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COnnected DEvices LAB

RESEARCH INTERNSHIP: SECURITY AND PRIVACY FRAMEWORKS FOR WIRELESS BODY AREA NETWORK (WBAN) [WSN001]

Project Description

The use of wearables is gaining a lot of momentum, this provides real-time patient data for analysis. The confidentiality of data traversing the network is paramount, since the data contain patient medical information. There are a number of security proposals in place for securely transferring data within a WBAN. The research is to produce an extensive and analytical assessment of existing security and privacy-aware frameworks with a focus on identifying open research gaps. A proposed technique will be designed and simulated to validate its potential in addressing the established gap.

Required Skills

1. Good research potential with good analytical skills
2. Knowledge on network and information security.
3. Basic understanding of WSN operations.
4. Mathematical modelling and
5. Conversant with simulations using MATLAB.

Contact Person

For further information, contact Henry Nunoo-Mensah. Click here to apply for this position.

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RESEARCH INTERNSHIP: DESIGN AND IMPLEMENTATION OF A WATER QUALITY WIRELESS SENSOR NODE [WSN002]

Project Description

Water research involves on-site measuring of parameters. The research is to design and implement a water quality sensor node that is used to measure various properties of water. Energy-efficient computations and communication, low-cost design, and a small form factor approach should be considered in the design of the sensor node. An analytical engine will also be developed, to aggregate and analyse sense data from the field sensor nodes. The project is designed in partnership with the Water Resources, Environment and Sanitation Programme (WRESP).

Required Skills

1. Good research potential with good analytical skills
2. Knowledge of embedded systems.
3. Basic understanding of WSN operations.
4. Mathematical modelling and
5. Conversant with simulations using MATLAB.

Contact Person

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RESEARCH INTERNSHIP: WIRELESS SENSOR NETWORK FOR WATER LEAKAGE REPORTING [WSN003]

Project Description

Water leakage, from burst community water supply pipes, is a major problem that poses severe revenue challenges to water service providers. The research seeks to provide a relevant WSN architecture, which clearly outline the sensing mechanism with its accompanying energy efficient message traversal within the network. An analytic software engine to perform data analytics should be designed to handle real-time notification in order to reduce the time to repair of these burst pipes. The project is designed in partnership with the Water Resources, Environment and Sanitation Programme (WRESP).

Required Skills

1. Good research potential with good analytical skills
2. Knowledge of embedded systems, web and mobile application development.
3. Basic understanding of WSN operations.
4. Mathematical modelling and
5. Conversant with simulations using MATLAB.

Contact Person

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AN OVERVIEW OF ARTIFICIAL NEURAL NETWORKS (ANNS) IN BIOMEDICAL IMAGING – THE CONVOLUTIONAL NEURAL NETWORKS (CNN) REGIME [ML001]

Project Description

ANNs have been an area of research for many years now. Since their inception, they have gradually taken centre stage in computer vision tasks, and have become very efficient.

A popular model of ANN is known as CNN. CNNs are models of ANNs that shot into the lime light in 2012 after they out performed all other competitors at a specific computer vision task. Since then, many researchers have sort different ways to improve its performance, and find several applications for the huge potential it offers. This project aims to review CNNs, and collate information on the current state of the art. This is to identify potential aspects of the model that needs optimization, and explore possible applications in biomedical image processing

This era of 'deep learning' as it popularly called, holds promising applications especially in the field of biomedical image processing.

Required Skills

1. Very good knowledge in Basic Signal Processing Concepts
2. Good programming Skills – C++, MATLAB or Python
3. Good grasp of Calculus
4. Ability to work under pressure
5. Ability to summarize large amounts of information

Contact Person

For further information, contact Prince E. Adjei. Click here to apply for this position.

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COMPUTER AIDED DIAGNOSTIC TOOL FOR BREAST CANCER SCREENING [ML002]

Project Description

The use of machine learning in computer aided diagnostics in increasingly gaining pace. Intelligent screening of medical issues. This research seeks to model, train and test a convolutional neural network for the detection of breast cancer to provide early and convenient screening services.

A web and mobile application will also be developed to act as a proof of concept to evaluate and validate the proposed model.

Required Skills

1. Good research potential with good analytical skills
2. Knowledge of embedded systems, web and mobile application development.
3. Mathematical modelling and
4. Conversant with simulations using MATLAB or python.

Contact Person

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COMPUTER AIDED DIAGNOSTIC TOOL FOR SKIN CANCER SCREENING [ML003]

Project Description

The use of machine learning in computer aided diagnostics in increasingly gaining pace. Intelligent screening of medical issues. This research seeks to model, train and test a convolutional neural network for the detection of skin cancer to provide early and convenient screening services.

A web and mobile application will also be developed to act as a proof of concept to evaluate and validate the proposed model.

Required Skills

1. Good research potential with good analytical skills
2. Knowledge of embedded systems, web and mobile application development.
3. Mathematical modelling and
4. Conversant with simulations using MATLAB or python

Contact Person

For further information, contact Henry Nunoo-Mensah. Click here to apply for this position.