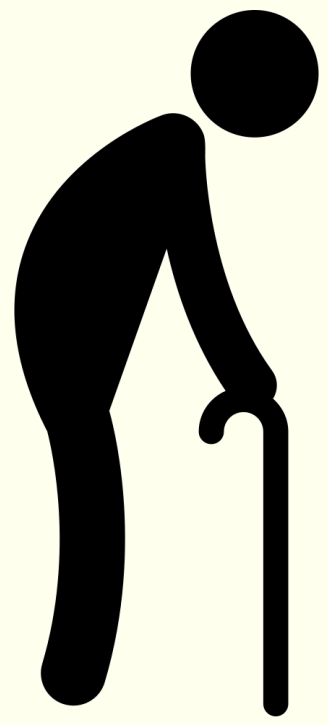# SCSE19074 – An Affective Computing Companion

Presented by Timothy Low
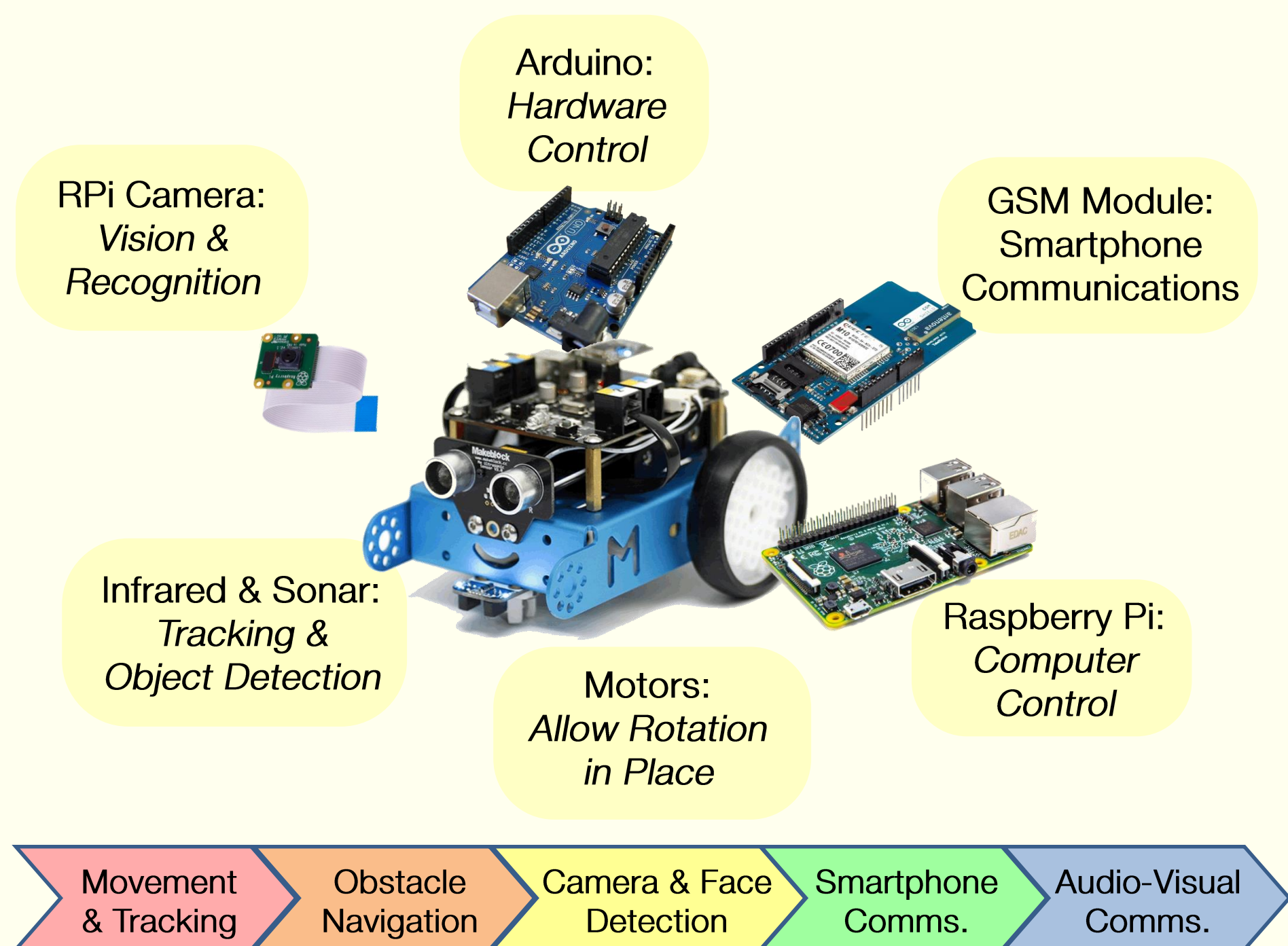**Supervised by Dr Smitha Kavallur Pisharath Gopi**

Introduction

The world's elderly population is projected to grow to 17% of the world's population by 2050. This increases the necessity for elderly care, including health monitoring and home assistance. In addition, loneliness and mental health issues are also prevalent in the aged population, with suicides for individuals aged 60 and above hitting a record high in 2017.

The system proposed is an affective companion robot for the elderly. It provides a variety of assistive, communicative, and health tracking features. As there exists strong evidence that the presence of a companion is beneficial to mental health, the system assumes the role of a pet, to alleviate loneliness.
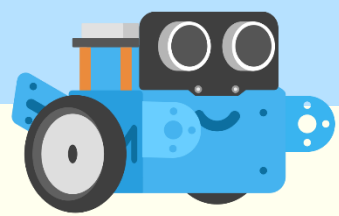
Design & Implementation

A home system was initially considered. However, this would not fulfil the goal of providing a companion to alleviate loneliness. Therefore, a robot with a physical presence was chosen.

RPi Camera: *Vision & Recognition*

Arduino: *Hardware Control*

GSM Module: *Smartphone Communications*

Infrared & Sonar: *Tracking & Object Detection*

Motors: *Allow Rotation in Place*

Raspberry Pi: *Computer Control*

Movement & Tracking → Obstacle Navigation → Camera & Face Detection → Smartphone Comms. → Audio-Visual Comms.

Current Market

Pepper is an healthcare robot that can identify visitors and make appointments. However, it is not designed for domestic use, having no personalized functions, and costing 200,000 JPY. Therefore, the objective of this project is to create a robot for domestic use that can be manufactured with low-cost hardware components.
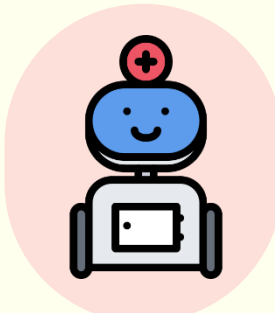
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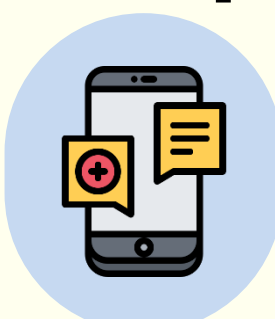
Home Assistant: Sends & receives texts, voice messages, and news headlines. Checks door & identifies visitor before the individual has to get up.

Health Monitor: Checks in on the individual at intervals, taking photos and sending them to their loved ones. Monitors their heart rate.

Affective Companion: Moves around, and provides a companion to talk to. Reminds them to take their medication.

These features will assist with home tasks to reduce dangers that can arise from small accidents in the home.

Conclusion

Preliminary work shows that rapid facial recognition and personalization is feasible with more economically-priced hardware.

This enables an affordable solution to the mass-market demand for affective computing.
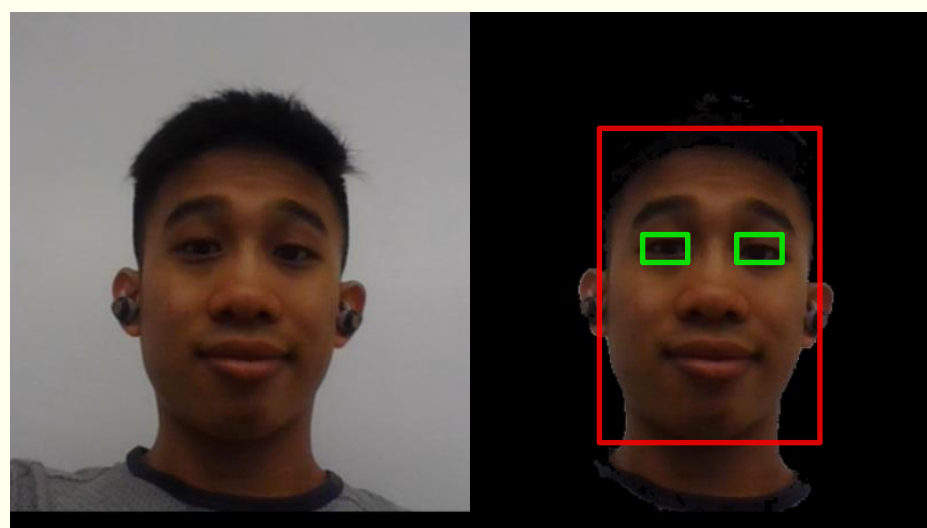
Future Improvements

❖ Track sleep quality and other relevant health metrics.
❖ Modify chassis to increase pet-like visual appeal.

References
https://www.straitstimes.com/singapore/number-of-suicides-among-seniors-hits-record-high
https://bmcpsychiatry.biomedcentral.com/articles/10.1186/s12888-018-1613-2