
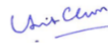




UNIVERSITY OF CAPE TOWN
Department of Electrical Engineering
EEE4022F/S - Final Year Project
Graduate Attribute Tracking Form

Student name:	Mishay Naidoo	DP Awarded? [Y/N]	Y
Student no:	NDXMIS011	Supervisor name:	Amit K Mishra
Date:	27/09/2023	Date:	04-Oct-2023
Student signature:		Supervisor signature:	

GA 1: Problem Solving

Student Response:

The objective of this project is to use low cost doppler radars to monitor traffic. This entails identifying the speed of the vehicles driving past the radar as well as the type of vehicle.

This has and will require various signal processing techniques to solve problems with noise and a low signal to noise ratio. The target must be identified from the sensor data and its speed determined from this data. Furthermore, a data collection system must be designed, requiring sourcing low cost hardware to sample the radar data, analyse it and potentially communicate the results to a central device.

Supervisor Response:

Satisfactory progress. GA can be granted.

GA 6: Professional and Technical Communication

Student Response:

During this project, I have communicated over Microsoft Teams and in person with my two supervisors. I have given weekly updates on my progress and am using Trello to plan my milestones and showcase them to my supervisor.

My process in this project is and will be documented in a report showcasing my research into existing literature, definition of requirements and specifications, as well as design, results and conclusions.

Lastly, I will be giving an oral presentation of my accomplishments in this project at the end and will design a poster to accompany the presentation.

Supervisor Response:

Satisfactory progress. GA can be granted.

GA 4: Investigations, Experiments, and Data Analysis

Student Response:

This project requires an investigation into the workings of low cost doppler radars, and to develop an understanding of the doppler effect and radar processing techniques. This requires understanding of basic radar principles and digital signal processing techniques such as the doppler effect and filtering. Experiments have and are being conducted using various radar sensors.

I have tested 3 radar modules by firstly walking towards the radars and processing the results. Spectrograms, the time domain signal as well as the frequency spectrum of these results have all been plotted and analysed.

Furthermore, I have tested the modules using a car in a controlled environment (empty parking lot) by driving the car at a known speed towards the radar. Once again the same plots were generated and analysed. Various filtering techniques such as moving average filters, FIR filters and downsampling have all been tested on the data.

Lastly, I am testing these modules on public roads and am in the process of analysing this data and trying to obtain the speeds and car types from it.

Supervisor Response:

Satisfactory progress. GA can be granted.

GA 8: Individual Working

Student Response:

I have done all of the research, design and experimentation in this project on my own with guidance from my supervisors. All the results spoken about in the report will have been obtained by me alone.

Supervisor Response:

Satisfactory progress. GA can be granted.

GA 9: Independent Learning Ability

Student Response:

I have done my own research into existing literature on the topic of doppler radars for traffic monitoring. I have also engaged with the a radar basics textbook (Principles of Modern Radar by Mark A. Richards et al.) and read chapters specified by my supervisor. Furthermore, I have researched filtering techniques and radar analysis plots such as spectrograms to help understand my data better.

Supervisor Response:

Satisfactory progress. GA can be granted.

Instructions:

Students must explain in this document what they **have already done** and what they **plan to do** to satisfy each Graduate Attribute. Descriptions of each GA is provided below. Supervisors may then respond to the student's plans and current progress, providing additional comments or advice as they see fit. If the student's progress is sufficient, they may indicate that DP is awarded.

GA 1: Problem Solving

Identify, formulate, analyse and solve complex engineering problems creatively and innovatively.

GA 4: Investigations, Experiments and Data Analysis

Demonstrate competence to plan and conduct investigations and experiments. The balance of investigation and experiment should be appropriate to the discipline. Research methodology to be applied in research or investigation where the student engages with selected knowledge in the research literature of the discipline. Note: An investigation differs from a design in that the objective is to produce knowledge and understanding of a phenomenon and a recommended course of action rather than specifying how an artefact could be produced.

GA 6: Professional and Technical Communication

Demonstrate competence to communicate effectively, both orally and in writing, with engineering audiences and the community at large. This course evaluates the long report component of this outcome at exit level. Material to be communicated is in an academic or simulated professional context. Audiences range from engineering peers, management and lay persons, using appropriate academic or professional discourse. Written reports (10 000 to 15 000 words plus tables, diagrams and appendices) should cover material at exit-level. Methods of providing information include the conventional methods of the discipline, for example engineering drawings, as well as subject-specific methods.

GA 8: Individual, Team and Multidisciplinary Working

Demonstrate competence to work effectively as an individual, in teams and in multidisciplinary environments. This course evaluates the **individual** working component of this learning outcome at exit level.

GA 9: Independent Learning Ability

Demonstrate competence to engage in independent learning through well developed learning skills. Operate independently in complex, ill-defined contexts requiring personal responsibility and initiative, accurately self-evaluate and take responsibility for learning requirements; be aware of social and ethical implications of applying knowledge in particular contexts.