Project in Artificial Intelligence

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- Sound Localization

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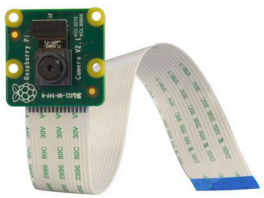
- Gantt Chart

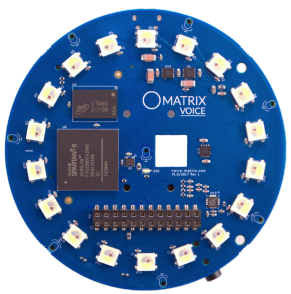
The Problem

- Smart learning robot
  - Online learning navigation
  - Sound to roughly localize human
  - Camera to localize obstacle
- Use Case
  - Trashcan robot

Equipment

- Raspberry Pi 4
- Matrix voice
- Raspberry Pi Camera
- Ultra Sonic Sensors
- Differential drive
- Battery





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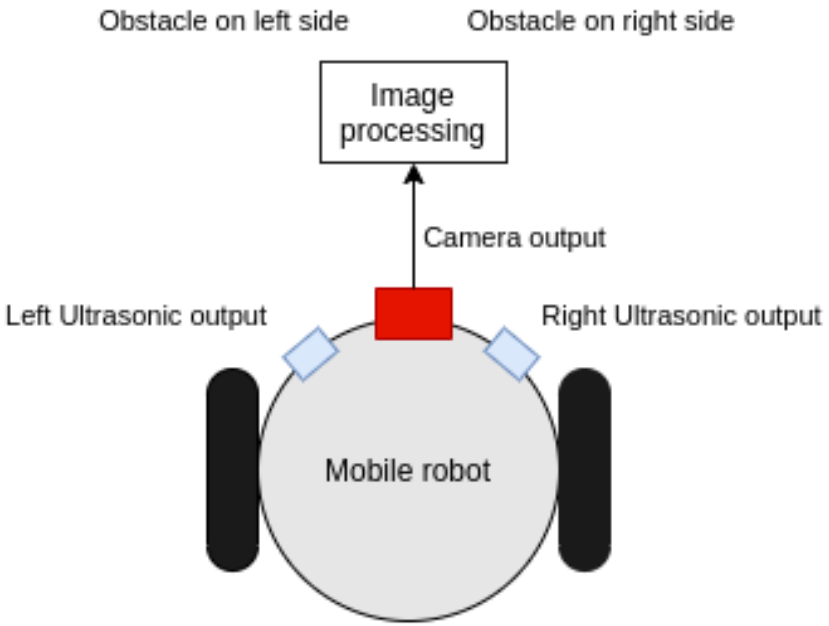
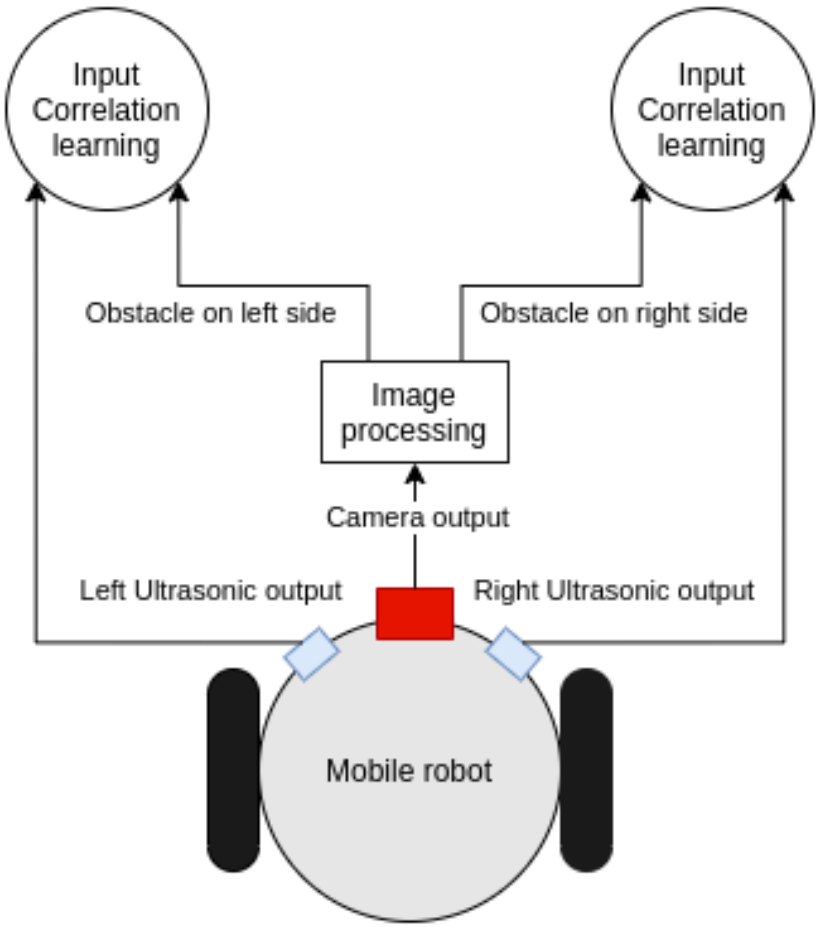
Online Learning

The Robot



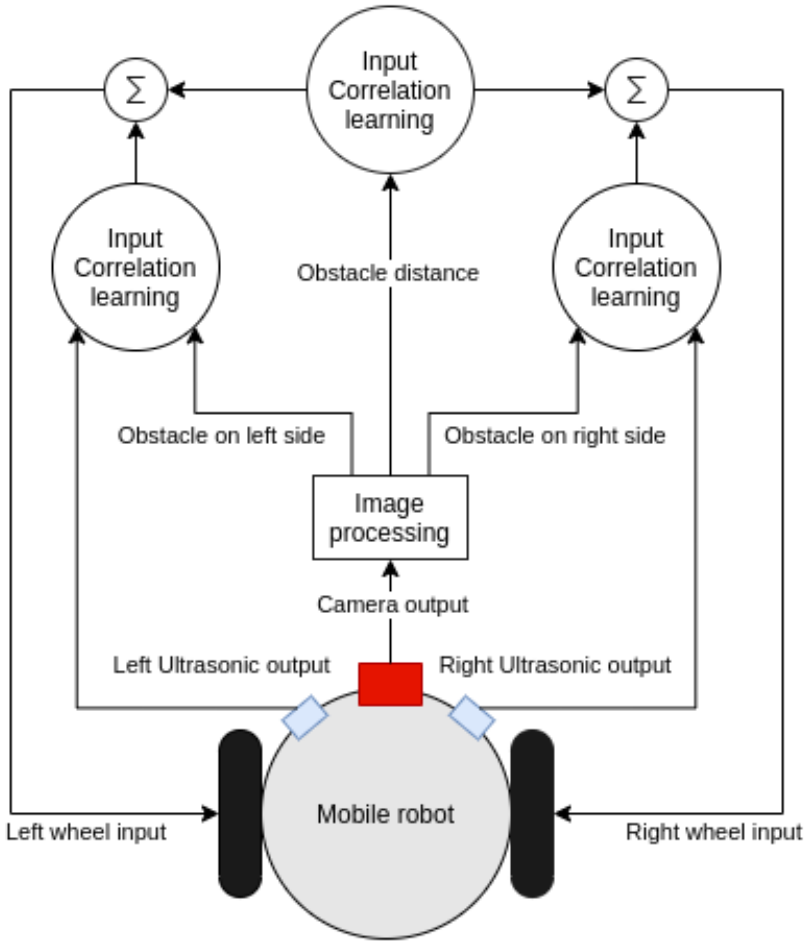
Online Learning

Adaptive Neural Circuit



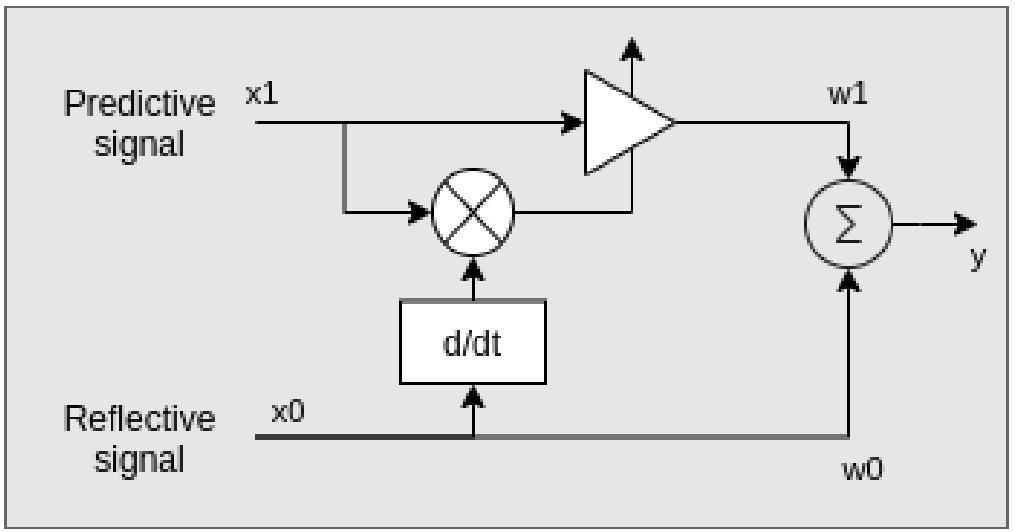
Online Learning

Adaptive Neural Circuit



Online Learning

Input Correlation Learning



$$y = w_0 \cdot x_0 + w_1 \cdot x_1$$

$$\frac{d}{dt}(w_1) = \mu \cdot x_1 \cdot \frac{d}{dt}(x_0)$$

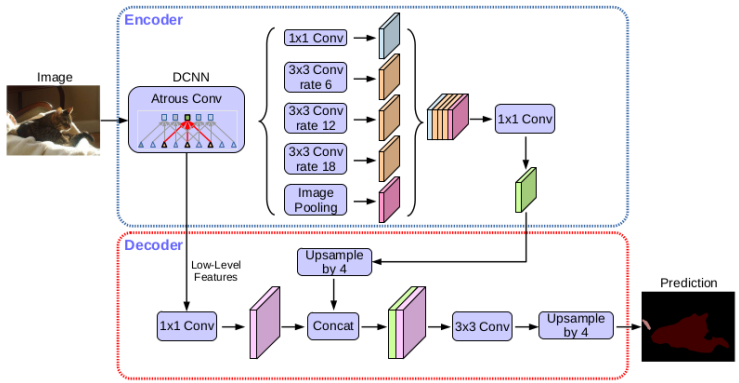
Semantic Image Segmentation

- Used as predictive signal
  - Obstacle avoidance
  - Human following
- Deep learning
  - DeepLabV3+
  - TensorFlow ⇒ TensorFlowLite
  - Coral USB accelerator

Coral USB accelerator

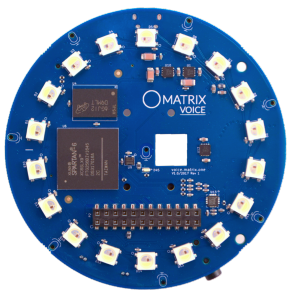
Semantic Segmentation

DeepLabV3+ Architecture

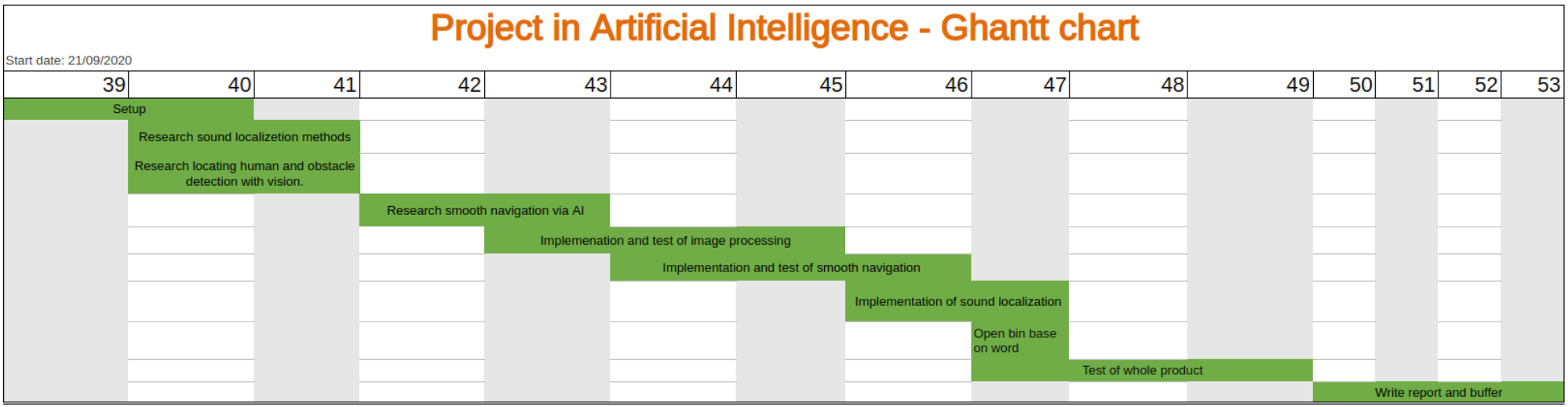


Sound Localization

- Google assistance or Alexa
- Sound array localization



How is it going then?



Questions

Any questions?

References

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