Advancing Edge AI: PhD Research Opportunities at the EPSRC National Edge Artificial Intelligence Hub

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Research Focus:
The EPSRC National Edge Artificial Intelligence Hub, hosted by Newcastle University, addresses the next frontier of AI by pushing computation to the edge. By enabling AI to operate closer to where data is generated, we can improve speed, reduce costs, and enhance privacy and security. With a focus on real-world impact, our work spans smart healthcare, autonomous systems, smart cities, and industrial automation.

PhD Project Opportunities (you are also welcome to suggest your own ideas):

1. **AI Guardians for Critical Infrastructure: Detecting Cyber Threats in Real-Time**
    Cyber threats are evolving faster than ever, targeting critical infrastructure like power grids, health, and transportation systems. Traditional centralised approaches to cybersecurity struggle with latency and scalability. This research will create AI-powered security agents that run on edge devices to detect and neutralise cyber-attacks in milliseconds. Using federated learning and adversarial AI techniques, you will build systems capable of adapting to novel threats while maintaining seamless operation. **Outcome**: You will be developing the "immune system" of the future, protecting vital systems that underpin modern life.
2. **Health on the Edge: Revolutionising Remote Patient Monitoring**
    Remote healthcare is transforming medicine, but devices often face limitations in processing power and battery life. Real-time analytics must be balanced with patient privacy and energy efficiency. This project will design AI models that optimise performance on wearable and implantable devices, focusing on early detection of medical conditions like arrhythmias and chronic diseases. You will explore novel compression algorithms and energy-aware AI frameworks. **Outcome:** Your work will directly impact lives by creating technologies that enable proactive and personalised healthcare for millions.
3. **Unlocking AI Trust: Explainability in Edge Systems for Healthcare**
    Motivation: As AI becomes integral to healthcare, users demand systems they can trust. Explainable AI (XAI) is crucial, especially in life-critical scenarios.
    Project Description: This research will create explainable AI models for healthcare applications on edge devices. By using symbolic reasoning and visualisation techniques, you'll ensure healthcare professionals can understand and trust AI-driven diagnoses.
    Outcome: You'll be bridging the gap between cutting-edge AI and its ethical, human-centred application in healthcare.

Applicant Skills/Background
Eligible candidates should have completed or be nearing completion of a postgraduate (MSc) degree in fields such as Artificial Intelligence, Computer Science, Data Science, Cybersecurity, Electrical Engineering, or related disciplines. At the EdgeAIHub, you will work under the guidance of world-leading researchers and collaborate with industry partners to make a tangible impact on society.