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

PHD STUDENT PROJECT

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

Project details

Supervisory Team:
- DIRECTOR OF STUDY: Dr Kia Dashtipour (Email: k.dashtipour@napier.ac.uk)
- 2ND SUPERVISOR: Dr Mandar Gogate

Subject Group: Cyber-Security and System Engineering

Research Areas: Computer Science

Project Title: Multimodal Multilingual Sentiment Analysis

Project description:
Multimodal multilingual sentiment analysis involves analysing sentiments expressed in different modalities (such as text, images, audio) and across different languages. This complex task begins with integrating and representing diverse data types, including textual, visual, and auditory information. Text is processed using natural language techniques, images are analyzed through computer vision methods, and audio data is examined through audio-specific models. The representations from these modalities are then fused to create a comprehensive view of sentiment, considering emotional and contextual aspects. Language-agnostic approaches or multilingual embeddings ensure that the system can handle sentiments expressed in various languages. Machine learning or deep

learning models are employed for sentiment analysis, which are trained, fine-tuned, and evaluated using appropriate metrics. The resulting system can be deployed for real-time sentiment analysis across a wide range of data, continuously improved through feedback and updates to adapt to evolving languages and sentiments.

The multimodal multilingual sentiment analysis combines the analysis of sentiments expressed through text, images, and audio, accounting for diverse languages. This comprehensive approach integrates techniques from natural language processing and computer vision, involving the fusion of modality-specific representations to understand and interpret sentiments accurately. The system is designed to be adaptable to multiple languages, making it a powerful tool for real-time sentiment analysis across various data sources, with ongoing refinements to enhance its effectiveness and applicability in our interconnected, multilingual world.

The primary objectives of this project encompass the development of an innovative real-time, context-aware system dedicated to detecting sentiment across multiple modalities, including text, audio, and video, thereby enhancing the scope of sentiment analysis in a multilingual context.

References:

[1] 1. Dashtipour, K., Poria, S., Hussain, A., Cambria, E., Hawalah, A.Y., Gelbukh, A. and Zhou, Q., 2016. Multilingual sentiment analysis: state of the art and independent comparison of techniques. Cognitive computation, 8, pp.757-771.
[2] 2. Dashtipour, K., Gogate, M., Li, J., Jiang, F., Kong, B. and Hussain, A., 2020. A hybrid Persian sentiment analysis framework: Integrating dependency grammar based rules and deep neural networks. Neurocomputing, 380, pp.1-10.
[3] 3. Al-Ayyoub, M., Khamaiseh, A.A., Jararweh, Y. and Al-Kabi, M.N., 2019. A comprehensive survey of arabic sentiment analysis. Information processing & management, 56(2), pp.320-342.
[4] 4. Ghallab, A., Mohsen, A. and Ali, Y., 2020. Arabic sentiment analysis: A systematic literature review. Applied Computational Intelligence and Soft Computing, 2020, pp.1-21.

Candidate characteristics

Education:

A first-class honours degree, or a distinction at master level, or equivalent achievements in Computer Science

Subject knowledge:

- Expert in one of these programming languages: C, Python or Matlab.

Essential attributes:

- Strong Communication Skills:
- Effective verbal and written communication abilities, including clarity, active listening, and articulation, essential for collaboration, client interaction, and conveying ideas effectively.
- Problem-Solving and Critical Thinking:
- Capability to analyse situations, identify problems, and propose effective solutions through logical and analytical thinking.