python programming with previously collected images. The corresponding gesture detected is then sent to the raspberry pi controlling the rover and the robotic arm.

### *Robot operation:*

The data fed from the image processing module is given as an input to the microcontroller (Rpi3). The microcontroller is programmed in a way to define the movement of the rover forward/backward/sideways and also the pick/drop/elbow operations of the robotic arm.

### *Data transfer between the modules:*

The data is transmitted between the modules using a local network. Both the modules communicate via wifi.

## Tentative Task list:

- 1.Image processing:** Recognise Gestures of Hand, Probably use Convolution Neural Network
- 2.Transfer of data:** A wifi module is used to communicate the results from image processing to the robot
- 3.Programming raspberry pi:** Programming raspberry pi which takes the inputs from image processing and generates the corresponding signal to control the robotic action
- 4.Required circuitry:** Necessary additional electronics and driver circuitry needed during practical implementation to get desired output

**Member Responsibilities:**

Name	Skills	Tasks
Praveen Padala	OpenSource Dev Boards,Electronics, Programming	2,3,4
Raj shah	Image Processing,Machine Learning, Programming	1,2
Tauha Khan	Power and Controls, Electrical,Programming	2,3,4
Soumya G Rama	Cloud Computing,Image Processing, Electronics	2,3,4
Manasa Tempalli	OpenSource Dev Boards,Electronics, Programming	2,3,4
Zankhana Rana	Programming (Computer Science Background)	2,3

**Cost Estimate:*****Prototyping cost estimate***

Component	Price
Raspberrypi3	\$35
USB Camera	\$10
Miniature Wifi module	\$12
Rover	\$100
Robotic arm	\$50
Relays	\$9
Power supply/Battery	\$10

***Potential Engineering cost***

No. of members in the team	No of working hourse per month	Non recurring engineering cost@\$12/hour
6	50	\$600
Total		\$3600