Project Reference: CTE_DDRC_Daqing_Chen_001_25_26

About the Project

This is an exciting PhD opportunity within the College of Technology and Environment (CTE) at London South Bank University (LSBU). The successful candidate will receive a tuition fee waiver beginning in September 2025 for 4 years, including the write-up year.

Project Title

A Deep Learning-powered Hybrid Approach to Automated Lip-reading Systems Development

Project Overview

Automated lip-reading techniques have a vast range of potential applications, such as healthcare, creation of subtitles in silent films, animation and digital avatars, forensic investigations, and silent dictation in public places. However, research in this area is still in its infant stage. The main issues with most of the existing works include: 1) Constrained to monolingual data with fixed sentence structure, limited vocabulary, and character/word-based classification schemes; 2) Have a very poor performance on word conversion from recognized encoded elements, e.g., visemes and phonemes; and 3) have a little consideration, if not at all, about recognizing homophone words.

This PhD programme aims to carry out a comprehensive investigation into the subject based on the ongoing research our team has been working on in the past years. The main proposed studies are:

- 1. Developing an appropriate topology of a deep learning network for lip-reading by combining CNN, LSTM, and Transformers coupled with transfer learning.
- 2. Implementing multiple classification schemes in the system, including characters, visemes, and phonemes to ensure better classification performance for further conversion to meaningful words.
- 3. Training the system with large-scale, diverse data with rich vocabulary including BBC-Oxford LRS2/LRS3, and Silent films collection to improve systems robustness and generalization capability.
- 4. Integrating large language models and high dimensional data embedding into the system for better word conversion, especially for homophone words.
- 5. Conducting comprehensive and intensive comparative studies on the effect of the proposed systems and the approach with other existing systems.
- 6. Creating a web portal for lip-reading systems demos and to promote awareness of the research.

In the past year, the research team has been working on viseme and phoneme-based lip-reading systems along with high dimensional data embedding algorithms. In addition, the team has a collaboration with Northern Ireland Screen (<u>https://northernirelandscreen.co.uk/</u>) in creation of subtitles in silent films for educational purpose.

Who Are We Looking For?

- Open to any UK or international candidates. Starting in September 2025.
- The candidate must meet the minimum entry requirements for our PhD programme by clicking the '<u>Apply</u>' link.
- Previous research experience in deep learning and pattern recognition is essential.
- Strong programming skills with popular deep learning frameworks, such as PyTorch, TensorFlow, and Keras, etc., would be desirable.
- Knowledge of large language models and techniques for dimensionality reduction would be an advantage.

Selection Criteria:

- Academic Qualifications You should normally have at least a 2.1 honours degree from a UK University or an equivalent qualification in engineering, computer science, etc.
- **Research and Analytical Skills** Ability to research subjects using libraries, the internet, and other information resources, ability to conduct comprehensive literature reviews, experience in qualitative and quantitative data collection and analysis, strong research design and methodology skills, ability to independently collaborate with stakeholders, and excellent academic writing and communication skills.
- **Professional Skills** Project management and organisational skills, ability to work independently and as part of a team, problem-solving and critical thinking skills, and adaptability and willingness to learn new skills.
- **Communication Skills** The candidate should be highly motivated, able to collaborate, have good visual, oral, and written communication skills, and communicate the work's outcomes to commercial, industrial, and scientific audiences.
- Teamwork and Collaboration Ability to work with industrial and academic supervisors.
- Language Proficiency Overseas applicants must have a minimum English language IELTS score of 6.5, with at least 5.5 in any of the components.
- **Understanding of Equality and Diversity** Able to demonstrate an understanding of equality and diversity and their practical applications.
- Visa and Legal Requirements Non-EU/EEA nationals may need to apply to the Foreign and Commonwealth Office (FCO) for clearance from the Academic Technology Approval Scheme (ATAS).

Training & Development Opportunities

Doctoral students at London South Bank University (LSBU), through the London Doctoral College (LDC), benefit from a rich and structured training environment designed to support academic excellence and professional development. All PhD candidates are offered a comprehensive programme of workshops and seminars covering essential research skills, including research design, data analysis, academic writing, ethics, and project management. These sessions aim to support students through every stage of their doctoral journey—from literature review and methodology to thesis completion and viva preparation. Postgraduate researchers can access advanced, discipline-specific training aligned with their research focus. LSBU's doctoral training environment is designed to build deep expertise in a chosen research area and the broader skills necessary for successful careers in research, industry, and beyond.

About the College

The College of Technology and Environment (CTE) at London South Bank University (LSBU) is a newly formed academic college, launched in January following the university's recent reorganisation. Led by Executive Dean Professor Chris Harty, CTE brings together four schools: Architecture & Planning, Construction, Property & Surveying, Engineering & Design, and Computer Science & Digital Technologies. The college fosters a collaborative and interdisciplinary environment, addressing the complex challenges of the built and digital environments. CTE strongly emphasises research, with doctoral students playing a key role in shaping and contributing to the college's research agenda. CTE prepares students to become future leaders through innovation, industry partnerships, and a commitment to sustainability. With a focus on real-world impact and academic excellence, the college is set to drive forward LSBU's vision of delivering applied knowledge that transforms lives and communities locally and globally. The university has five centres, and any academic staff and students in the college can join. These research centres are described below.

About the Digital x Data (DD) Research Centre

<u>Digital x Data Research Centre</u> is a university-wide interdisciplinary research centre exploring the impact and potential of digitalisation and datafication. We focus on cutting-edge AI and data science developments, addressing opportunities and challenges through a responsible, explainable, and

sustainable lens. Rooted in LSBU's commitment to social justice, our research fosters equity by integrating science, technology, the arts, and the humanities. We drive innovation through applied research and strong partnerships with industry, academia, and the public sector and ensure that our work delivers real-world, transformative outcomes. Our approach is collaborative and future-facing, aiming to inform policy, practice, and public understanding.

Contact Person

Before applying, please contact the main supervisor, **Dr. Daqing Chen**, a senior lecturer in Data Science at the School of Computer Science and Digital Technologies, College of Technology and Environment.

E-mail: chend@lsbu.ac.uk Phone: +44(0)2078157492

In your email, include:

- Details of your current level of study and academic background.
- A summary of any relevant experience.
- A brief paragraph about your motivation for pursuing this PhD project.

Fee Waiver

The fee waiver is available for 4 years (48 months), including the writing-up year, examination period, and submission of the corrected thesis.

How to apply

Applications should be submitted via the programme page using the links below:

https://www.lsbu.ac.uk/study/course-finder/computing-science-informatics-phd

You should upload the problem statement, qualifications, CV, and other relevant documentation to the application portal. Remember to state the correct reference number and the appropriate supervisor.