# Job Description – EPSRC DTP Internship: Development of AI-based fault detection system for HVAC systems

*“EPSRC’s Vacation Internships scheme gives undergraduate students a taster of what it is like to do research. The students are given practical, first-hand experience of working on and carrying out research in a UK university.”*

Source: [Internships and placements – UKRI](https://www.ukri.org/councils/epsrc/career-and-skills-development/studentships/flexibility-for-funders/internships-and-placements/)

To be eligible for an EPSRC Vacation Internship you **must**:

* be an undergraduate or Masters student in a STEM subject area.
* not have completed your degree studies before the planned end of the internship. An internship should generally take place in the summer vacation **before** your final year of study.
* have a right to work in the UK and carry out the placement whilst resident in the UK. We are **not** able to sponsor visas for the internship.

**About the Role**

You will be responsible for:

* Analysing HVAC data to identify patterns and anomalies indicative of system faults.
* Developing and implementing initial machine learning algorithms for early fault detection and prediction.
* Testing and validating the performance of a basic AI-based fault detection system using real-world HVAC data.
* Collaborating with engineers to optimise system performance and enhance predictive maintenance strategies.
* Documenting project progress, findings, and recommendations for future research.

The role will develop skills and experience in:

* Data analysis and interpretation
* Machine learning algorithm development
* Collaboration and communication with industry professionals
* Problem-solving and critical thinking in real-world applications

**About the Unit**

The School of Computing & Communications at the Open University brings together a diverse academic community who are passionate about delivering world-leading teaching, research and scholarship in computing and communications. Through these activities, we aim to empower our students, their employers and society in general to develop and use digital technologies to solve the problems of the future. Research in the School of Computing and Communications is committed to integrating technology effectively into our lives. We address real problems that matter to a society where computing is increasingly ubiquitous.

The Department of Research and Development at Orlando Refrigeration & Air Conditioning Ltd. is dedicated to advancing the field of HVAC technology through innovative research and development initiatives. The team collaborates with industry partners and academic institutions to address key challenges and drive technological innovation in the HVAC industry.

**Key Responsibilities**

* Data collection and preprocessing (Week 1-2):
* Some real-world HVAC system gathered data will be provided for analysis
* Preprocess the collected data to ensure consistency and readiness for analysis
* Data analysis and pattern identification (Week 3-4):
* Analyse the preprocessed HVAC data to identify patterns and anomalies indicative of potential faults
* Use data visualisation techniques to gain insights into system behaviour
* Algorithm development (Week 5-6):
* Develop initial machine learning algorithms for real-time fault detection and prediction
* Implement the algorithms using Python or MATLAB programming languages
* Testing and validation (Week 7-8):
* Test the performance of the developed AI-based fault detection system using the collected HVAC data
* Validate the system's effectiveness in detecting faults and predicting maintenance needs
* Documentation and presentation (Week 9-10):
* Document the project progress, methodologies, findings, and recommendations
* Prepare a comprehensive presentation summarising the internship project for stakeholders

**Skills and experience**

Essential:

* Strong analytical and problem-solving skills
* Proficiency in programming languages such as Python or MATLAB
* Understanding of machine learning concepts and algorithms
* Experience in data analysis, statistics and Web based application development as well as knowledge in SQL database, Client/Server environment.
* Ability to work independently and as part of a team
* Access to a computer/laptop, the Internet and Microsoft Office applications

Desirable:

* Previous experience with HVAC systems or related research projects

If you would like further details about the role before making an application, then please email [stem-research-student-support@open.ac.uk](mailto:stem-research-student-support@open.ac.uk) quoting the reference number and job title.