**1. Title of the Project:**  
**Air Drawing Application Using Hand Gestures**

**2. Introduction:**  
This project is a virtual drawing application that allows users to draw on screen using only their hand gestures. Using MediaPipe and OpenCV, the system tracks hand landmarks via a webcam and responds to specific finger gestures to perform drawing, erasing, color changing, and canvas clearing without touching any input device.

**3. Experimental Procedure / Program:**

* **Technologies Used:** Python, OpenCV, MediaPipe, NumPy
* **Setup:**
  + Install dependencies using pip install opencv-python mediapipe numpy
  + Run air\_draw.py using Python
* **Main Modules:**
  + Hand tracking using MediaPipe
  + Gesture detection (thumb up, index finger, palm)
  + Drawing/Erasing on a transparent canvas

*(You can insert a screenshot of the code or gesture flow here)*

**4. Observations / Logic Table:**

| **Gesture** | **Action Performed** |
| --- | --- |
| Index finger only | Draw on canvas |
| Thumb up | Switch to eraser |
| Thumb down + index up | Switch to brush |
| Open palm | Clear canvas |
| Touch color swatch (with finger) | Change brush color |

**5. Results, Discussion, and Applications:**

* The application successfully draws on screen using real-time gesture tracking.
* Can be extended for smart classrooms or collaborative whiteboards.
* Provides a no-contact way to interact with a drawing surface.

**6. Conclusion:**

This project demonstrates the effectiveness of using hand gestures as input mechanisms. It blends computer vision with intuitive control and opens up future possibilities in gesture-based UIs.

**7. Future Scope:**

* Add support for drawing shapes (rectangle, circle)
* Allow gesture-based undo or redo
* Voice commands integration
* Save drawings as image files
* Run on mobile or Raspberry Pi for portability

**8. References:**

1. MediaPipe Hands
2. OpenCV Python Docs
3. [NumPy Documentation](https://numpy.org/)
4. [Gesture Drawing App Research](https://ieeexplore.ieee.org/document/9251613)
5. [Python.org](https://www.python.org/)