Postdoctoral Research Fellowship

Project Title: Signal processing algorithms and systems to detect and classify cetaceans.

Scope of Research: A good proxy of overall marine ecosystem health is the abundance and state of marine mammal populations. These ecosystems can be impacted by various factors including but not limited to climate change and human activities. However, the effective monitoring and management of marine living resources - where these living organisms inhabit a vast, mainly inaccessible and hostile environment - requires innovation and the use of the best available technologies and methods. Specifically, monitoring of cetacean populations prove to be very difficult due to the many challenges of observing animals at sea (e.g. weather, limited daylight, ocean conditions, and expense).

Systems relying on acoustic signals have an effective reach which can exceed thousands of meters, as opposed to electromagnetic signals which disperse in a few meters. A unique feature of many cetaceans is that they rely on sound, both passively and actively, for navigation and to find resources. Therefore, various studies have implemented passive acoustic monitoring and found these techniques to be very effective, while not causing any significant environmental harm or damage when studying studying aquatic animals and their environment.

The aim of this project is to research algorithms to detect and classify cetaceans. A major focus of the project is on noise removal, as the hydrophone system is envisaged to be used as a datapack on an unmanned surface vessel. Detection and classification will focus on the use of Hidden Markov Models. The focus of this research will be on developing novel preprocessing and noise removal techniques, as well as feature extraction methods to be fed into the classification system.

The main role of the postdoctoral fellow will be to carry out research. Specific duties include:

- Generation and validation of research code
- Publication and presentation of research
- Assistance with supervision of undergraduate and postgraduate students
- Contribution towards funding applications

saam vorentoe · masiye phambili · forward together

Department of Electrical and Electronic Engineering
Departement Elektriese en Elektroniese Ingenieurswese
Privaat Sak X1, Private Bag X1, Matieland, 7602
Tel: +27 21 808 4936 | www.eng.sun.ac.za

ENGINEERING EZOBUNJINELI INGENIEURSWESE

The duration of the research position is 24 months, subject to performance reviews.

Host: The successful applicant will work under supervision of Prof Jaco Versfeld at the

Department of Electrical and Electronic Engineering (Stellenbosch University) and collaborate closely with other team members in the department.

Requirements:

- A PhD obtained within the last five years in the field of Electrical and Electronic engineering / Computer Science /Applied Mathematics, with a publication track record in international scientific journals in the relevant field.
- Strong probablility and statistics background.
- Strong programming skills (preferably in MATLAB/R/Python).
- Strong technical and analytical skills.
- Strong technical writing skills.

Please note that postdoctoral fellows are not appointed as employees and their fellowships are awarded tax free. They are therefore not eligible for employee benefits. The fellowship is sponsored by the NRF and the monetary value of the fellowship is R220 000 pa.

Commencement of duties: 1 January 2022, or soonest thereafter

Closing date: 15 December 2021

Enquiries: Please submit your complete application (including cover letter, CV with details of at least 2 referees who may be contacted, relevant degree and other certificates) to:

Professor DJJ Versfeld
Email: djjversfeld@sun.ac.za
Tel +27 (0)21 808 4319

Applicants should request their referees to forward confidential reports to the same address.

saam vorentoe · masiye phambili · forward together

Department of Electrical and Electronic Engineering
Departement Elektriese en Elektroniese Ingenieurswese
Privaat Sak X1, Private Bag X1, Matieland, 7602
Tel: +27 21 808 4936 | www.eng.sun.ac.za

ENGINEERING
EZOBUNJINELI
INGENIEURSWESE