

Research Fellow



ROLE DESCRIPTION

GRADE

Grade 5

LOCATION

Merchiston, Edinburgh


LINE MANAGER

Dr Gokula Vasantha

ROLE SUMMARY

This Research Fellow (RF) position will work on a collaborative EPSRC research project that seeks to automate the capture and interpretation of activity data in manufacturing operation. Working with researchers at the Universities of Strathclyde and University of Edinburgh, the project will develop computational methods to analyse large flows of diverse (i.e. multimodal) sensor data and recognise the patterns that allow engineers to assess the current state of the shop floor, understand the impact of past events and predict the consequences of incidents on a range measures.

The project's work program investigates if the forms of probabilistic networks that have been employed to generate computational models from location tracking data in other contexts (e.g. vehicles movements in traffic models and the daily routines of individuals in domestic environments) can be extended to work with multiple forms of industrial activity data recorded on a factory floor. Such a model would allow diverse signals of manufacturing activity (e.g. material transport, staff movement, vibration, electrical current and air quality etc.) to be used to infer the behaviour of an industrial workplace and generate quantitative measures that support decisions which impact on a sites' production and sustainability performance.



The post is within the School of Engineering and the Built Environment at the Edinburgh Napier University and is associated with the Mechanical Engineering and Design Group.

MAIN DUTIES AND RESPONSIBILITIES

Undertake research related to the 'Responsive Manufacturing' project. This will entail both independent research work and working in collaboration with other researchers. The successful candidate will:

- Proactively engage with collaborating researchers to coordinate the design and implementation of sensor networks for the collection of industrial activity data in both laboratory and industrial environments. The sensor network will output a graph representation of the recorded activity data (that holds both chorological and location data) for further analysis and interpretation.
- Conduct data analysis that includes removing noises, extracting key features and patterns, identifying relationships between parameters, and predicting manufacturing performance.
- Ensure safe working and informed consent of individuals whose activities are being captured. Ensure the project's datasets are documented and processed as defined by the project's data management plan.
- Support the creation and use of digital simulation of the manufacturing processes recorded.
- Disseminate research findings through jointly authored internal reports, conference proceedings, and journal publications.

PLANNING & ORGANISING

- Work with the line manager to define and plan a programme of relevant research work and then to produce publishable results within appropriate timescales.
- Work independently to plan the schedule of tasks to ensure that work of the projects progresses according to agreed overall timetable.
- Organise own time so that different aspects of the project can proceed in parallel giving due consideration to the needs of other members of the team.
- Be proactive in interacting with project partners to share data and ideas.
- Take a leadership role in regular project meetings to report and review progress, and to generate new ideas and lines of research.
- Determine the aims, objectives and deadlines for short to medium term work plan, in discussion with the Line Manager (particularly for medium term planning).
- Contribute to long-term strategic planning and development of group activities, in discussion with the Line Manager and other researchers.

PROBLEM SOLVING

- Be resourceful in overcoming problems encountered in the development of new approaches and the implementation of existing techniques in the normal course of the research.
- Define the methodology to solve the problems in the project.
- Work in close cooperation with the other project investigators, project partners, technical staff, and PhD students working on the project to resolve problems, as required.



DECISION MAKING

- The post-holder should be able to organise their work schedule to ensure satisfactory progress and to meet the demands (where realistic) of other project partners, PhD students, etc. The successful candidate will play an important role as a member of the team in making daily decisions about their own plan of work and the allocation of time and resources.
- Manage day-to-day workload, making independent decisions about immediate priorities to meet short- and medium-term targets that have been agreed with Line Manager.

PERSON SPECIFICATION

ESSENTIAL

DESIRABLE

EDUCATION / QUALIFICATIONS

- Masters degree (or equivalent) in a related area of engineering (manufacturing or mechanical or mechatronics or operation research or systems engineering) with a focus on real-time data capture and processing (or a closely related area). ✓
- A PhD in a related area of engineering (manufacturing or mechanical or mechatronics or operation research or systems engineering) with a focus on real-time data capture and processing (or a closely related area). ✓

SKILLS / EXPERIENCE

- Track record of research in manufacturing or activity monitoring (or a closely related area), and data analytics. ✓
- Competent in system modelling simulation software, and statistical packages. ✓
- Some experience of software development. ✓
- Experience in delivering research project results; i.e. a record of peer-reviewed journal and conference papers in a relevant area. ✓
- Capable of working collaboratively with researchers from different disciplines or technical background. ✓
- Capable of working independently, exercising a high degree of initiative and demonstrating a pro-active and flexible approach to work. ✓
- Ability to work under pressure and meet agreed milestones. ✓
- Ability to develop and maintain effective working relationships. ✓
- Good timekeeping and time-management, with associated effective prioritisation of tasks. ✓
- Good communication skills; oral, writing and presentation of data. ✓
- Ability to contribute ideas and initiate new ways of working. ✓
- Ability to be adaptive and accepting of new ideas and a willingness to approach new challenges and adjusts plans to meet new priorities. ✓



	ESSENTIAL	DESIRABLE
<ul style="list-style-type: none"> • Knowledge of data mining and pattern recognition methods. 	✓	
<ul style="list-style-type: none"> • Practical experience of working in an industrial environment. 		✓
<ul style="list-style-type: none"> • A knowledge of the AWS platform and the Neo4j graph database would be an advantage. 		✓
<ul style="list-style-type: none"> • Engage in continuous professional development. 	✓	