

Department	School of Computing
Supervisors	Sana Ullah Jan Bill Buchanan
Project Title	Deep machine learning for zero-day adversarial intrusion detection in Internet-of-Things and Cyber-Physical Systems
<p>PROJECT DESCRIPTION</p> <p>The increasing demand of secure and reliable communication has never been higher due to elevated number of applications in the present-day world such as the Internet of Things (IoT). The integration of numerous IoT-based applications in various aspects of our lives, e.g., industrial automation, smart healthcare, smart cities, and intelligent transportation has resulted in a continuously growing amount of heterogenous data generated and shared among IoT devices. This situation has constituted grounds for intruders to attack on the ubiquitous IoT devices and security against these attacks is considered one of the biggest barriers in adopting IoT. The aim of this project is to design machine learning-based intrusion detection system (IDS) that can discriminate between normal samples and the samples under zero-day adversarial network attacks.</p> <p>Perspective applicants are encouraged to contact the Supervisor before submitting their applications. Applications should make it clear the project you are applying for and the name of the supervisors.</p> <p>Academic qualifications A first degree (at least a 2.1) ideally in Computer Science/Engineering/Mathematics and relevant fields with a good fundamental knowledge of basic computing concepts .</p> <p>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.</p> <p>Essential attributes:</p> <ul style="list-style-type: none"> • Experience of fundamental programming in R/Java/Python/Matlab etc. • Competent in Click here to enter text. • Knowledge of basic computer science concepts • Good written and oral communication skills • Strong motivation, with evidence of independent research skills relevant to the project • Good time management <p>Desirable attributes: Interest in cybersecurity and artificial intelligence or machine learning</p>	
Indicative Bibliography	<p>A. Jamalipour and S. Murali, "A Taxonomy of Machine-Learning-Based Intrusion Detection Systems for the Internet of Things: A Survey," in IEEE Internet of Things Journal, vol. 9, no. 12, pp. 9444-9466, 15 June15, 2022, doi: 10.1109/JIOT.2021.3126811.</p> <p>B. G. De Carvalho Bertoli et al., "An End-to-End Framework for Machine Learning-Based Network Intrusion Detection System," in IEEE Access, vol. 9, pp. 106790-106805, 2021, doi: 10.1109/ACCESS.2021.3101188.</p>

Enquiries	For informal enquiries about this PhD project, please contact Dr. Sana Ullah Jan (s.jan@napier.ac.uk)
Web page	https://www.napier.ac.uk/research-and-innovation/research-degrees/application-process