Design and realization of number location System
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Abstract
This project integrates computer vision and robotics by using an ESP32-CAM to detect printed digits. Captured images are processed with Python and Tesseract OCR. When a number is identified, an Arduino Uno controls a robotic arm with four servo motors to move, pick up an object, and place it in a predefined location. The system showcases how embedded devices and image processing can work together for simple automation tasks.
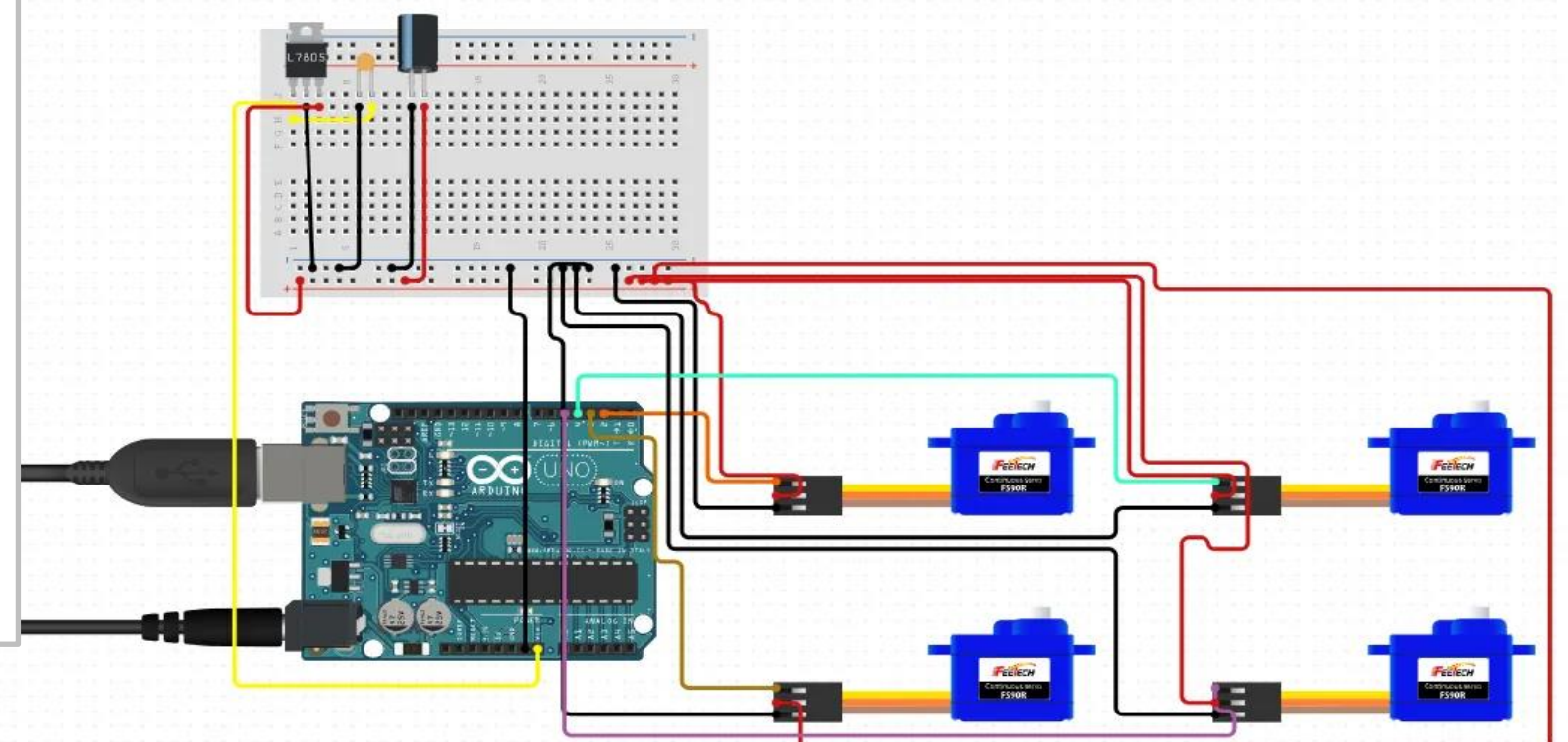
Pictures of Project
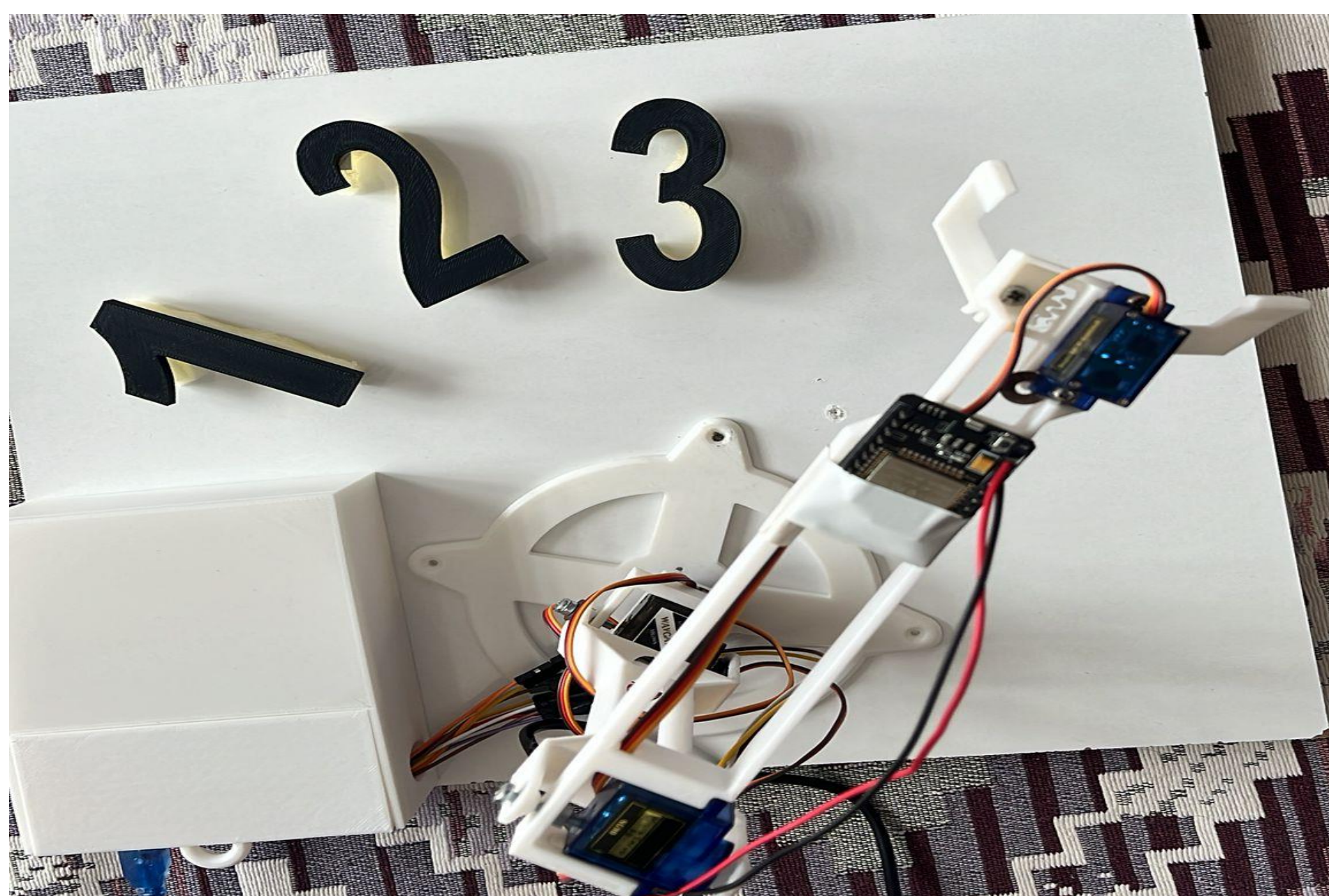
Signal Flow Chart
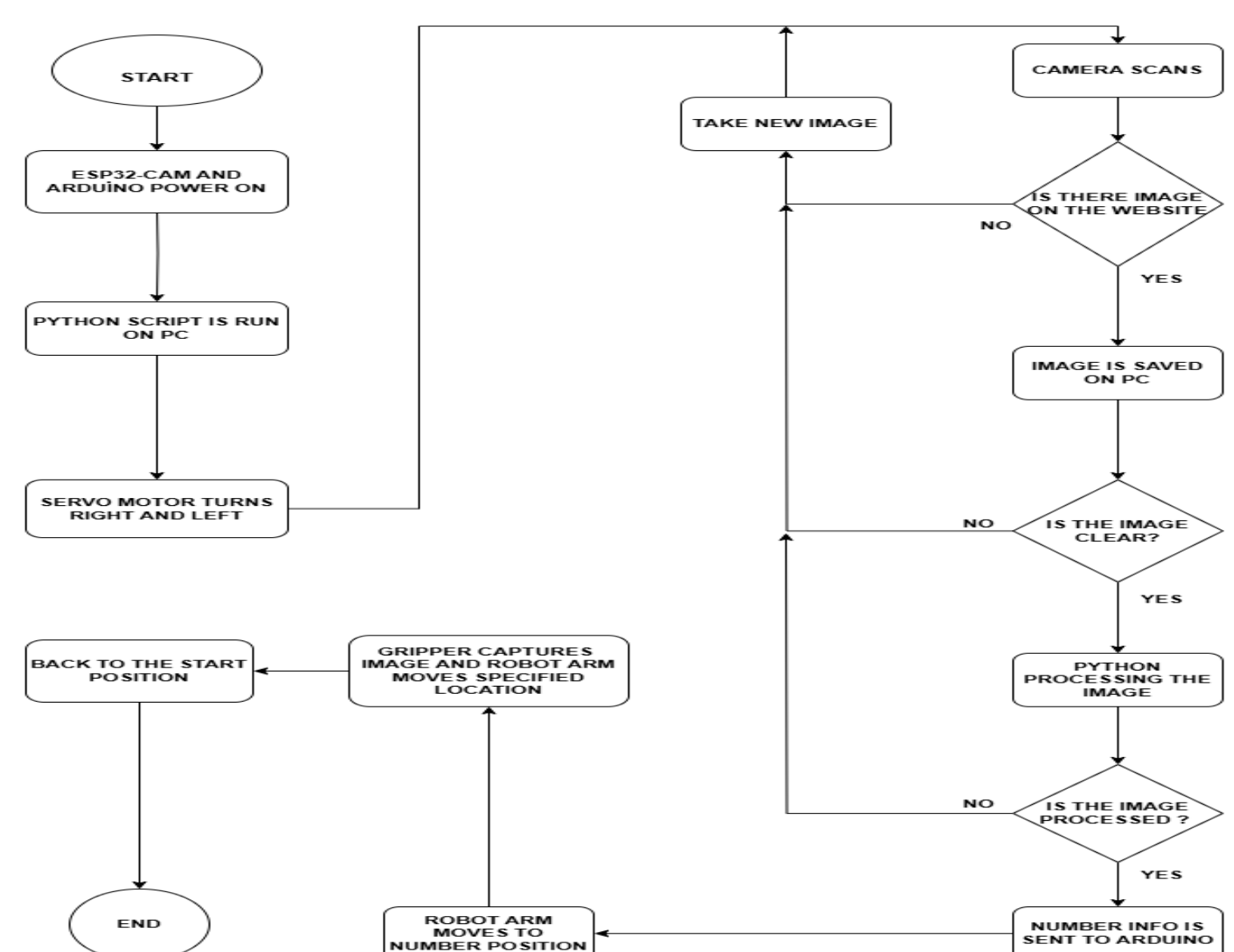
Main Components
ESP32-CAM ,Arduino Uno ,Python (OpenCV + Tesseract OCR) ,SG90 Servo Motors (x4 ,Power Supply (5V 2A) ,3D Printed Robotic Arm

ELECTRONICS DESIGN

Conclusion
The system successfully demonstrates the capability of combining computer vision and embedded control systems to perform number-based object sorting. Despite occasional challenges with image clarity or power fluctuations, the robot can accurately detect printed digits and perform the associated physical movements. The modularity of the design allows for easy expansion into more complex decision-based automation tasks.

References:

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