David Corney

d.p.a.corney@rgu.ac.uk   07507 204684   www.dcorney.com

Personal Profile

I am a scientist and engineer, with a strong interest in discovering new knowledge and applying it to solve challenging data-driven problems. In my current role as a Senior Research Fellow, I am developing methods to help journalists find and organise real-time news from Twitter and other social networks. This includes developing software to access and process large quantities of text rapidly to find trends and patterns. I am working as part of an EU-wide consortium of academic and commercial partners and work closely with journalists and computer scientists.

I have always worked to transfer of knowledge between industry and academia, drawing on the different strengths of each. I have several years of commercial computing experience, when I acquired many technical and non-technical skills, including software development, liaison with clients and supervision of junior colleagues. I returned to university to undertake an MSc and then a PhD both of which involved applying machine learning techniques to industrial data mining problems. This allowed me to explore and expand my interests in machine learning and in the application of novel techniques to practical problems.

Since then, I have held a number of research posts at UK universities. Along the way, I have successfully collaborated with Unilever, GlaxoSmithKline and Kew Gardens, along with various academic partners. My work has covered a range of fields including machine learning, large scale text analysis, data mining, image processing, evolutionary and neural computing, and natural and artificial vision.

Professional Experience

Senior Research Fellow   April 2012 - now
Dept. of Computing, City University London *and* IDEAS Research Institute, Robert Gordon University

- I am currently researching and developing methods to find information on social networks such as Twitter to aid journalists and others seeking real-time news.
- I have helped to develop and evaluate novel trend-detection algorithms and methods to identify useful sources on Twitter.
- I work closely with journalists and with academic and commercial partners from across Europe as part of the EU Framework 7 project "SocialSensor".
- In April 2013, the principal investigator relocated to Robert Gordon University, resulting in a change in employer, but the research continues with the same focus.
- I recently co-organized the SNOW workshop data challenge, where I led the evaluation of 10+ international teams' submissions to a news-detection task.

Research Fellow   July 2009-March 2012
Department of Computing, University of Surrey

- I developed and applied image processing, machine learning and evolutionary computing techniques to images of dried plant specimens from the Kew Gardens herbarium.

- I developed software to automatically extract information about the leaves and carried out evaluation with botanists.
- One key challenge was the great variety of sizes and shapes of the leaves, many of which were damaged. This required very robust algorithms.

Research Fellow July 2006-July 2009
UCL Institute of Ophthalmology

- I investigated human and insect vision, including the appearance of optical illusions and the perception of lightness, colour, and depth, in collaboration with visual and computational neuroscientists.
- I used statistical and machine learning tools, such as neural networks, to produce "virtual animals" that learned to interpret simple scenes within a synthetic ecology. I then analysed their behaviour and internal representations.
- This helped us to better understand the evolution and function of natural vision systems and contributed to visual neuroscience more generally.

Online tutor (part-time) 2004-2006 *and* 2008-2011
Queen Mary, University of London *and* University of Hertfordshire

- I taught several undergraduate Computer Science modules to distance learning students. This involved teaching students from a wide variety of backgrounds, along with coursework and exam preparation and marking.
- I also carried out online supervision of BSc and MSc degree projects.

Senior Research Fellow November 2001-July 2006
University College, London, Department of Computer Science

- I worked with GlaxoSmithKline to develop software to aid their drug-development programs.
- My software was designed to locate large numbers of documents (research papers) on the internet and to extract useful information from the text to build a database.
- My work also involved undergraduate and Master's level project supervision, and classroom-based teaching support work.

Analyst Programmer February 1995-September 1997
Fraser Williams plc

- My work at this London software house was focussed on developing bespoke, large-scale database systems.
- This included analysis, design, implementation, testing and documentation.
- My responsibilities also included client visits, training provision, supervising and training junior programmers.

Education

PhD Computer Science, University College, London 1998-2002
My thesis was "Intelligent Analysis of Small Data Sets for Food Design" and concerned the development and evaluation of machine learning methods motivated by product design work within the food industry. I modelled consumer preferences of food products by finding patterns in very small data sets. Areas that I researched include feature selection, cluster analysis, outlier detection, regression and Bayesian belief networks.

Unilever plc sponsored this work, and provided data and advice throughout. I spent 6 months at one of their research centres, which allowed me to disseminate novel academic thinking and to learn more about their approaches to data analysis.

MSc Computational Intelligence (Distinction), Plymouth University   1997-98

This included study of adaptive intelligent systems such as genetic algorithms and neural networks, and their application to engineering, business and financial systems. My thesis reported an investigation into using Genetic Programming as a tool for high-dimensional symbolic regression and system identification. This work was in collaboration with Unilever plc, and involved modelling chemical data sets. The degree also included modules in project management and communication skills.

BSc (Hons.) Cognitive Science, Class 2 (ii), Exeter University   1991-94

This included study of artificial intelligence, neural networks, perception, cognition and linguistics, along with more general computer science and psychology modules.

Technical and Personal Skills

- I have professional experience of several major programming languages and operating systems, and have learned new languages, libraries and tools whenever required. Most of my recent work has used Java and Matlab, but I also have experience of Python, R, Processing, MongoDB, SQL, VB and PRO-IV under Windows and UNIX-style systems.

- I have developed good oral communication skills, including attending a course on "Technical Voice Production" at the City Lit college. I have presented work at several conferences and workshops, and given invited talks at the University of Sheffield and Tohoku University (Japan) among others.

- I helped to organise the BBSRC-funded workshop "BioText London" and invited several of the speakers from both industry and academia.

- I often act as a reviewer for various academic journals and conferences.

- I have good written communication skills, as demonstrated by a range of scientific and technical publications and also several creative writing pieces.

- I volunteered as the treasurer of a local residents association, which included teamwork with people from a wide variety of backgrounds to help organise events. I also chaired the committee meetings on several occasions.

- Languages: Basic knowledge of French (including taking evening classes, 1999-2000) and Japanese (evening classes, 2009-10).

Interests

- Running: I compete regularly at 10K and half-marathon distances.

- Photography: I have a long-standing interest in photography, and more recently I have started exploring digital image manipulations and synthesis inspired by the human visual system.

Publications

Journal Papers

[1] S. Schifferes, N. Newman, N. Thurman, D. Corney, A. Göker, and C. Martin, "Identifying and verifying news through social media," *Digital Journalism*, 2014.

[2] L. M. Aiello, G. Petkos, C. Martin, D. Corney, S. Papadopoulos, R. Skraba, A. Göker, Y. Kompatsiaris, and A. Jaimes, "Sensing trending topics in Twitter," *IEEE Transactions on Multimedia*, vol. 15, no. 6, pp. 1268–1282, 2013.

[3] D. Corney, J. Y. Clark, H. Tang, and P. Wilkin, "Automatic extraction of leaf characters from herbarium specimens," *Taxon*, vol. 61, no. 1, pp. 231–244, 2012.

[4] D. P. A. Corney, H. L. Tang, J. Y. Clark, Y. Hu, and J. Jin, "Automating digital leaf measurement: the tooth, the whole tooth, and nothing but the tooth." *PLoS one*, vol. 7, no. 8, p. e42112, 2012.

[5] J. S. Cope, D. Corney, J. Y. Clark, P. Remagnino, and P. Wilkin, "Plant species identification using digital morphometrics: A review," *Expert Systems with Applications*, 2012.

[6] R. B. Lotto, R. Clarke, D. Corney, and D. Purves, "Seeing in colour," *Optics & Laser Technology*, 2010.

[7] D. Corney, J.-D. Haynes, G. Rees, and R. B. Lotto, "The brightness of colour," *PLoS ONE*, vol. 4, no. 3, p. e5091, Mar. 2009.

[8] D. Corney and R. B. Lotto, "What are lightness illusions and why do we see them?" *PLoS Computational Biology*, vol. 3, no. 9, p. e180 EP, Sep. 2007.

[9] D. Corney, B. Buxton, L. W.B., and D. Jones, "BioRAT: Extracting biological information from full-length papers," *Bioinformatics*, vol. 20, no. 17, pp. 3206–3213, 2004.

[10] D. Corney, "Food bytes: intelligent systems in the food industry," *British Food Journal*, vol. 104, no. 10, p. 787, 2002.

Conference Papers (selected)

[11] D. Corney, C. Martin, and A. Göker, "Two sides to every story: Subjective event summarization of sports events using Twitter," in *ICMR2014 1st Workshop on Social Multimedia and Storytelling*, Glasgow, UK, Apr. 2014.

[12] E. Byrne and D. Corney, "Sweet FA: sentiment, swearing and soccer," in *ICMR2014 1st Workshop on Social Multimedia and Storytelling*, Glasgow, UK, Apr. 2014.

[13] D. Corney, C. Martin, and A. Göker, "Spot the ball: Detecting sports events on Twitter," in *ECIR 2014*, Amsterdam, Holland, Apr. 2014, pp. 449–454.

[14] C. Martin, D. Corney, A. Göker, and A. MacFarlane, "Mining newsworthy topics from social media," in *BCS SGAI Workshop on Social Media Analysis*, Cambridge, UK, Dec. 2013, pp. 32–43.

[15] D. Corney, C. Martin, A. Göker, E. Spyromitros-Xioufis, S. Papadopoulos, Y. Kompatsiaris, L. Aiello, and B. Thomee, "SocialSensor: Finding diverse images at MediaEval 2013," in *MediaEval Workshop*, Barcelona, Spain, Oct. 2013.

[16] S. Diplaris, G. Petkos, S. Papadopoulos, Y. Kompatsiaris, N. Sarris, C. Martin, A. Göker, D. Corney, J. Geurts, Y. Liu, and J.-C. Point, "SocialSensor: Surfacing real-time trends and insights from multiple social networks," in *NEM Summit*, Istanbul, Turkey, Oct. 2012.

[17] E. Byrne, D. Corney, and B. Lotto, "An ecology-based approach to perceptual modelling," in *The Twelfth Neural Computation and Psychology Workshop*, London, 2011.

[18] D. Corney, E. Byrne, B. Buxton, and D. Jones, "A logical framework for template creation and information extraction," in *Data Mining: Foundations and Practice*, ser. Studies in Computational Intelligence, 2008, vol. 118, pp. 79–108.

[19] D. Corney, "Designing food with Bayesian belief networks," in *Evolutionary Design and Manufacture ACDM2000*, 2002, pp. 83–94.