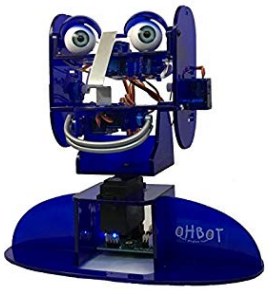
Name: Gal Samuel Moore



Abstract & Technical Description

Creation of a ROS based robotic head on Linux Ubuntu Operating System (OS) with basic computer vision and conversational abilities. This project will be completed within 3 months (12 weeks) and programmed by Gal Moore and a friend who is a computer vision & machine learning expert.

The project hardware is built upon the off-the-shelf platform ohBot (https://www.ohbot.co.uk/) that provides basic motor movements. We have already demonstrated the working OhBot with some conversational and computer vision capabilities (age/gender/emotion detection) to the toi team previously and at a public event. Now that the POC/ prototype has been achieved and demonstrated already the focus of the proposed project is to:

A) Make the software & hardware platform open source and accessible.
B) Create the desired behaviours for a receptionist (recognise people, basic conversation, assist unknown guests).
C) To form a small and informal weekly or bi monthly group of enthusiasts around the project.

Budgetary calculations were done on the basis of 3-5 weekly hours per member. At least one of us will be at the TOI lab space one evening per week to meet other enthusiasts. We believe that the estimated hours for work is conservative. For the purpose of the project we will buy the hardware setup identical to the existing one demonstrated by Gal (ohBot unit, speaker, microphone array, cables etc).

Timeline

#	**Development stage** (and deliverables)	1	2	3	4	5	6	7	8	9	10	11	12
1	**Software and Hardware environment setup and configuration:** ohBot and all hardware running on platform and on operating system with all dependencies												
2	**Conversational abilities:** Have basic conversation with ohBot through speech with minimal latency												
3	**Computer Vision features:** face recognition, object tracking, object detection, emotion recognition												
4	**State Machine:** behaviours, definition of interactions, people and situations												
5	**Quality Assurance and testing:** Validation and testing of capabilities with TOI staff and visitors												

Features & capabilities

The ToiBot will have the following states, behaviours and features:

1. **Waiting state**
    a. Looks around
    b. Identifies things of interest
    c. Track objects of interest
2. **Small talk state**
    a. Whilst waiting can have simple chit- chat
3. **Face has been found nearby state**
    a. Greeting (Incl. name if face is known)
    b. Authenticate identity through Question and Answer
    c. Open door for staff / expected guest
    d. Refer unknown people to some defined place or person (“assisting unknown guest”)
    e. Teach ohBot to remember new faces
4. **Game state**
    a. “Guess my age ohBot”
    b. “What kind of face am I making”

c. “Can you imitate my facial expression”

Future development

The output of this 3 month project is a complete and open source software/hardware platform for artificial intelligence development, cognitive computing and social robotics. In particular the platform is useful for exploration of Human Robot Interaction (HRI) and modelling cognitive processes. The robot has basic senses (it can see and hear) and it’s processing is ever-improving; for example, from recognizing people’s faces to understanding what is happening in a scene and reacting appropriately (including emotionally).

The overall purpose of our initial 3 month engagement is to reach a point where a hackathon can be conducted with multi-disciplinary teams of neuro-scientists, psychologists and engineers for experimentation with cognitive architectures and to test them in real-time with an embodied humanoid head in real- life situations.