School of Engineering

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

B.Tech. ECE, IV-I, Mini Project 2024-2025

Abstract Submission Form

GESTURE-CONTROLLED SMART HOME INTERFACE WITH REAL-TIME HAND TRACKING

**Abstract:**

A Gesture-Controlled Smart Home Interface designed to provide a contactless and intuitive method for controlling household devices. The primary objective is to enhance the ease of interaction with smart home systems by leveraging hand gestures as input commands. The system uses a webcam to capture real-time video, which is processed through OpenCV and MediaPipe to detect and track hand gestures. Each detected gesture corresponds to a specific action such as turning on/off an LED, fan, buzzer, or water pump, with the ability to control all devices simultaneously.

The methodology involves the use of MediaPipe hand tracking module to accurately identify hand landmarks and determine the state of each finger. These states are then mapped to predefined commands of Arduino, which are executed in real-time to control the connected devices. The results demonstrate the system’s ability to reliably interpret gestures and provide immediate feedback by displaying the recognized command on-screen and activating the corresponding device. The findings suggest that this gesture-controlled interface can significantly improve the user experience in smart home environments by reducing the need for physical contact with switches or remote controls. This project highlights the potential for further development in gesture-based interaction systems, particularly in enhancing accessibility and convenience in smart homes.

**Domain:** **Signal and Image Processing**

**Implementation Tools:**  **Python,MediaPipe&Arduino**

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