

Grade 7

Manual: 1

AI Project 1: Hand Gesture Recognition System

Theory

Hand Gesture Recognition is an Artificial Intelligence (AI) system that detects and understands human hand movements using a camera.

The system captures images of different hand gestures through a webcam. These images are used to train a machine learning model. The model learns patterns of different gestures such as open hand, closed fist, thumbs up, etc.

During training, the AI system is provided with labeled data (each gesture is assigned a name). After training, the system can recognize gestures in real time.

The recognized gestures can be used to control devices such as lights, robots, or computers. This makes interaction with machines more natural and touch-free.

This project demonstrates how AI can be used for human-computer interaction using computer vision.

Aim / Objective

To design and train an AI model that recognizes hand gestures and performs actions based on the detected gestures.

Tools Required

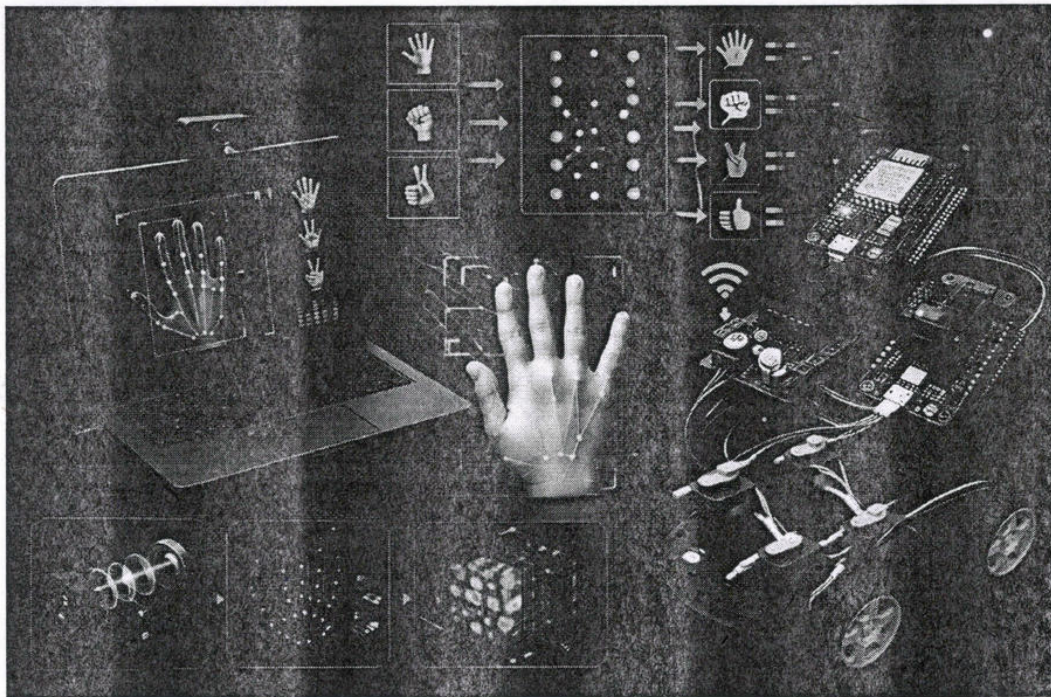
- Computer with webcam
 - AI Training Platform (Teachable Machine / PictoBlox)
 - Internet Connection
 - Python (optional for advanced use)
-

Connections

- Webcam is connected to the computer for capturing images.
 - AI platform is used to train the model.
 - The trained model is linked to actions (light, robot, etc.).
 - The system processes gestures in real time.
-

Working Principle

- The webcam captures live hand images.
- Images are used to train the AI model.
- Each gesture is labeled during training.
- The model learns patterns of gestures.
- During testing, new gestures are shown.
- The AI system recognizes the gesture.
- The system performs the assigned action.
- The process works in real time.



Result

The AI system successfully recognizes different hand gestures and performs actions, demonstrating real-time interaction using AI.

System Concept

- ☐ **Input:** Hand gesture images (webcam)
 - ☐ **Process:** AI model training and recognition
 - ☐ **Output:** Action (light control / robot movement)
-

Learning Outcome

Students train an AI system that recognizes different hand gestures and performs actions such as controlling a light or robot movement.

Grade 7

Manual: 2

AI Project : Voice Command Recognition System

Theory

A Voice Command Recognition System is an Artificial Intelligence (AI) system that understands and responds to spoken commands.

The system uses a microphone to capture voice input from the user. The captured audio is processed using speech recognition technology, which converts spoken words into text.

AI algorithms analyze the text and determine the meaning of the command. Based on the command, the system performs actions such as turning on a light, controlling a device, or giving a response.

Voice recognition systems use machine learning models trained on different voice patterns and languages to improve accuracy. The system works in real time, allowing smooth interaction between humans and machines.

This project demonstrates how AI enables hands-free control and smart automation using voice commands.

Aim / Objective

To design and develop a voice command recognition system that can understand spoken instructions and perform actions automatically.

Tools Required

- Microphone
 - AI Voice Recognition Tool
 - Computer / Laptop
 - Internet Connection
-

Connections

- Microphone is connected to the computer for voice input.
 - AI tool processes speech and converts it into text.
 - The system links commands to specific actions.
 - Output devices (light/robot) respond to commands.
-

Working Principle

- The user speaks a command into the microphone.
- The system captures and processes the audio signal.
- Speech recognition converts voice to text.
- AI analyzes the command meaning.
- The system matches the command with an action.
- The output device performs the action.
- The system provides feedback if needed.
- The process happens in real time.



Result

The voice command system successfully recognizes spoken instructions and performs corresponding actions, demonstrating AI-based automation.

System Concept

- ☐ **Input:** Voice command (audio)
 - ☐ **Process:** Speech recognition + AI processing
 - ☐ **Output:** Action (device control / response)
-

Learning Outcome

Students develop a voice recognition system that responds to spoken commands to control simple devices.

Grade 7

Manual: 3

AI Project : Smart Fan Speed Suggestion System

Theory

A Smart Fan Speed Suggestion System is an AI-based system that automatically suggests the appropriate fan speed based on room temperature.

The system uses a temperature sensor to measure the surrounding temperature. A Raspberry Pi Pico processes the sensor data and applies simple AI logic to determine the suitable fan speed level.

A potentiometer can be used to simulate user input or adjust sensitivity. The LCD display shows the temperature and the suggested fan speed (low, medium, high).

AI decision-making is applied by setting conditions such as:

- Low temperature → Low fan speed
- Medium temperature → Medium fan speed
- High temperature → High fan speed

This system demonstrates how AI can improve comfort and energy efficiency by making automatic decisions.

Aim / Objective

To design and develop an AI-based system that suggests fan speed based on temperature using Raspberry Pi Pico.

Components Required

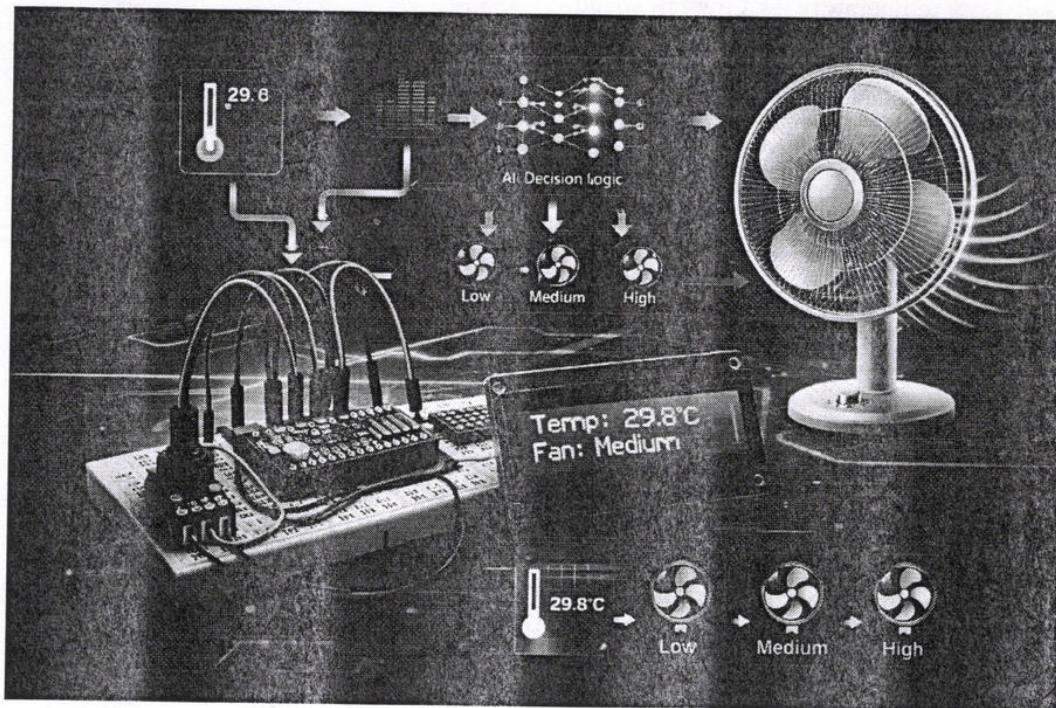
- Raspberry Pi Pico
- Temperature Sensor
- Potentiometer
- LCD Display
- Breadboard
- Jumper Wires
- Power Supply

Connections

- Temperature sensor is connected to the Raspberry Pi Pico.
 - Potentiometer is connected for input adjustment.
 - LCD display is connected to show output.
 - Power supply is connected to the circuit.
 - All components share a common GND connection.
-

Working Principle

- The temperature sensor measures room temperature.
- Raspberry Pi Pico reads the sensor data.
- AI logic processes the temperature value.
- The system decides the appropriate fan speed.
- The LCD displays temperature and speed level.
- The potentiometer can adjust sensitivity or input.
- The system updates continuously in real time.
- The process improves comfort and efficiency.



Result

9

The system successfully suggests fan speed based on temperature, demonstrating AI-based decision-making and real-time feedback.

System Concept

- ☐ **Input:** Temperature data
 - ☐ **Process:** AI decision logic
 - ☐ **Output:** Fan speed suggestion (Low/Medium/High)
-

Learning Outcome

Students understand temperature control logic and learn basic AI decision-making and user feedback systems.
