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# Ergonomic Virtual Keyboard

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In this project,

- Development of an innovative Virtual Keyboard leveraging computer vision and advanced machine learning techniques.
- Unlike traditional physical or on-screen keyboards, it doesn't rely on single-hand gestures and limited finger interaction.
- The Virtual Keyboard uses a camera or sensor to capture both hands and all finger movements, translating them into text input seamlessly.
- By detecting both hands and tracking fingertip trajectories and patterns, the system predicts intended keystrokes with high precision.
- Users interact with this virtual keyboard by mimicking typing motions for a seamless typing experience.

## PROBLEM DEFINITION

- The system will use an on-screen keyboard where the current letters will be entered based on hand movements.
- When the index and middle fingers meet on a virtual key, a click is generated, and the desired text is displayed in the corresponding text box.
- Very slow to interact with Computer (Document Typing, Coding, etc.)
- Waste of usable screen area.
- Inconvenient to type in public places.

## **Virtual Hands: Real Time Keyboard, Desktop & Application Navigation using Gestures**

- A contactless Virtual Keyboard and navigation system using a webcam and computer vision.
- Mediapipe's Blaze Palm Detector & Hand Landmark Model detect hand and fingertip positions.
- Supports all essential keys, including alphabet, numbers, and symbols.
- Full Windows and Desktop Navigation using hand gestures.

## Voice Guided, Gesture Controlled Virtual Mouse

- A Virtual Mouse developed using hand gestures and voice.
- Reduces dependency on physical peripherals, to avoid contact during the pandemic.
- Calculates Euclidean distance between the point to determine the ratio and finger state.
- The distance between the fingers determines the function to be performed.

## EXISTING SYSTEM

### **Gesture Controlled Virtual Mouse and Keyboard using OpenCV**

- Development of a hybrid gesture control system integrating hand, voice, and eye for enhanced computer interaction.
- Utilizes Convolutional Neural Networks (CNN) with MediaPipe for accurate gesture recognition and Pyttsx3 for voice feedback, all operated through a webcam.
- Combines multiple input methods like hand, voice, and eye to improve user flexibility and interaction.
- It is an onscreen keyboard and a single hand is used to access the keys.

# PROPOSED SYSTEM

- Uses a Camera or Sensors to detect our finger movements and predict which key is typing.
- By detecting both hands and tracking the fingertip's trajectories and patterns, the system predicts intended keystrokes with high precision, users interact with this virtual keyboard by mimicking typing motions.
- It is convenient to use at any place.
- Easy to Type as Touch typing.
- Can also be used in Mixed Reality applications.
- Can be paired with both small and large devices.



# ARCHITECTURE DIAGRAM

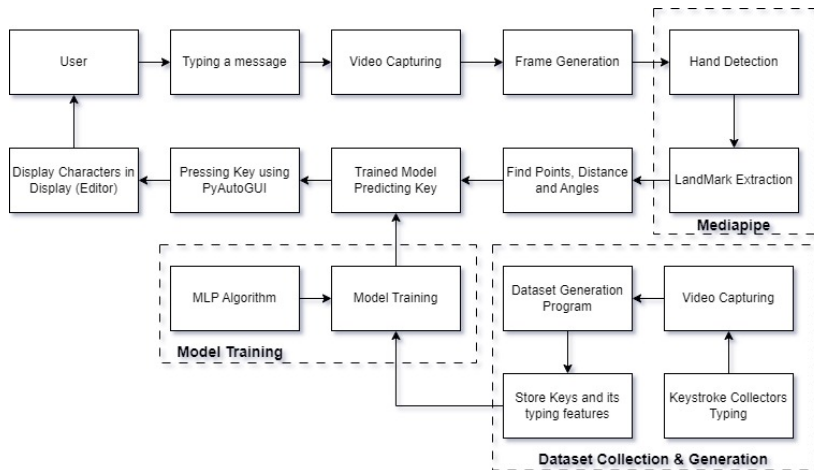


Figure: Architecture Diagram

# USECASE DIAGRAM

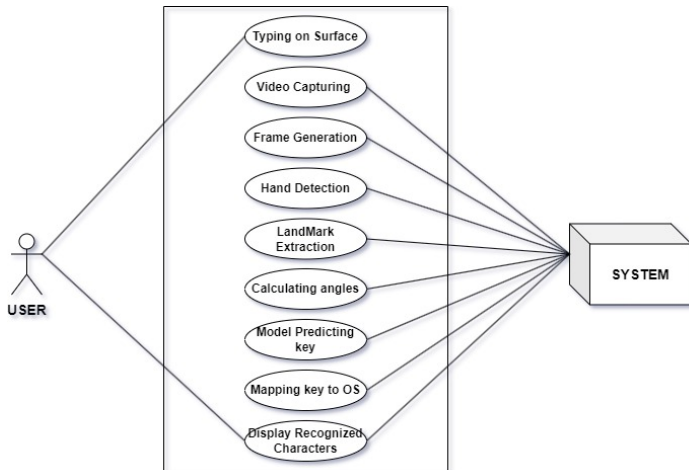


Figure: Usecase Diagram

# GANTT CHART

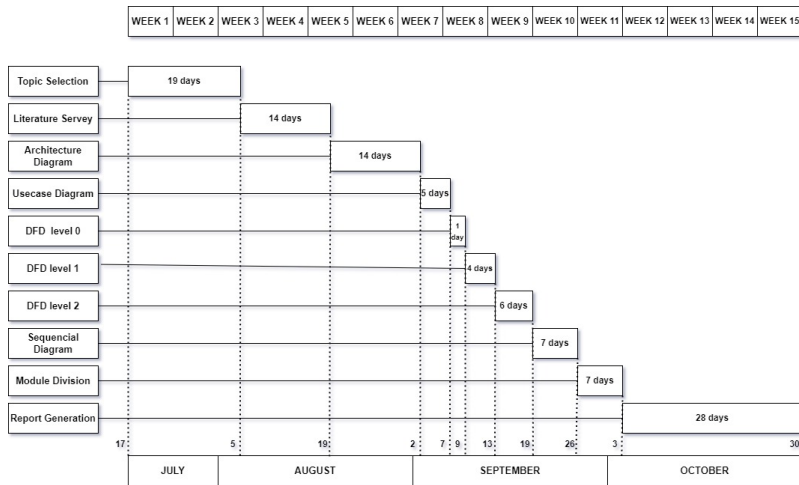


Figure: Gantt Chart

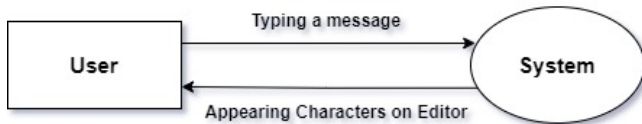





Figure: DFD Level 0

# CONCLUSION

- The research focuses on developing a model for gesture-controlled computing that integrates with hand gestures.
- This model aims to enhance user interaction with computers by leveraging advanced technologies such as Convolutional Neural Networks (CNNs) and MediaPipe.
- The primary objective is to create a versatile and efficient control system with significant applications in typing and coding environments.

## REFERENCES

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