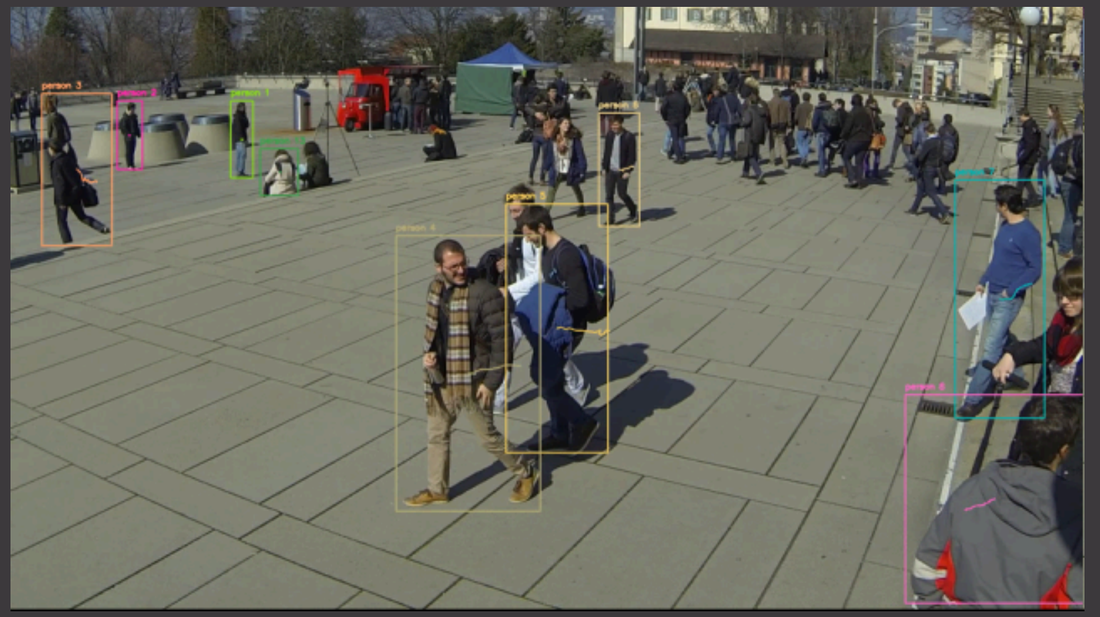
VIRTUAL PTZ SYSTEM

REPO: https://github.com/JoseLopez36/RPi-Virtual-PTZ

GOALS

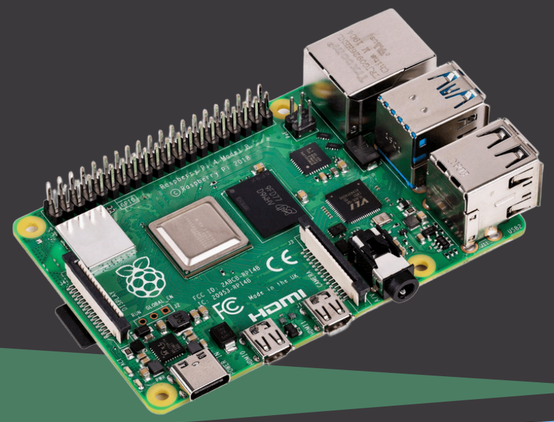
- Smart surveillance system
- Multi-target tracking
- No mechanical parts
- Distributed (edge AI)
- Low-latency



ARCHITECTURE

RPI 4B (EDGE NODE)

- Captures 720p video
- Handles v-PTZ logic
- Visual radar



PC (AI/HUD NODE)

- Runs YOLO inference (GPU)
- Displays video (with crop)
- Broadcasts detections

COMMUNICATION

- TCP stream (H.264)

TCP

- MQTT broker Mosquitto (RPi)
- MQTT inference (PC → RPi)
- MQTT PTZ state (RPi → PC)

MQTT

WORKFLOW

RPI

1. Stream 720p video via TCP
2. Calculate crop (x, y, w, h)
3. Publish crop via MQTT
4. Map targets to LED display
5. Handle joystick

PC

1. Run inference using stream
2. Publish detections
3. Display original + crop video

SENSE HAT INTERFACE ✨

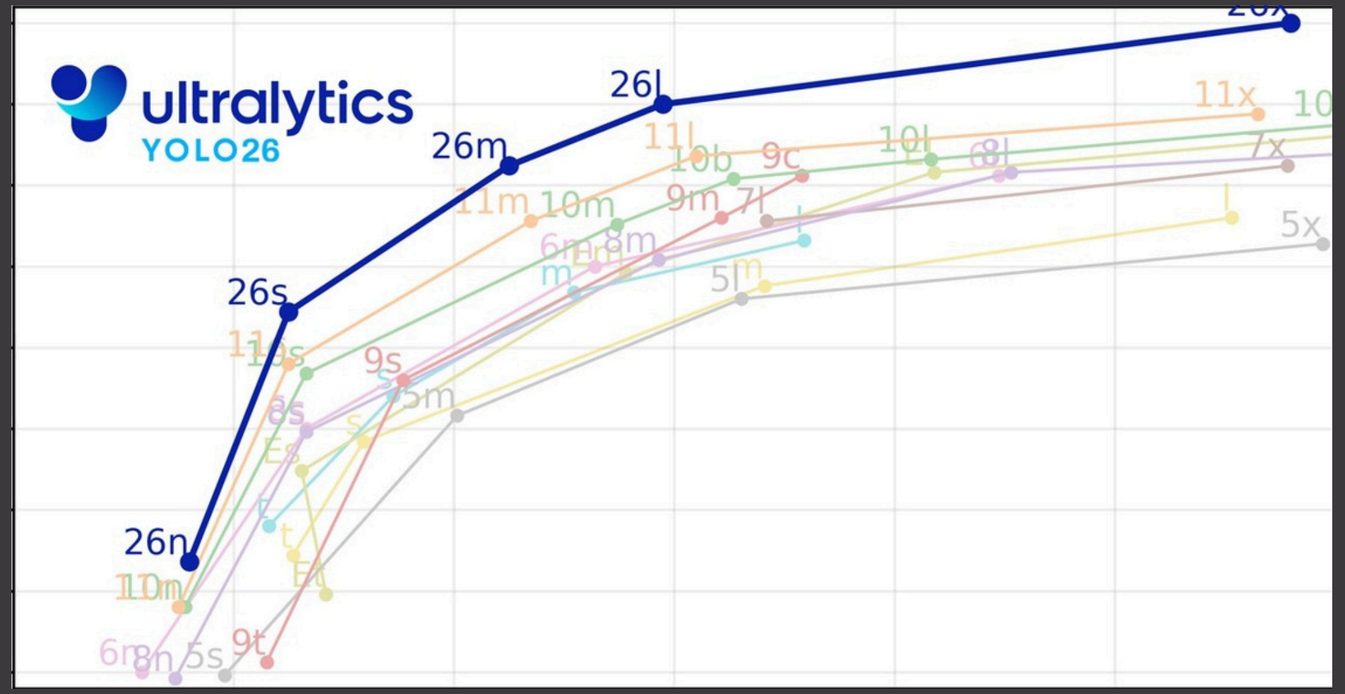
- **Visual radar:**
  - Red pixel: active target
  - White pixel: other targets
  - Maps 1280x720 to 8x8 grid

- **Joystick:**
  - Left/right: cycle through targets
  - Up/down: adjust zoom
  - Middle: reset zoom

HUD

AI SETUP

- **YOLO26m** → Speed/Accuracy
- Task: tracking
- Confidence thres.: 0.7
- Input size: 1280



DEMO

QUESTIONS

THANK YOU