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R&D Project Proposal

Multimodal Machine Learning for Robotics

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1. Introduction

- The environment that we experience is multimodal because we use visual, audio, touch, taste and smell sensory information. A very good example could be a person talking to someone will combine audio (voice) with the visual (lips movement) information to understand them better

- The robot is equipped with multiple sensors to measure an aspect of its environment and perform various task.

- The measurement of environmental aspects from the sensors are correlated by some factors. For example, pick and place task can be performed better if we combine information from video and other manipulator sensors.

- According to Merriam Webster, vision is the prime part of sensation in modality.

- We focus to combine, process and relate multiple sensory modalities using machine learning techniques to solve a certain task in the field of robotics.

- Developing such a model can help to correlate visual information with multiple other modalities from robot sensors to understand the robot's environment better and increase the performance.

- The approach can help robot to understand it's environment better or accurately given a particular task.

- It can be applied to following task performed by the robot,

    - Pick and place task
    - Fault detection and diagnosis
    - Audio-Visual Speech recognition
    - Event recognition

- Other than Robotics, multimodal machine learning can also be used for,

- In the medical field such as neuroimaging to fuse data from EEG, MEG, MRI and increase the performance of diagnosis [**?**].

- Media captioning

1.1. Problem Statement

- What are you going to solve?

- How are you evaluating?

2. Related Work

- What have other people done?

- Why is it not sufficient?

2.1. Section 1

2.2. Section 2

3. Project Plan

3.1. Work Packages

The bare minimum will include the following packages:

WP1 Literature Search

WP2 Experiments

WP3 Project Report

Keep in mind that depending on your project, you will probably need to add work packages that are more suited to your projects.

3.2. Milestones

M1 Literature search

M2 Experimental setup

M3 Experimental Analysis

M4 Report submission

3.3. Project Schedule

Include a gantt chart here. It doesn't have to be detailed, but it should include the milestones you mentioned above. Make sure to include the writing of your report throughout the whole project, not just at the end.
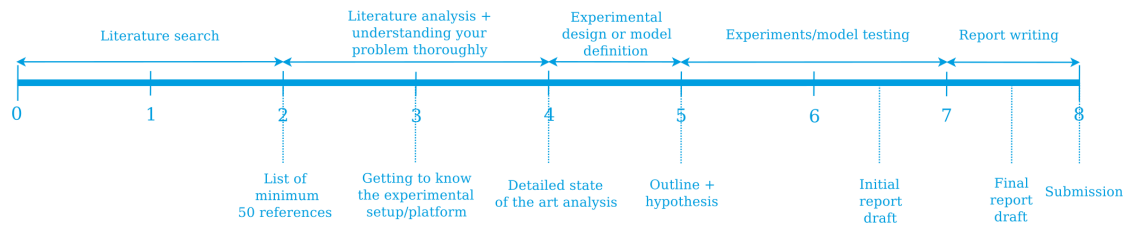
Figure 3.1:

3.4. Deliverables

3.4.1. Minimum Viable

- Survey

- Analysis of state of the art

- Simple simulated use case

- Demo on youBot or Jenny

3.4.2. Expected

- Comparation of approaches in the robot

3.4.3. Desired

- Integration to scenario