Candidate Information

Position: Research Fellow in Autonomous Vehicle Control
School/Department: Centre for Wireless Innovation
Reference: 21/108659
Closing Date: Monday 15 March 2021
Salary: £33,797 per annum
Anticipated Interview Date: Week Commencing 29 March 2021
Duration: Available for 35 months or until 31 January 2024 (whichever is soonest)

JOB PURPOSE:

To be part of an exciting UKRI-funded project to investigate, develop and implement autonomous collision avoidance strategies for maritime vehicles working closely with industrial collaborators. To be an active member of the Energy, Power and Intelligent Control research cluster as well as the Centre for Intelligent Autonomous Manufacturing Systems assisting in the planning and delivery of research activity within the general area of autonomous systems and robotics so that the overall research objectives of the project are met.

MAJOR DUTIES:

1. To investigate and develop various fail-safe path planning algorithms for unmanned marine vehicles with a view to implement them in real time on physical systems.
2. Extensively test and verify the above algorithms for a number of real-case scenarios in desktop simulations and high-fidelity bridge simulator environments.
3. To investigate and develop risk assessment and decision-making strategies to determine and mitigate the risk of collision with other vessels.
4. In-depth study and incorporation of marine collision regulations (COLREGs) as an integral part of the path planning algorithms developed above.
5. Development of a formal framework for modelling and analysis of safe planning algorithms with provably correct behaviour such as safety, stability, robustness.
6. To work in close coordination with industrial collaborators for bridge simulator testing and real-time implementation of the above algorithms.
7. Undertake research and development activities that may include fieldwork, critical evaluation, interpretation and replanning, computer-based data analysis and re-evaluation in consultation with the supervisors, collaborators and other stake holders.
8. Present regular progress reports to members of the consortium, research cluster and to external audiences and stakeholders to disseminate and publicise research findings as appropriate.
9. To participate in regular meetings with the supervisors and project partners.
10. Write up results of own work and contribute to the production of research reports, publications and proposals.
11. Carry out routine administrative duties as requested, e.g. arranging research group meetings, maintaining project website etc.
12. Read academic papers, journals and textbooks to keep abreast of latest developments.
13. Carry out occasional undergraduate (final year, MEng) project supervision, demonstrating or lecturing duties within the post holder's area of expertise and under the direct guidance of a member of academic staff.
14. Carry out any other duties designated by the line manager and which fall within the general ambit of the post.

Planning and Organising:

1. Plan for specific aspects of research programmes. Timescales range from 1-6 months in advance and contribute to research group planning.
2. Plan for the use of research resources, laboratories and workshops where appropriate.
3. Plan own day-to day activity within the framework of the agreed research programme.

4. Plan up to a year in advance to meet deadlines for journal publications and to prepare presentations and papers for conferences.
5. Coordinate and liaise with other members of the research group over work progress.

Resource Management Responsibilities:
1. Ensure research resources are used in an effective and efficient manner.
2. Provide guidance as required to support staff and any students who may be assisting with research.

Internal and External Relationships:
1. Liaise on a regular basis with colleagues, support staff and students on routine and project-specific matters.
2. Build internal and external contacts and participate in relevant networks for the exchange of information and to form relationships for future collaboration.
3. Contribute to the School's outreach programme by establishing links with local community groups, industries etc.
4. Attend and contribute to relevant meetings.
5. Attend regular project meetings with project collaborators as and when needed.

ESSENTIAL CRITERIA:
1. Minimum of 2:1 Honours degree in Electrical and Electronic Engineering/Computer Science/Mechatronics/Applied Mathematics (or related discipline).
2. Have or be about obtain a PhD in a relevant area related to research activity.
3. 3 years recent relevant research experience.
4. Proven expertise in robotic navigation and path planning algorithms.
5. Significant demonstrable programming skills in Java, C++, or other languages to develop and implement real-time algorithms.
6. Ability to contribute to broader management and administrative processes.
7. Contribute to the School's outreach programme by links with industry, community groups etc.
8. Sufficient breadth and depth of specialist knowledge in the discipline and of research methods and techniques to work within established research programmes.
9. Evidence of proficiency in the area of autonomous systems/robotics.
10. Evidence of knowledge of methods in control.
11. Ability to communicate complex information clearly.
12. Ability to build contacts and participate in internal and external networks.
13. Demonstrable intellectual ability.
14. Ability to assess and organise resources.

DESIRABLE CRITERIA:
1. Demonstrable experience of navigation, guidance and control systems design of unmanned systems.
2. Proven expertise in obstacle detection and avoidance systems.
3. Demonstrable experience in control theoretic methods, among other hybrid systems and formal verification.
4. Proven experience of working in other programming languages such as Matlab/Simulink, VisualCV, Python, Julia etc.
5. Willingness to carry out occasional teaching/supervision duties under the direct guidance of a member of academic staff.
6. Experience of collaborative research or working in a team.
7. Defined experience of working with simulators.
8. Experience of relevant field work.