MAHARAJA INSTITUTE OF TECHNOLOGY MYSORE
Department of Electronics & Communication Engineering

Feasibility Seminar of

# Python-based Raspberry Pi for Hand Gesture Recognition

by:

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# Agenda


## Introduction

Project Overview, Objectives, and Significance of the Project


## Methodology

Project Approach, Tools and Resources


## Conclusion

Summary

# Introduction

## Project Overview

Hand gesture recognition involves capturing and interpreting hand movements or positions to trigger specific actions or commands.

Here we use mobile robot using Raspberry Pi, where its movement is controlled via the camera connected with Raspberry Pi that forward commands directly to the driver of a two-wheel drive mobile rover. It uses hand gesture algorithm to identify the object (hand) and control the movement of robot.

# Introduction

## Objectives

- To create a system that can accurately recognize and respond to hand gestures
- To move the Robot forward , backward, Right , left ,start and stop by using hand gestures.

# Introduction

## Significance of the Project

- Using gestures to control robots makes human-robot interaction more accessible and user-friendly
- In industrial settings, these robots can be used for tasks like material handling, where ability to avoid physical contact are essential.
- Further development of gesture control technology continues the research and innovation in computer vision, machine learning, and robotics.

# Methodology

Methodologies provide an infrastructure for accomplishing projects. They're a blueprint for how tasks and projects are planned, managed, and executed.

- **Hardware Setup**: Gather the necessary hardware components, including a Raspberry Pi, a camera module (e.g., Raspberry Pi Camera), and any other peripherals you might need.
- **Raspberry Pi Setup**: Install the Raspberry Pi OS (formerly Raspbian) on your Raspberry Pi. Update and upgrade your system packages.
- **Python Installation**: Make sure Python is installed on your Raspberry Pi. Python 3 is recommended.
- **Camera Configuration** :Enabling the Raspberry Pi Camera Module from the Raspberry Pi configuration menu.
- **Gesture Recognition Libraries**: Choose a hand gesture recognition library for Python i.e Open CV

# Methodology

- **Collecting and Labeling Data** :Capture images of different hand gestures using the Raspberry Pi camera. Label the images and creating a dataset.
- **Real-time Gesture Recognition** :Write Python code to capture real-time video frames from the camera . Implement logic to perform actions based on recognized gestures (e.g., controlling a robot)
- **Testing and Optimization** :Test the system extensively with various hand gestures. Optimize the model and code for better accuracy and performance.
- **Documentation and Sharing** :Documenting project, including hardware setup, code, and usage instructions. Share your project with the community or online platforms.

# Methodology

## Tools and Resources

- Software
- Raspberry pi OS (Operating System) and Python & Open CV
- Hardware
- Raspberry Pi 3 Model B
- Motor driver (H-bridge) and 5MP Raspberry Pi 3/4 Model B Camera Module Rev 1.3 with Cable
- Five-inch Touch Screen HDMI interface
- L298N motor driver board and some robot components

# Conclusion

- By combining the computational capabilities of the Raspberry Pi with the flexibility of Python, we aim to create an accessible and affordable hand gesture recognition system .
- We can move the robot/system forward , backward, right, left, start or stop them by hand gesture(using one finger for each operation)

# References


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# Questions

# Thank You