MOTION DETECTION AND TRACKING

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Abstract

This project aims to create a real-time object tracking system using advanced computer vision algorithms. The system, equipped with a sophisticated camera and pan-tilt mechanism, autonomously detects and tracks moving objects in video streams. The primary focus is on prioritizing human faces amidst multiple moving objects within the frame.

Signal Flow Chart

Camera Module → Micro-processor → Vision Codes → Servo Motors → Pan-Tilt tracking
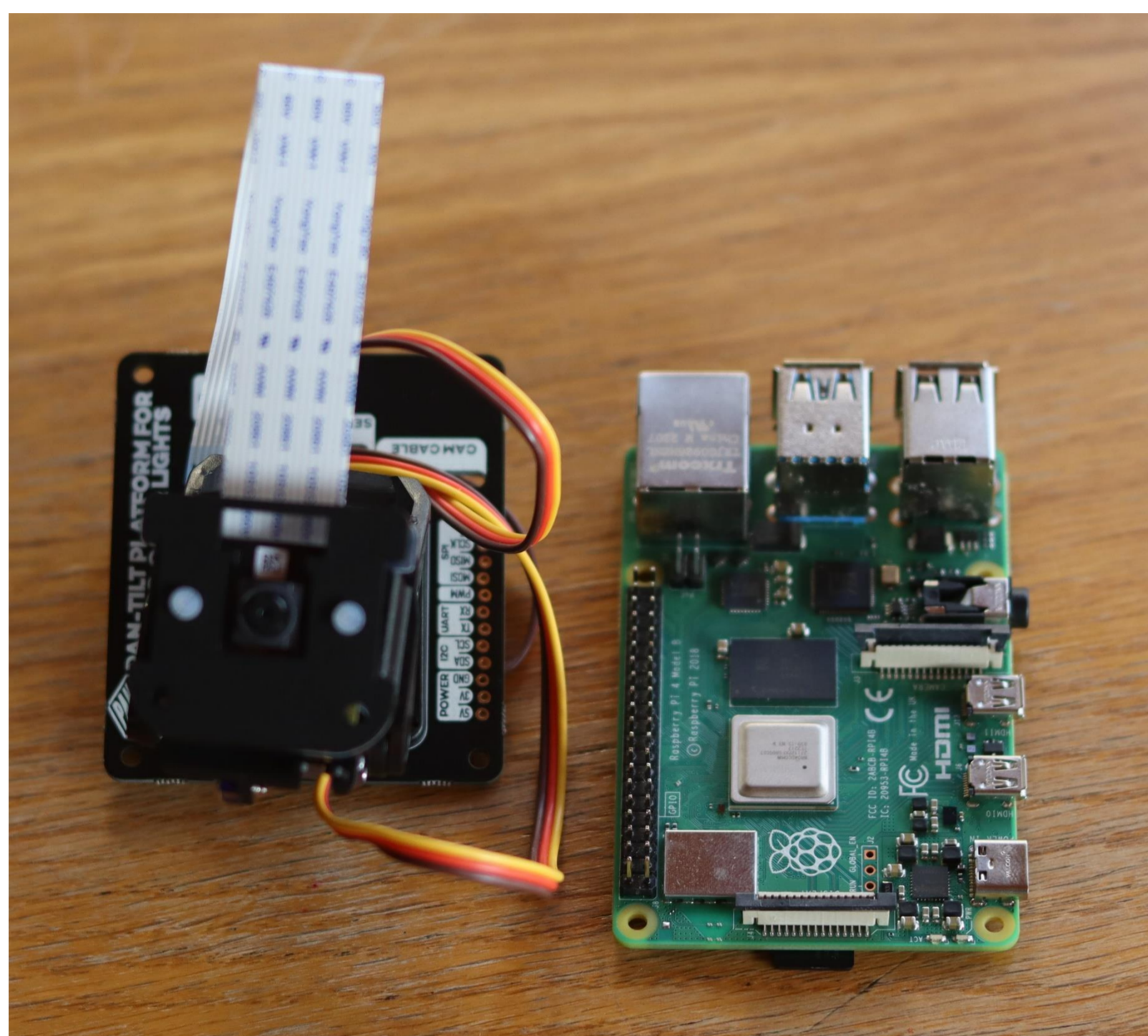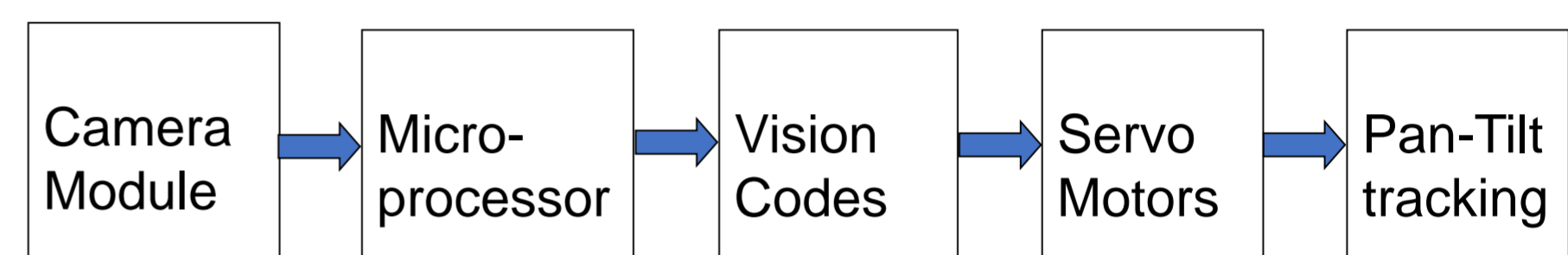
Main Components
Raspberry Pi 4 Model B, PAN-Tilt HAT, Pi Camera Module V2, NeoPixel LEDs

Board and Pan-Tilt HAT
The camera placed in the center takes video frames and sends them to the processor, which processes these images and sends the necessary commands to the servo motors if there is movement, and thus tracking begins.
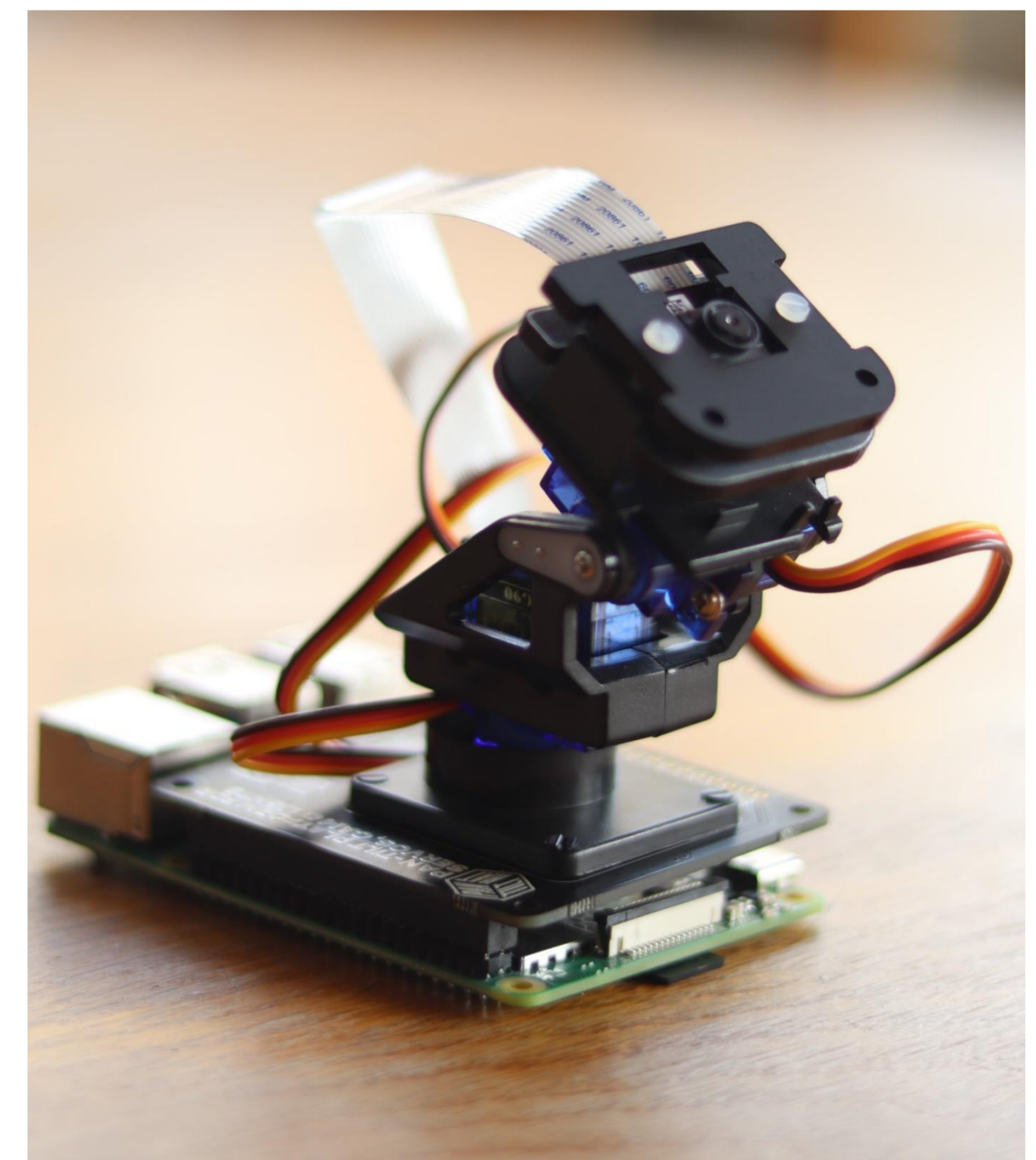
Conclusion

This project aims to develop an advanced image processing system that can track and detect objects in real-time video streams. By utilizing state-of-the-art computer vision algorithms, this system will accurately detect and track various objects within video frames. The main goal is to create an efficient and versatile system capable of detecting and tracking any moving object, with a focus on recognizing human faces amidst multiple objects in the frame.

References:

• *OpenCV: Face Detection using Haar Cascades*. (n.d.). https://docs.opencv.org/4.x/d2/d99/tutorial_js_face_detection.html

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• *Raspberry Pi Documentation - Getting started*. (n.d.). https://www.raspberrypi.com/documentation/computers/getting-started.html