School of Computing, Engineering, and the Built Environment
Edinburgh Napier University

PHD STUDENT PROJECT

Funding and application details

Funding status: Self-funded students only

Application instructions:
Detailed instructions are available at https://www.napier.ac.uk/research-and-innovation/research-degrees/how-to-apply

Prospective candidates are encouraged to contact the Director of Studies (see details below) to discuss the project and their suitability for it.

Project details

Supervisory Team:

- DIRECTOR OF STUDY: Zakwan Jaroucheh (Email: Z.Jaroucheh@napier.ac.uk)
- 2ND SUPERVISOR: Naghmeh Moradpoor

Subject Group: Computer science

Research Areas: Computer Science: Cyber Security

Project Title: How Blockchain and NFT Technologies can Fight Counterfeiting and Forgery of Physical Goods and Digital Assets in the Metaverse

Project description:

Building blocks for the so-called "Internet of Value" are provided by blockchain and distributed ledger technology (DLT), which allow for the recording of interactions and the transfer of "value," which can refer to any record of ownership of an asset, such as money, securities, or land titles, as well as ownership of specific information, such as identity, health information, or other personal data. Blockchain technology is becoming more widely recognised as a tool for enhancing data openness and traceability in intelligent societies and social systems in the age of the "twin technologies." We clearly observe a movement toward a decentralised paradigm in the social media space. The Web3 plan makes the assertion that by

entirely decentralising the web, it can eliminate the intermediary role of Big Tech companies. With the use of this new Web paradigm, numerous social media networks can now incorporate metaverses, cryptocurrencies, and tokens. This opens up the possibility of rewarding users for their social actions as well as defining Non Fungible Tokens (NFTs), digital assets that represent real-world objects like art, music, game items, and other real-world objects. This leads to the development of Social Finance (SocialFi), a new type of decentralised finance that may be crucial to the circular economy.

Following the initial disruptive outbreak in the cryptocurrency space, the DLT provides the foundation for a number of fresh, creative applications that have the potential to transform how people socialise and interact in daily life. NFTs, Web3 and the metaverse enable the creation of scarce digital objects used to mint unique versions of luxury goods, artworks, intellectual properties etc. To make these DLT applications really pervasive, some technological pitfalls have still to be solved.

References:

[1] Regner F, Urbach N, Schweizer A. NFTs in practice–non-fungible tokens as core component of a blockchain-based event ticketing application.

[2] Rehman W, e Zainab H, Imran J, Bawany NZ. Nfts: Applications and challenges. In2021 22nd International Arab Conference on Information Technology (ACIT) 2021 Dec 21 (pp. 1-7). IEEE.

[3] Brown Sr, Rodney, Soo Il Shin, and Joo Baek Kim. "WILL NFTS BE THE BEST DIGITAL ASSET FOR THE METAVERSE?." (2022).

[4] Pierro GA, Sawaf M, Tonelli R. Original or Fake? How to Understand the Digital Artworks' Value in the Blockchain. InInternational Conference on Software Engineering and Formal Methods 2022 (pp. 76-85). Springer, Cham.

[5] Cupi G. The Internet of Value and the Circular Economy. InEnabling the Internet of Value 2022 (pp. 137-143). Springer, Cham.

Candidate characteristics

Education:

A second class honour degree or equivalent qualification in Computer science or closely related discipline.

Subject knowledge:

- blockchain and cryptography but this is not a requirement.

Essential attributes:

- Experience of fundamental computer science with strong programming skills.
- Competent in software engineering fundamentals and preferably cryptography/math.
- Good written and oral communication skills.
- Strong motivation.
- Good time management.

Desirable attributes: