

Counting People Using a PIR Sensor

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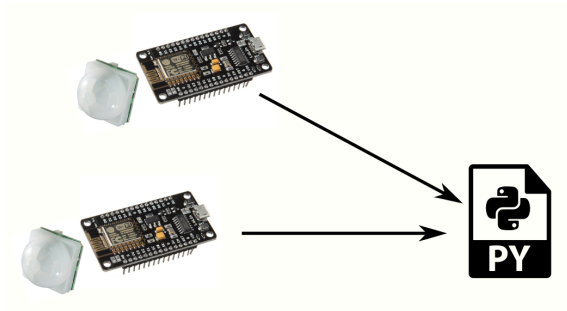
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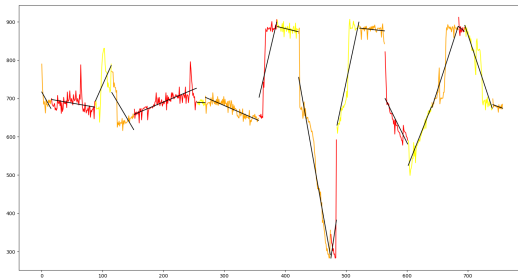
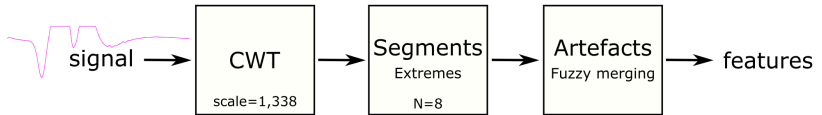


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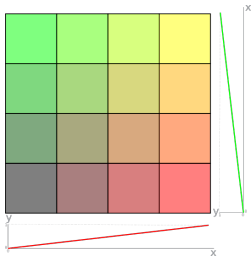
- Study the topic.
- Design a theoretical system, that could:
 - Localize a person.
 - Estimate a count of people.
- Implement and test the approach.
- Summarize.

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

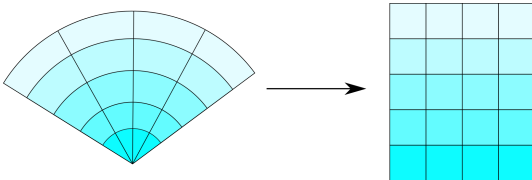




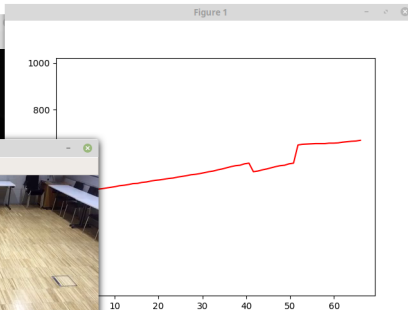
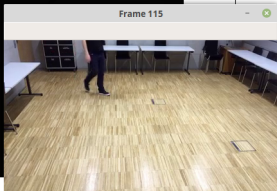
- Based on set of linear regression classifiers.



- Spatial model of sensed area.

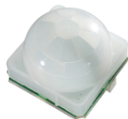


```
martin@LeopardMintVM: ~/bc/monitor
File Edit View Search Terminal Help
(env) martin@LeopardMintVM:~/bc/monitor$ make label
Current directory is "/home/martin/bc/monitor".
Label >> dBF_LR_1
Is the person present? No.
Is the person present? Yes.
Is the person close the center? No.
Is the person on the left? Yes.
Is the person close? No.
Is the person present? Yes.
Is the person close the center? No.
Is the person on the left? Yes.
Is the person close? No.
Is the person present? ☐
```

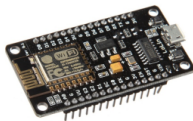


- For **localization** cluster analysis is used.
 - K-means
 - Medoids (PAM)
- **Count of people** by minimal within-cluster sum of squares.

- B+B Sensors: PIR STD



- NodeMCU (C++/Arduino)
 - ESP8266 (WiFi)
 - mDNS, HTTP



- Communication with server via multicast

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

- Posterior probability (%)

Aspect	Presence	Distance	Center	Left
Positive rate	75.972	75.785	63.725	49.263
Negative rate	86.542	69.793	53.436	59.327

- Possible improvements
 - Labelling
 - Multiple sensors

Thank You For Your Attention !