

Title: MyWorld: End-to-End Learned Video Compression

Type of award PhD Research Studentship

Department Electrical and Electronic Engineering, Visual Information Laboratory

*Scholarship
Details* Minimum £17,668 p.a. in 2022/23

Duration 3 years

Eligibility Home (UK) and EU citizens who have confirmation of UK settlement or pre-settlement status under the EU Settlement Scheme

Start Date From Sept 2022

PhD Topic Background/Description

In recent years, video compression has played an essential role in the application and uptake of video technologies across film, television, terrestrial and satellite transmission, surveillance and particularly Internet video. Inspired by recent breakthroughs in AI technology, deep learning methods such as Convolutional Neural Networks (CNNs) have been increasingly exploited into video coding algorithms to provide significant coding gains compared to conventional approaches based on classic signal/image processing theory.

One major type of learning-based picture coding algorithms relates to end-to-end training and optimisation using auto-encoder type architectures. They have demonstrated great potential when compared to the state-of-the-art image codecs, with evident coding gains. However, their applications on video coding are not yet competitive with the latest standardised codecs, such as VVC and AV1.

In this context, this PhD project proposes to develop a new deep video coding framework based on end-to-end optimisation, focusing on diverse training databases, perceptual loss functions and new network architectures. The resulting deep video codec is expected to offer superior performance over VVC and AV1, with relatively low computation complexity.

This project is funded by the MyWorld UKRI Strength in Places Programme at the University of Bristol, which is creating a world-leading collaborative environment with innovation at its core. In this programme, we address some of the big creative-technology challenges facing our sector, combining technology and production research in a translational pipeline. This PhD project aligns well with one of the primary focuses of MyWorld, on developing new video delivering algorithms for immersive video content.

URL for further information: <http://www.myworld-creates.com/>
<https://www.bristol.ac.uk/news/2020/june/myworld-ukri-funding-announcement.html>

Candidate Requirements

Applicants must hold/achieve a minimum of a master's degree (or international equivalent) in a relevant discipline. Applicants without a master's qualification may be considered on an exceptional basis, provided they hold a first-class undergraduate degree. Please note, acceptance will also depend on evidence of readiness to pursue a research degree.

If English is not your first language, you need to meet this profile level:

Profile E

Further information about [English language requirements and profile levels](#).

Basic skills and knowledge required

Essential: Excellent analytical skills and experimental acumen.

Desirable: A background understanding in one or more of the following:

Video compression

Artificial intelligence / Machine Learning / Deep Learning

Scholarship Details

Stipend at the UKRI minimum stipend level will also cover tuition fees at the UK student rate. Funding is subject to eligibility status and confirmation of award.

To be treated as a home student, candidates must meet one of these criteria:

- be a UK national (meeting residency requirements)
- have settled status
- have pre-settled status (meeting residency requirements)
- have indefinite leave to remain or enter.

Application Process

- All candidates should submit a full CV and covering letter to myworldrecruitment@myworld-creates.com (FAO: Professor David R. Bull) by the deadline.
- Formal applications for PhD are not essential at this stage, but can be submitted via the University of Bristol homepage (clearly marked as MyWorld funded): <https://www.bristol.ac.uk/study/postgraduate/apply/>
- A Selection Panel will be established to review all applications and to conduct interviews of short-listed candidates.
- Candidates will be invited to give a presentation prior to their formal interview, as part of the final selection process. It is expected that the shortlisting selection process will commence **6 December 2022**, with interviews to follow.
- The initial closing date for applications is **30 November 2022**. The positions will however remain available until all scholarships are awarded.

For questions about **eligibility and the application** process please contact SCEEM Postgraduate Research Admissions sceem-pgr-admissions@bristol.ac.uk