David Beattie

Contact

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Research Interests

I specialise in analysing human attitudinal and behavioural data using statistical modelling and machine learning techniques. My research focuses on understanding user interactions, experiences, and adoption patterns across augmented reality, autonomous vehicles, telecommunications, and cryptocurrencies. My passion lies in developing intelligent and adaptive user interfaces that directly address individual needs through ambient sensing, context comprehension, and understanding user intention to enhance the overall user experience.

Education

Ph.D. in Computer Science: Human-Computer Interaction *2012-2017*
Glasgow Caledonian University
Thesis title: "Auditory Feedback for Autonomous Vehicles: Improving Trust for the Driver"
Advisors: *Lynne Baillie, Martin Halvey*
Major area(s): *Human-computer interaction, multi-modal feedback, context awareness*

B.Sc. Hons. in Audio Engineering & Multimedia *2008-2010*
Glasgow Caledonian University
Thesis title: "A Graspable Musical Interface for Music Therapy Patients"
Major area(s): *Signal processing & analysis, software engineering, interactive audio synthesis*

Professional Experience

Kraken Digital Asset Exchange *2022-Present*
Senior Quantitative User Researcher

- Lead quantitative research efforts, incl. survey modelling/design, logs analysis, and other data collection techniques for entire research organisation.
- Collaborated with cross functional partners (Data Science, Qual. Researchers, & Product) to establish mix-method frameworks and studies.
- Developed first-of-its-kind crypto finance user survey to connect perception & attitudes to on-platform app metrics: won initial approval and conducted dimensionality reduction via exploratory factor analysis.
- Enhanced client segmentation research via survey gathered perceptual data and feature engineering strategies to predict user intentions during website use and trading activities; segmented via hierarchical clustering.
- Established protocols for data retention, workflow, and insight presentation with data eng. and governance teams.

Ultraleap *2018 - 2022*
Senior Research Engineer

- Responsible for the advancement of haptic feedback systems by combining machine learning techniques to produce context aware adaptive tactile sensory experiences.
- Produced the company's first texture rendering algorithm using a Tensorflow-based machine learning pipeline achieving 76% accuracy in recognising roughness qualities from images, enabling a new product vertical for monetisation.
- Analysed behavioral data to examine performance of prototypes; driving research-driven decision-making.
- Co-authored successful grant proposals while providing mentorship to team members. Research discoveries led to successful application of >£100k grant funding.

Vodafone Group *2017 - 2018*
Research Data Scientist

- Conducted a comprehensive investigation on the impact of mobile phone usage on overall well-being.
- Orchestrated a large-scale survey involving 1000 device users, collaborating with data engineers to develop an efficient data logging pipeline.
- Combined objective and subjective well-being measures with aggregated mobile device usage data and performed correlation and regression analysis.

Heriot-Watt University *2011 - 2012*
Research Assistant

- Contributed to the development and evaluation of a speech synthesis application. Conducted exploratory research study examining its usability and effectiveness. Work published in academic conference.

Skills

Programming languages: Python, R, SQL, C#
Libraries: Pandas, numPy, scikit-learn, Keras/Tensorflow, OpenCV, SciPy
Data Vis: Matplotlib, Seaborn, Plotly, Tableau, Mixpanel
Research Methods: Survey design, sampling methods, online experiments, crowd-sourced data gathering
Analysis: Predictive modelling, clustering, regression, neural networks, group analysis, dimensionality reduction

Selected Publications

K. Wojna, O. Georgiou, **D. Beattie**, M. Wright and C. Lutteroth, 2023. "Does It par-Tickle?: Investigating the Relationship Between Mid-Air Haptics and Visual Representations of Surface Textures.," in **IEEE Transactions on Haptics**.

Deans-Browne, C., Cataldo, A., Frier, W., Limerick, H., **Beattie, D.**, Haggard, P. 2022. Sense of Agency Over Hands-free Gestural Control is Modulated by the Timing of Haptic Feedback. in **EuroHaptics 2022**.

Beattie, D., Frier, W., Georgiou, O., Long, B., and Ablart, D. 2020. Incorporating the Perception of Visual Roughness into the Design of Mid-Air Haptic Textures. in **ACM Symposium on Applied Perception 2020**.

Limerick, H., Hayden, R., **Beattie, D.**, Georgiou, O., and MÃ¼ller, J. 2019. User engagement for mid-air haptic interactions with digital signage. in **ACM International Symposium on Pervasive Displays**.

Beattie, D., Baillie, L., Halvey, M. 2017. Exploring How Drivers Perceive Spatial Earcons in Automated Vehicles. in **ACM Interact. Mob. Wearable Ubiquitous Technology**.

Beattie, D., Baillie, L., Halvey, M. 2015. A comparison of artificial driving sounds for automated vehicles. in **ACM International Joint Conference on Pervasive and Ubiquitous Computing**.

Beattie, D., Baillie, L., Halvey, M. and McCall, R. 2015. Adapting SatNav to meet the demands of future automated vehicles. in **ACM CHI**.

Beattie, D., Baillie, L., Halvey, M. and McCall, R. 2014. What's around the corner? Enhancing driver awareness in autonomous vehicles via in-vehicle spatial auditory displays. in **ACM NordiCHI**.

Patents

Beattie, D., Clark, R., Harwood, A., Georgiou, O., Long, B., and Carter, T.A. Mid-air haptic textures. US Patent 11,550,395. 2023.

Selected Press

Softserve Textures, Commercialising Technology: E-Textures Success Journey. July 2022.

Professional Affiliations & Service

Reviewing

- ACM Human Factors in Computing Systems (CHI) *2014 - 2021*
- ACM Automotive User Interfaces (AutoUI) *2016 - 2019*
- ACM Intelligent User Interfaces (IUI) *2020 - 2022*
- ACM International Conference on Multimodal Interaction (ICMI) *2018 - 2020*
- ACM Designing Interactive Systems (DIS) *2019*
- ACM User Interface Software & Technology (UIST) *2018*

Mentoring

- Rory Clark, Eng. D. Computer Science - University of Bournemouth
- Kat Wojna, Eng. D. Computer Science - University of Bath

Affiliations

- Association for Computer Machinery (ACM) Member
- PyData Attendee
- DataBeers London Attendee