Counting People Using a PIR Sensor

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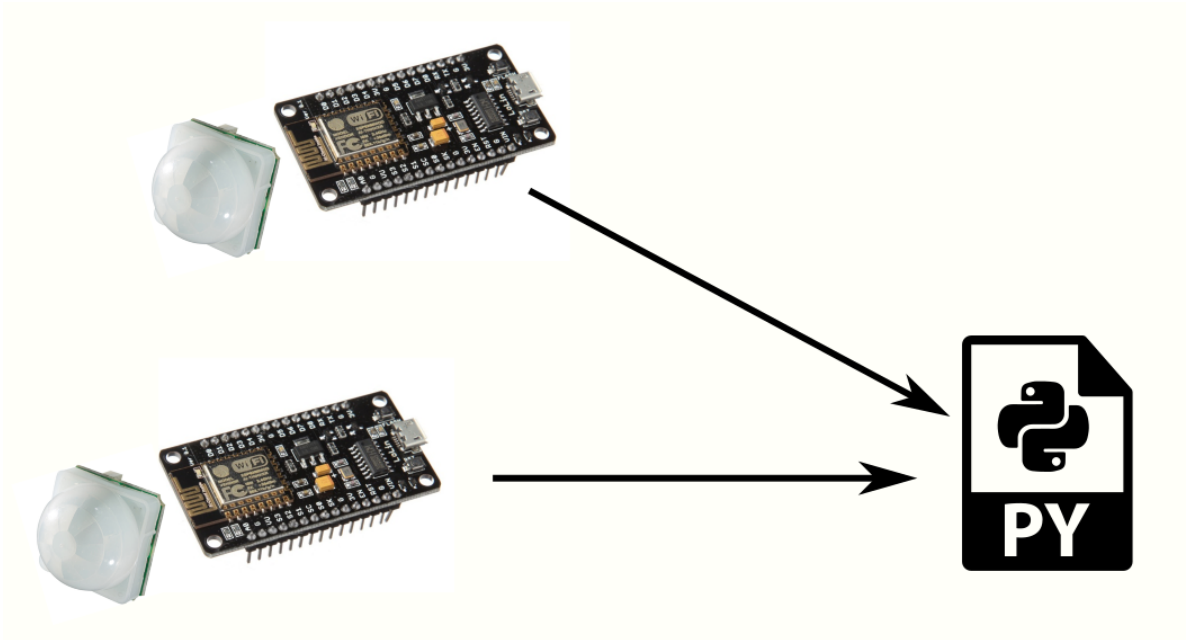
The aim

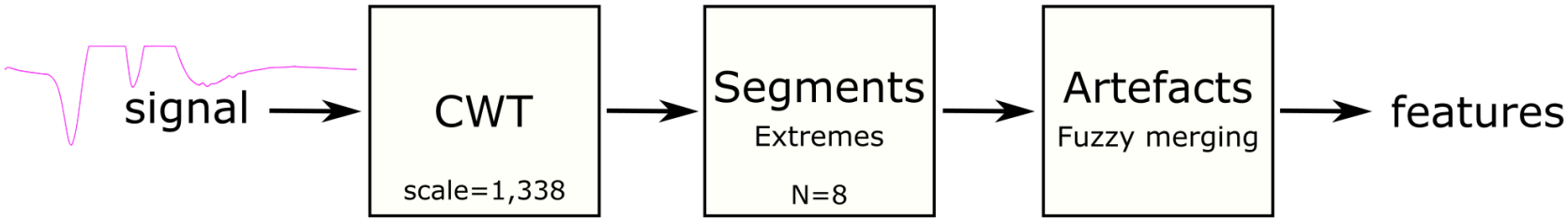
- Study the topic.
- Design a theoretical system, that could:
  - Localize a person.
  - Estimate a count of people.
- Implement and test the approach.
- Summarize.

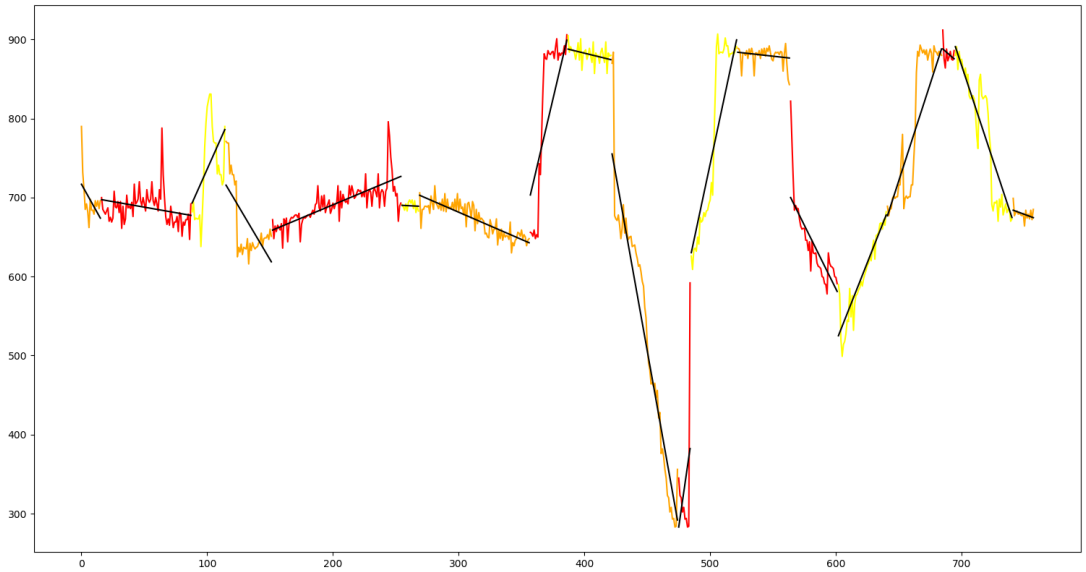
The design

- Sensor device
  - Sampling
- Classification server
  - Classification
  - Fusion

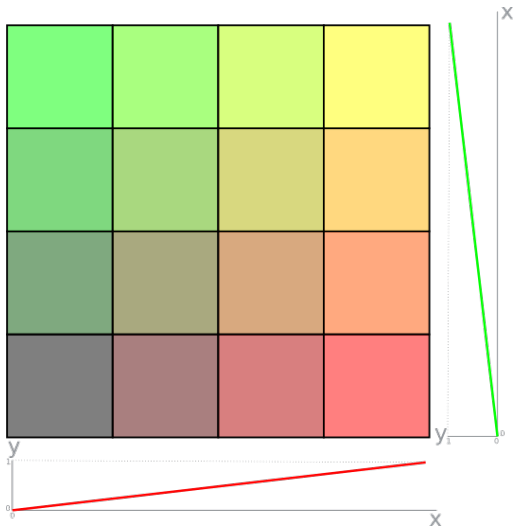


Classification: feature extraction

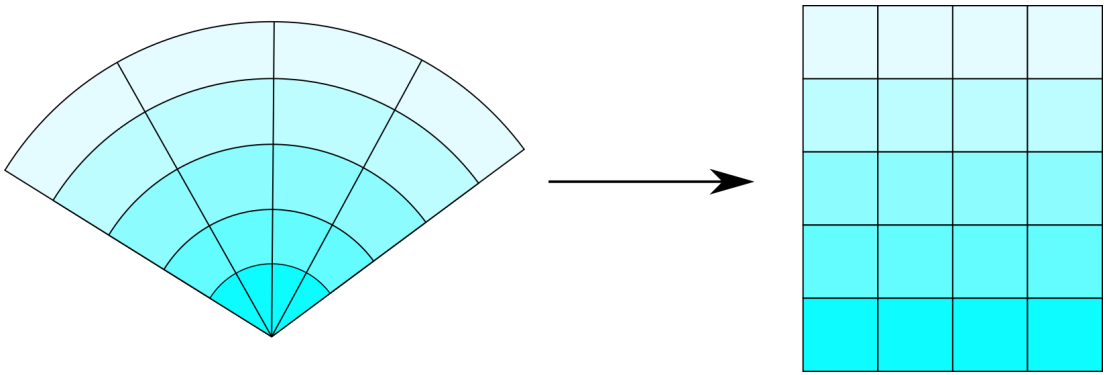




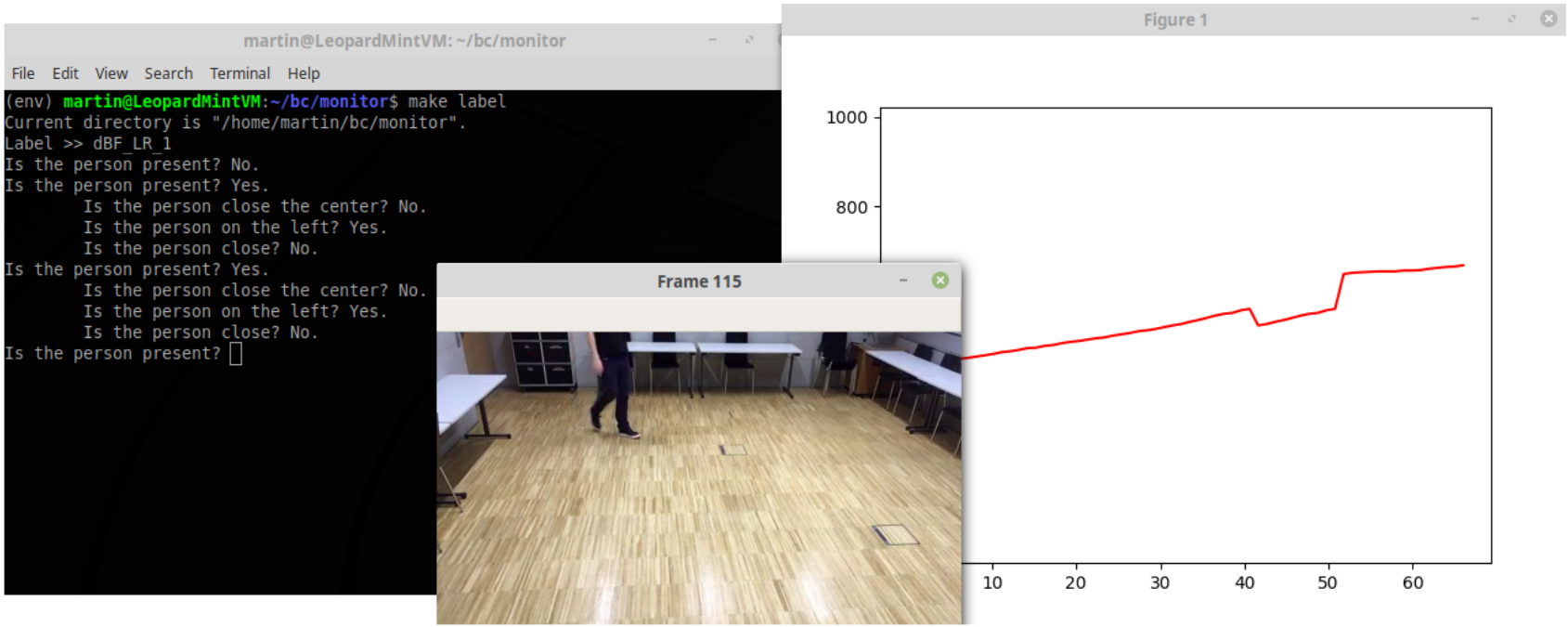
- Based on set of linear regression classifiers.



- Spatial model of sensed area.



Classification: training

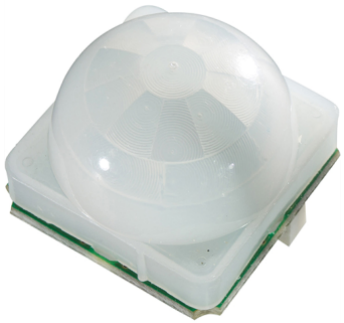


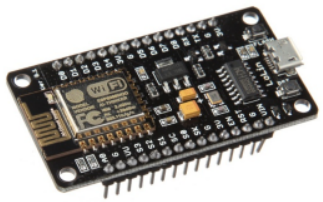
Classification: postprocessing

- For localization cluster analysis is used.
  - K-means
  - Medoids (PAM)
- Count of people by minimal within-cluster sum of squares.

Implementation: sensor device

- B+B Sensors: PIR STD
- NodeMCU (C++/Arduino)
  - ESP8266 (WiFi)
  - mDNS
  - Dynamic HTTP configuration
- Communication via multicast





Implementation: classification server

- Python3
  - NumPy, SciPy, scikit
  - MatPlotLib, PySerial
- Linux, Bash

Thank You For Your Attention !