YorRobots Internship – Care Robots

Supervisor information - Dr Javier Camara Moreno

Dr. Javier Camara is a Lecturer in Software Engineering at the University of York. He has over 12 years of research experience in the field of autonomous and self-adaptive systems, cast into 50+ research papers published in peer-reviewed journals and conferences. Prior to joining York, he was a Senior Research Scientist at Carnegie Mellon University (USA), where he co-led research on multiple projects, including “Intelligent Model-based Adaptation for Mobile Robotic Systems”, funded by a $7.9M DARPA grant. He has served on the programme committees of over 40 international conferences and workshops in areas relevant to this internship.

Project description

My project is using facial recognition combined with analysing social media to create algorithms for care robots, these algorithms will be able to detect and respond to emotion. The project falls into robotics as it is designing and creating algorithms for care robots. To achieve this goal, my first task will be to develop a DNN that can categorise facial emotion into one of the six main categories: happy, sad, neutral, surprised, disgust, and fear. I plan to use the FER+[[1]](#footnote-1) dataset to train my DNN (~ 1-2 Weeks). My second task will be to develop a neural network that has the capacity to detect emotion in text, I will be using the ISEAR[[2]](#footnote-2) dataset for this, this will be used to verify the integrity of my data aggregated from social media (~1 week). The third task and the bulk of my time will go into aggregating the data from social media and tagging it with the appropriate emotion and then using this data to develop an emotional AI capable of responding to specific emotions (~4 weeks). The importance of this is that the datasets used to train the current emotional response AI have sentences that sound either robotic or the sentences use outdated language, social media counterposes this with millions of people talking in a modern context daily. The last stage is testing and making sure everything is well documented (~1-2 weeks). I have prior AI/ML experience, so I think these goals are well within reach.

I will be developing software for the robots. I will be using Python mainly for this project as that is my most proficient language and has many very valuable modules related to ML, such as PyTorch, OpenCV, and Tensorflow of which I am sure all will be invaluable to my project.

My expected outcome is to be able to develop multiple algorithms with the capability of detecting and responding to emotion. There are many positive scenarios I see this being greatly valuable, from care homes to general home usage. However, the area I see this most useful is care homes, it is no secret that the elderly are generally scared of robots[[3]](#footnote-3), making these robots capable of being friendly, or helping when they are sad (etc.) will be greatly valuable.

I will be able to work remotely as I am not using any hardware I do not have already. I will keep a logbook of what I do each day as well as plans or ideas I have for future research, keeping in close contact with my supervisor, through mediums such as email or zoom. My supervisor will also be able to suggest resources such as research papers that might help with my research/development.

1. Microsoft, FER+ Dataset, https://github.com/microsoft/FERPlus [↑](#footnote-ref-1)
2. Klaus R. Scherer, Harald Wallbott, ISEAR Dataset, https://github.com/sinmaniphel/py\_isear\_dataset/blob/master/isear.csv [↑](#footnote-ref-2)
3. Frennert, Susanne & Östlund, Britt. (2018). How do older people think and feel about robots in health- and elderly care?. 10.13140/RG.2.2.13289.13928. (Page 2 Section B) [↑](#footnote-ref-3)