Department	School of Computing
Supervisors	Professor Ashkan Sami
Project Title	Atrificail Intelligence for Software Engineering (AI4SE)

PROJECT DESCRIPTION

The process of software development has become more complex and time-consuming. Researchers and engineers are in constant effort to software production faster, cheaper and better. With the advent of the latest tools and technologies, it has become easier for software developers to swiftly build the products par excellence. On the same token, there has been a large number of researchers who are trying to improve various software engineering tasks using Artificial Intelligence (AI). Deployment of Artificial Intelligence in various phases of Software development can produce many benefits, such as: improved accuracy and precision to deliver superior outcomes, remarkable support for developers and testers, improved project planning and monitoring, better problem analysis and data compilation, improved coding, accurate bug detection, and automated code corrections and fixes. Unofrtunately majority of these objective are far from perfect. Thus, researchers in Software Engineering investigating various AI techniques to Software Engineering tasks and methods. For a fairly recent survey please see [1]. AI has been applied to all areas of Software Engineering: Software requirements, Software design and modelling, Software implementation, Software testing and debugging, Software maintenance, and Software management. To perform these task various sources of traditional software engineering dataset like GitHub and GitLab repositories are used. In addition, to more recent alternatives like video tutorials on YouTube or Question and Answer platforms like Stack Overflow.

In this Ph.D. program, the researcher is expected to deploy and adjust advanced AI and deep learning methods for various Software Engineering tasks that have not been explored. A sample expectation from a Ph.D. student is to perform a series of tasks as [2]. In the process, the prospective Ph.D. student may need to get engaged with more complex and recent deep learning tools and techniques and perform tasks like [3] for Software Engineering data.

Perspective applicants are encouraged to contact Professor Sami before submitting their applications. Applications should make it clear the project you are applying for and the name of the supervisors.

Academic qualifications
A first degree (at least a 2.1) ideally in Computer Science, Software Engineering, or related fields with a good fundamental knowledge of computer programming and machine learning.

English language requirement
IELTS score must be at least 6.5 (with not less than 6.0 in each of the four components). Other, equivalent qualifications will be accepted. Full details of the University's policy are available online.

Essential attributes:
- Experience of fundamental machine learning and deep learning
- Competent in computer programming
- Knowledge of advanced deep learning tools and technologies
- Good written and oral communication skills
- Strong motivation, with evidence of independent research skills relevant to the project

	• Good time management
	Desirable attributes: Working knowledge of probability and statistics

Indicative Bibliography	[1] Yang, Y., Xia, X., Lo, D., & Grundy, J. (2022). A survey on deep learning for software engineering. ACM Computing Surveys (CSUR), 54(10s), 1-73. [2] Yazdaninia, M., Lo, D., & Sami, A. (2021, May). Characterization and prediction of questions without accepted answers on stack overflow. In 2021 IEEE/ACM 29th International Conference on Program Comprehension (ICPC) (pp. 59-70). IEEE. [3] Moezzi, S. A. R., Ghaedi, A., Rahmanian, M., Mousavi, S. Z., & Sami, A. (2022). Application of Deep Learning in Generating Structured Radiology Reports: A Transformer-Based Technique. Journal of Digital Imaging.
Enquiries	For informal enquiries about this PhD project, please contact Prof. Ashkan Sami at: a.sami@napier.ac.uk
Web page	https://www.napier.ac.uk/research-and-innovation/research-degrees/application-process