

AI, Novel Computing, Remote Sensing & Media Security

Supervision team

Dr Deepayan Bhowmik: deepayan.bhowmik@newcastle.ac.uk

<https://www.ncl.ac.uk/computing/staff/profile/deepayanbhowmik.html>

Research projects

Novel Computing Architecture: Neuromorphic Vision System Prompt reaction to an interesting event is a critical feature for any embedded system for safe and reliable interaction with the environment. Computer vision, which plays a significant role in such interaction processes, requires higher level scene understanding with ultra-fast processing capabilities operating at extremely low power. Mimicking the human visual system, this PhD will develop a novel low-power and high-performance neuromorphic vision platform/framework. The platform will be of use to wider applications areas, including robotics, autonomous vehicles, surveillance etc.

Generative AI and Remote Sensing: Imagery Scene classification and change detection for remote environmental monitoring became significantly important to help in understanding the impact of climate change and taking preventive measures. Satellite imagery is a key component in such scenarios which offers an array of imaging sensors and can provide information in a non-invasive way. However, publicly available satellite data, such as from European Space Agency's (ESA) Sentinel 1 and 2, are of low resolution, noisy, and not best suitable for remote scene classification. Leveraging Generative Artificial Intelligence (AI), this project aims to develop novel algorithms that can create high-resolution maps from low-resolution satellite data.

Media Authenticity in the Age of Artificial Intelligence: With the progression of generative AI and deep learning-based techniques, synthetically generated image and deepfake has been commonplace. Deepfakes are getting popular, all for wrong reasons, such as creating fake news and generating fake or manipulative images, videos, and audios for amusement and criminal purposes. It is the need of the hour to develop technologies that can detect deepfakes with high accuracy and stop or minimize the damage caused by them. This PhD proposes development of theories and algorithms that can be used for the media integrity, authenticity and provenance leading to the establishment of trust in media.

Applicant skills/background

This project requires candidate from Computer Science, Electronics Engineering or related subject areas with good analytical and coding skills.