

Christopher Clarke

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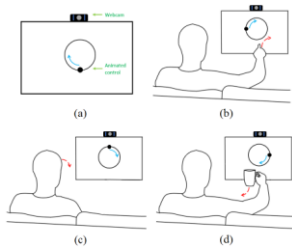
<http://christopherclarke.net>

I am primarily interested in human-computer interaction and ubiquitous computing. My research goals are to methodically research, develop, and evaluate novel and compelling interaction techniques and systems that impact our everyday lives. I am also generally interested in, and have experience with, computer vision, machine learning, and eye tracking.

EDUCATION AND PROFESSIONAL EXPERIENCE

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|------------------------|--|
| Oct. 2015 – Present | <p>PhD in Computer Science
Lancaster University, UK</p> <ul style="list-style-type: none">• Supervisor: Prof. Hans Gellersen• Investigating motion correlation techniques using computer vision and commodity sensing devices to enable user input with any body part or object |
| Jan. 2014 – Sept. 2015 | <p>Project Co-ordinator
Veraz Ltd, Lancaster, UK</p> <ul style="list-style-type: none">• Managed the productisation of a novel touch monitoring hand hygiene system, culminating in a trial at a leading Manchester hospital, and the development of a novel person-to-person touch monitoring system |
| Jan. 2014 – July 2014 | <p>Research Assistant
Intelligent Systems Research Group, Lancaster University, UK</p> <ul style="list-style-type: none">• Developed two autonomous systems for detecting moving objects using a camera on a moving platform, one implemented on the Android smartphone platform and the other on a low-powered device mounted to a UAV |
| Oct. 2013 – Sept. 2014 | <p>MSc Computer Science
Lancaster University, UK</p> <ul style="list-style-type: none">• Distinction (Average 82%)• Master thesis: <i>"Autonomous Object Detection and Behaviour Analysis in Video Streams"</i>• Best Overall Students Performance award• Best MSc Computer Science Project award |
| Oct. 2012 – Jan. 2014 | <p>Research Engineer
Veraz Ltd, Lancaster, UK</p> <ul style="list-style-type: none">• Researched novel indoor positioning technology and algorithms, and was project manager for a Food Standards Agency (FSA) funded research project on the deployment of a novel touch monitoring hand hygiene system |
| July 2012 – Sept. 2012 | <p>Summer Intern
BAE Systems, Warton, UK</p> <ul style="list-style-type: none">• Supported the development of the existing safety data management system and development of training programmes |
| Oct. 2009 – June 2012 | <p>BEng (Hons) Computer Systems Engineering
Lancaster University, UK</p> <ul style="list-style-type: none">• First Class (Average 85%)• Bachelor thesis: <i>"Neural Network Approach for the Analysis and Design of Photonic Crystal Cavities"</i>• Pilkington Award for outstanding performance at Part I |

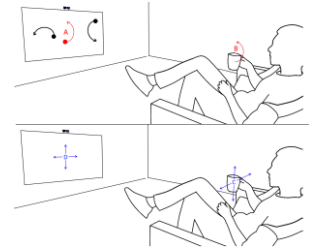
RESEARCH ACHIEVEMENTS



I developed **TraceMatch** using computer vision to enable flexible input with any body part, or use of any object, using only a webcam. The system leverages motion correlation techniques and was developed using OpenCV in C++, with interfaces built using HTML and JavaScript. I optimised the system parameters by conducting a study of 5 users, and presented the system at UbiComp '16. Following, this I undertook a thorough user study involving 20 participants to understand how users interact with a system that allows flexible input. The results were published in the inaugural issue of IMWUT, and the paper was presented at UbiComp '17.

MatchPoint is an implementation of “*spontaneous spatial coupling*” which allows any body part, or object, to be used as an ad-hoc pointing device. I developed the system based on the TraceMatch implementation, with a custom tracking algorithm used to track users’ movements in the pointing phase. MatchPoint enables a range of interaction techniques, including multiple pointers, parallel pointers, and the creation of spontaneous tangible interfaces. The system was presented at UIST '17 and has received national and international media coverage, including:

[BBC Click](#), [Reuters](#), [New Scientist](#), [Telegraph](#), [Wired](#).



SARIVA: Smartphone Application for Real-time Intelligent Video Analytics. The **SARIVA** system detects visual novelties using the video stream from a smartphone’s optical camera and automatically separates the interesting and novel objects from the background scene. I developed the system as an Android application using real-time object detection algorithms that require no prior knowledge of the shape, size or type of object to be detected.

AURORA: Autonomous Real-time On-board Video Data Analytics.

AURORA is an autonomous real-time and power efficient approach for on-board object detection and tracking on UAVs. I developed the system using OpenCV on the Linux platform for online processing of a video stream on a low-powered AD Link board. AURORA was funded by the Centre for Defence Enterprise (CDE) and the UK Ministry of Defence (MOD) and culminated in a successful demonstration for the project stakeholders and a journal article.



PROFESSIONAL ACTIVITY

June 2017

ACM SIGCHI Summer School on Computational Interaction

ETH Zürich

- Attended the summer school on computational interaction which focussed on optimization of user interface design, and machine learning & inference for designing transformations from input to useful action

2016 – Present

Reviewer of research articles in HCI conferences/journals

- ACM SIGCHI Conference on Human Factors in Computing Systems (CHI)
- ACM Annual Symposium on User Interface Software and Technology (UIST)
- PACM Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)
- ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp)
- ACM on Interactive Surfaces and Spaces (ISS)

2015 – Present

Teaching Assistant

Lancaster University, UK

- Supervision of undergraduate lab sessions, including marking of coursework

KEY SKILLS

Programming Languages: C, C++, JavaScript, HTML, Java
Software Packages: MS Office, MS Project, Visual Studio, SPSS, MATLAB, LaTeX
Platforms: Windows, Linux, and Android

RESEARCH PUBLICATIONS

- **Christopher Clarke** and Hans Gellersen. 2017. MatchPoint: Spontaneous Spatial Coupling of Body Movement for Touchless Pointing. In Proceedings of the 30th Annual ACM Symposium on User Interface Software and Technology (UIST '17). ACM, New York, NY, USA, 179-192.
DOI: <https://doi.org/10.1145/3126594.3126626>
- **Christopher Clarke**, Alessio Bellino, Augusto Esteves, and Hans Gellersen. 2017. Remote Control by Body Movement in Synchrony with Orbiting Widgets: an Evaluation of TraceMatch. Proc. ACM Interact. Mob. Wearable Ubiquitous Technol. 1, 3, Article 45 (September 2017), 22 pages.
DOI: <https://doi.org/10.1145/3130910>
- Eduardo Velloso, Marcus Carter, Joshua Newn, Augusto Esteves, **Christopher Clarke**, and Hans Gellersen. 2017. Motion Correlation: Selecting Objects by Matching Their Movement. ACM Trans. Comput.-Hum. Interact. 24, 3, Article 22 (April 2017), 35 pages.
DOI: <https://doi.org/10.1145/3064937>
- **Christopher Clarke**, Alessio Bellino, Augusto Esteves, Eduardo Velloso, and Hans Gellersen. 2016. TraceMatch: a computer vision technique for user input by tracing of animated controls. In Proceedings of the 2016 ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp '16). ACM, New York, NY, USA, 298-303.
DOI: <https://doi.org/10.1145/2971648.2971714>
- Plamen Angelov, Pouria Sadeghi-Tehran, and **Christopher Clarke**. 2017. AURORA: autonomous real-time on-board video analytics. Neural Computing and Applications 28, 5 (2017), 855–865.
- Corina Sas, Scott Challioner, **Christopher Clarke**, Ross Wilson, Alina Coman, Sarah Clinch, Mike Harding, and Nigel Davies. 2015. Self-Defining Memory Cues: Creative Expression and Emotional Meaning. In Proceedings of the 33rd Annual ACM Conference Extended Abstracts on Human Factors in Computing Systems (CHI EA '15). ACM, New York, NY, USA, 2013-2018.
DOI: <https://doi.org/10.1145/2702613.2732842>
- **Christopher Clarke**, Plamen Angelov, Majid Yusuf, and Pouria Sadeghi-Tehran. 2014. Sariva: Smartphone app for real-time intelligent video analytics. Journal of Automation Mobile Robotics and Intelligent Systems 8, 4 (2014), 15–19.
- Pouria Sadeghi-Tehran, **Christopher Clarke**, and Plamen Angelov. 2014. A real-time approach for autonomous detection and tracking of moving objects from UAV. In Evolving and Autonomous Learning Systems (EALS), 2014 IEEE Symposium on. IEEE, 43–49.