Daniel Whettam

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Interactive AI PhD student at The University of Bristol. I'm interested in machine learning and computer vision, particularly in regards to understanding videos. My current area of research involves self-supervised learning and audio-visual video understanding. I have research experience in multiple areas of artificial intelligence, and a depth of knowledge in a range of related disciplines including signal processing, computer vision, machine learning, deep learning, and natural language processing. I'm a highly motivated and personable individual who loves to learn and engage with new ideas, and participate within the wider machine learning community.

Education

Academic Qualifications

- **The University of Bristol**
  PhD - CDT in Interactive Artificial Intelligence — *2019–Present*
- **The University of Edinburgh**
  MSc Data Science , Merit — *2018–2019*
- **The University of Hull**
  BSc (Hons) Computer Science , 1st class — *2015–2018*

Research Projects

- **Ongoing Research**

  Keywords: Self-supervision, audio-visual, video understanding
  I'm currently researching how to use self-supervised learning to improve the performance of action recognition on the EPIC-KITCHENS dataset.
- **CDT Summer Project** *'The Blind Camera: Perception of Object Interaction Events from Audio Sensors'*

  Supervisors: Dima Damen, Vangelis Kazakos
  Keywords: Audio Processing, Deep Learning, Computer Vision, Convolutional Neural Networks, PyTorch
  I researched how to perform egocentric action recognition entirely from audio signals in the context of the home-kitchen setting. This work investigated the efficacy of audio alone, with the aim of demonstrating that audio sensors provide very rich and informative data, highlighting the perception that audio sensors are more private than cameras is a myth.
- **MSc Dissertation** *'Finding the Right Teacher for a Difficult Student'* (*Distinction*)

  Supervisors: Amos Storkey, Elliot J. Crowley
  Keywords: Deep Learning, Computer Vision, Convolutional Neural Networks, Network Distillation, Neural Architecture Search, PyTorch
  Investigated the use of Neural Architecture Search (NAS) models for network distillation, where a smaller *student network* approximates the learnt representation of a larger *teacher network*. Developed a novel approach to creating a teacher network for distillation using Fisher information to scale up a NAS model.
- **BSc Dissertation** *'Data Mining Over Cancer Data with Decision Support Tool'* (*First Class*)

  Supervisor: Darryl Davis
  Keywords: Data Mining, Clinical Decision Support, Software Development
  I researched the use of clinical decision support systems for cancer diagnosis and developed a decision support tool. This involved data pre-processing, tackling issues of class imbalance and missing data. The

decision support tool was an extensive software development project in C#, involving version control (Git) and thorough testing.

Professional Experience

Research Experience

- **Research Assistant** — **Sci-Tech Daresbury**
  STFC Hartree Centre — *June 2018–August 2018*

  Keywords: Speech Recognition, Deep Learning, Transfer Learning.
  Researched applications of transfer learning for deep end-to-end speech recognition systems for use in assisted living environments. Used transfer learning to train RNN's to recognise regional UK dialects. Engaged with relevant literature to learn and understand transfer learning approaches to speech recognition. Applied understanding to a new setting, creating an effective speech recognition system for the Liverpudlian dialect. Presented results to Hartree Centre academics and Data Scientists. Our work from this project has been accepted for presentation at the 2019 Interspeech workshop on Pluricentric Languages in Speech Technology.

Teaching Experience

- **Teaching Assistant** — **Bristol**
  University of Bristol — *Oct 2020–present*

  Teaching assistant for: Applied Deep Learning, Machine Learning, Applied Data Science (Lead TA). Assisted students with lab work and helped with preparing notebooks for labs. Lab work typically involves programming in Python, implementing machine learning models and performing statistical analysis.
- **Laboratory Demonstrator** — **Hull**
  University of Hull — *Sept 2016–July 2018*

  Labatory Demonstrator for: Artificial Intelligence (Prolog), Advanced Programming (C++), Networking and User Interface Design (C#), Programming 1 (C#). Engaged with students and academics during labs, assisting students with lab work and assignments.

General Work Experience

- **Student Intern** — **London**
  Information Management Group, part of Hitachi Consulting — *Jan 2017*

  Developed in-house software for managing room-bookings in C#. Worked within a large team and engaged with other professionals.
- **Software Developer** — **Stockport**
  Sam Williamson Solutions — *June 2016 - 2017*

  Assisted in the development of C#, SQL and web-development projects, often involving liaising with clients to ensure their needs were met.

Publications

Workshop Presentations and Abstracts

Whettam D., Gargett A., and Dethlefs N.: Cross-dialect speech processing *Satellite Workshop at Interspeech 2019: Pluricentric Languages in Speech Technology*

Invited Talks

- **Finding the Right Teacher for a Difficult Student**
  Apple, Cheltenham, UK — *February 2020*

An invited talk on my MSc dissertation with particular focus on how network distillation techniques may be applicable to the small scale neural networks used for speech recognition by the Hey Siri team.

- **Cross-dialect speech processing**
  Interspeech 2019, Graz, Austria *September 2019*
  A talk presenting my work on cross-dialect speech processing at the Interspeech 2019 workshop on Pluricentric Languages in Speech Technology. This work was a result of my research internship at the Hartree Centre.

Technical skills

- **Programming Languages/Packages/Frameworks: Python (3+ years)**, **PyTorch (2 years)**, NumPy, C++, **C# (10 years)**, TensorFlow, Hadoop MapReduce, Keras, SKLearn, Pandas, Stan, Matlab, LaTeX, Linux, Git, Prolog, C, SQL.

Scholarships and Awards

- **PhD Scholarship**
  EPSRC Centre for Doctoral Training Studentship *September 2019*
- **Outstanding BSc Final Project**
  Recognised as one of the top BSc projects for the 2018 class *July 2018*

Conference Attendance and Community Involvement

- **CVPR 2020 - Sight and Sound Workshop**
  Remote attendance due to COVID-19 *June 2020*
- **International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2020)**
  Barcelona, Spain (Remote attendance due to COVID-19) *May 2020*
- **Interactive Artificial Intelligence Winter School**
  The University of Bristol, UK *February 2020*
- **Interspeech 2019 - Pluricentric Languages in Speech Technology Workshop**
  Graz, Austria *September 2019*
- **Deep Learning Winter School**
  The University of Hull, UK *January 2018*