Augusto Esteves

Curriculum Vitae

Personal Information

Date of birth	July 2, 1985	augusto.esteves@tecnico.pt
Nationality	Portuguese	http://web.tecnico.ulisboa.pt/augusto.esteves

Education

Ph.D. Informatics Engineering (Human-Computer Interaction) — January 2015
M.Sc. Informatics Engineering — July 2010
B.Sc. Informatics Engineering — July 2008
University of Madeira, Portugal

Work Experience

Assistant Professor at Instituto Superior Técnico (IST), University of Lisbon — January 2020 – current
Department of Computer Science and Engineering (Portugal)

Visiting Professor at the Pohang University of Science and Technology — Aug. 2021 – Feb. 2022
Department of Computer Science and Engineering (Republic of Korea)

Assistant Professor at Edinburgh Napier University — November 2015 – Dec. 2019
School of Computing (United Kingdom)

Visiting Professor at the Ludwig Maximilian University of Munich (LMU) — August 2018
Funded by the Scottish Informatics and Computer Science Alliance

Visiting Professor at the Ulsan National Institute of Science and Technology — May – June 2018
Funded by Samsung Electronics (Republic of Korea)

Founding Partner at Prsma — September 2015 – Dec. 2017

Visiting Professor at Lancaster University — February – December 2016
InfoLab21, School of Computing and Communications (United Kingdom)

Research Fellow at Siemens Corporation — May – October 2015
Healthcare Technology Centre (United States of America)

Research Associate, Postdoctoral Fellow at Lancaster University — September 2014 – May 2015
InfoLab21, School of Computing and Communications (United Kingdom)

Visiting Researcher at the Ulsan National Institute of Science and Technology — Feb. 2013 – Feb. 2014
Interactions Lab, School of Design & Human Engineering (Republic of Korea)

Visiting Researcher at the Eindhoven University of Technology — February – June 2012
User Centered Engineering, Department of Industrial Design (Netherlands)

Research Intern at the Korea Advanced Institute of Science and Technology — June – September 2011
Telerobotics and Control Lab, Department of Mechanical Engineering (Republic of Korea)

Research Assistant at the SINAIS Project – Carnegie Mellon | Portugal
Madeira Interactive Technologies Institute (Portugal) April 2010 – May 2011
Carnegie Mellon University (United States of America) July – September 2009

ACTIVITY AND SERVICE

Board, Editor, and Steering Committee

Steering Committee Member for the ACM Int. Conference on Tangible, Embedded and Embodied Interaction

Steering Committee Member for the International Conference on Mobile and Ubiquitous Multimedia

Associate Editor for the International Journal of Human-Computer Studies (IJHCS)

Board Member of the Interactive Technologies Institute

Board Member of the Communication by Gaze Interaction (COGAIN) Association (*between 2023 and 2024*)

Organizing Committee

ACM Conference on Designing Interactive Systems (DIS '17, '25)

The 21st European Conference on Computer-Supported Cooperative Work (ECSCW '24)

ACM SIGCHI Conference on Computer-Supported Cooperative Work and Social Computing (CSCW '23)

ACM International Conference on Information Technology for Social Good (GoodIT '23)

International Symposium on Communication by Gaze Interaction (COGAIN '21-23)

ACM International Conference on Tangible, Embedded and Embodied Interaction (TEI '16, '22)

International Conference on Mobile and Ubiquitous Multimedia (MUM '22)

ACM/IEEE International Conference on Human-Robot Interaction (HRI '20)

ACM SIGCHI Symposium on Spatial User Interaction (SUI '17)

Select Program Committee

ACM SIGCHI Conference on Human Factors in Computing Systems (CHI '17, '19-20, '23-25) – *Papers, etc.*

ACM SIGCHI Conference on Computer-Supported Cooperative Work & Social Computing (CSCW '24) – *Demos*

ACM International Conference on Tangible, Embedded and Embodied Interaction (TEI '14-15, '19, '21, '24-25)

ACM International Conference on Creativity & Cognition (CC '19, '21-24) – *Papers* and *Best Paper*

European Tangible Interaction Studio (ETIS '22, '24)

ACM Conference on Designing Interactive Systems (DIS '20, '23)

ACM Symposium of Eye Tracking Research & Applications (ETRA '23) – *Short Papers*

IEEE International Conference on Artificial Intelligence & eXtended and Virtual Reality (AIxVR '20, '22, '24)

International Conference on Graphics and Interaction (ICGI '21-22)

ACM International Conference on Multimodal Interaction (ICMI '20)

ACM SIGGRAPH Int. Conference on Virtual-Reality Continuum and its Applications in Industry (VRCAI '19)

ACM International Conference on Interactive Surfaces and Spaces (ISS '16, '18-19)

Select Workshops and Demos

7th International Workshop on Everyday Virtual Reality (35 participants)
IEEE Conference on Virtual Reality and 3D User Interfaces (2021)

1st International Workshop on Cross-Reality Interaction (38 participants)
ACM International Conference on Interactive Surfaces and Spaces (2020)

Other Service

Mentor on the ATHENS Network course on "Locomotion in Virtual Reality" at KU Leuven
Committee Member for the ACM Gary Marsden Travel Awards
Expert Evaluator for the European Institute of Innovation and Technology (EIT) Culture & Creativity
European Media and Immersion Lab (EMIL) Independent Expert Panel Member
Eureka's Eurostars Programme Technical Expert
Research Grant Reviewer (ESRC, SNSF, etc.)

Select Invited Talks, Seminars, and Guest Lectures

2024 *Interaction Design at the Intersection of Ubiquitous and Spatial Computing*
Department of Human-Centered Computing, Indiana University

2023 *Defining a Fundamental Interaction Paradigm for eXtended Reality via Epistemic Action Detection*
Stereopsia EUROPE and XR4Europe Association

'19-22 *Five Years of Motion Matching Interfaces and Their Impact in Ubiquitous Computing*
Department of Computer Science and Engineering, University of Bologna
Department of Design, Ulsan National Institute of Science and Technology (UNIST)
Department of Computer Science and Engineering, Pohang University of Science and Technology
Department of Computer Science and Engineering, Ewha Womans University

What Challenges Await UX Practitioners in this New Age of Mixed-Reality?
ErgoUX 2020, Lisbon

'17-19 *Motion Matching: A New Interaction Paradigm for the IoT*
IXDS, Berlin
Centre for Design Informatics, University of Edinburgh
4th Aslla Symposium, Korea Institute of Science and Technology
Department of Computer and Information Sciences, Northumbria University
Glasgow Interactive SysTems (GIST), University of Glasgow
Human-Computer Interaction research group, University of Bath
Department of Industrial Design, Eindhoven University of Technology (TU/e)

2016 *Orbits: Gaze Interaction for Smart Watches Using Smooth-Pursuit Eye Movements*
UIST Reprise, ACM SIGGRAPH 2016

PhD Examinations

2024 Rui Filipe dos Santos Rodrigues – External Examiner
Supervisor: Prof. Nuno Correia, Universidade Nova de Lisboa

Pedro Miguel da Silva Rodrigues – External Examiner
Supervisor: Dr José João Baltazar Mendes, Instituto Universitário Egas Moniz

2023 Francisco Maria Galamba Ferrari Calisto – Internal Examiner
Supervisors: Dr Jacinto Nascimento, Prof. Nuno Nunes, Instituto Superior Técnico, University of Lisbon

2021 Alex Torquato Souza Carneiro – External Examiner
Supervisor: Dr Carlos Morimoto, University of São Paulo

2019 Llogari Casas – Internal Examiner
Supervisors: Dr G. Leplâtre, Prof. Kenneth Mitchell (Disney Research), Edinburgh Napier University

Current Supervision (PhD candidates and MSc students)

Adrián León, Inês Alves, Catarina Fidalgo[1], Andreia Valente[2], Eduardo Gomes[3], Noha Mokhtar[4], Beatriz Lopes[5], Juliana Marcelino, Henrique Águas, João Vaz, Tiago Quinteiro, Jiaqi Yu, and Basanta Poudel[6].

Past Supervisions

Select BSc	Eva Mackamul; Carl Bishop; *Jessica Bissett* (with Prof K. Mitchell, Disney Research); *Robin Piening*, *Philippe Schroeder*, and *Elizabeth Bouquet* (with Dr K. Pfeuffer, LMU Munich)
Select MSc	Gonçalo Azevedo, João Maurício, Luís da Silva, Miguel Bernardino, Diogo Lopes, Nuno Estalagem, Felipe Benatti, Miguel Dias, Mariana Mendes, Andrew McKelvey, Daniel Gonçalves, Jacinto Graça; *Beatriz Alves* (with Dr C. Sylla, University of Minho); *Rúben Rodrigues* (with Dr F. Quintal, University of Madeira); *Ana David* (with Dr S. James, University of Durham, and Dr D. Giunchi, UCL); *Gianni Tumedei* (with Dr C. Prandi, University of Bologna); *Carlos Gomes* (with Major T. Guedes, Academia Militar); *João Antunes, Renée Venema, Olivier Van Houtte, Nick Van Dun, João Gomes, Wouter Mertens*, *Stan Depuydt*, and *Piet Goris* (with Dr A. Simeone, KU Leuven); *Ana Abreu* (with Dr A. Gomez, University of Portsmouth); *Ana de Oliveira* (with Dr M. Khamis, University of Glasgow); *Katharina Reiter* and *Stefanie Meitner* (with Dr K. Pfeuffer, LMU Munich); *David Verweij* (with Dr S. Bakker and Dr VJ Khan, Eindhoven University of Technology); *Renato Bernardino* and *Paulo Baula* (with Prof. I. Oakley, University of Madeira)
PhDs and Postdocs	Ivo Roupa; *Xi Wang* and *Gopal Jamnal* (with Prof. X. Liu, Edinburgh Napier University)
RAs and Interns	Pedro Tavares, Sebastião Sousa, Federica Vinella, Szymon Klinkoz, Hector Macleod, Pierre Ruiz, Frida Lindblad, Colin Thomson, and Nicholas Sawford; *Francesco Boschi* (with Dr C. Prandi, University of Bologna); *Fábio Pacheco*, *Luís Brito,* and *Joaquim Perez* (with Dr F. Quintal, University of Madeira); *Martin Hering* and *Markus Wirth* (with Prof H. Gellersen[7], Lancaster University); *Pedro Mendes*, *Fábio Luis*, and *Vitor Baptista* (with Dr F. Quintal and Dr M. Barreto, Prsma); *Rasel Islam* (with Prof I. Oakley[7], UNIST)

[1] Co-supervised with Dr Daniel Lindlbauer (Carnegie Mellon University)
[2] Co-supervised with Prof Mark Billinghurst (University of Auckland)
[3] Co-supervised with Dr Hugo Morais (INESC-ID) and Dr Lucas Pereira (LARSyS)
[4] Co-supervised with Dr Hugo Nicolau
[5] Co-supervised with Dr Mary Barreto (UMa)
[6] Co-supervised with Dr Cláudia Silva
[7] Temporary co-supervision on my part.

HONORS

2024 Best short paper award, ACM Symposium on Eye Tracking Research and Applications (ETRA '24)
2021 Outstanding Teaching Award, Depart. of Computer Science and Engineering, IST, University of Lisbon
2020 Outstanding Teaching Award, Depart. of Computer Science and Engineering, IST, University of Lisbon
2020 Excellent Reviewer Recognition, ACM Conference on Designing Interactive Systems (DIS '20)
2019 Best paper award, ACM Transactions on Computer-Human Interaction (TOCHI)
2017 Excellent Reviewer Recognition, ACM Conference on Human Factors in Computing Systems (CHI '17)
2016 Computing Reviews: Notable Computing Books and Articles of 2015
2015 Best paper award, ACM Symposium on User Interface Software and Technology (UIST '15)
2014 Marie Skłodowska-Curie Early Stage Researcher (Scholarship, Computing and Communications)
2011 PhD studentship, Portuguese Foundation of Science and Technology (FCT)
2010 First place in the Fraunhofer Portugal Challenge 2010 (for MSc thesis)
2009 Semi-finalist in the Mobile Design category of the Adobe Design Achievement Awards 2009

TEACHING

Current Courses and Program Leadership

Advanced (CMU | Portugal)	Programming Usable Interfaces, XR Studio, and Human-AI IxD	*from 2025*
Advanced (CMU | Portugal)	User Experience and Service Design Program	*from 2024*
Graduate	User-Centred Design	*from 2022*
Undergraduate	Human-Computer Interaction	*from 2020*

Past Courses

Graduate	Interaction Design Studio (*in 2023*), Virtual-Reality (*between 2019-20*), Divergent Interaction (*in 2016*), and IxD (*in 2014*)
Undergraduate	Mobile Apps Development (*in 2019*), Playful Interaction (*between 2016-19*), Ubiquitous Computing (*between 2016-19*), Responsive Envir. (*in 2019*), and Vector Graphics (*in 2014*)

Past Program Leadership

2016 BSc (Hons) Computing and User Experience, Edinburgh Napier University (*until 2019*)

SELECT MEDIA

2017 Esteves, A. (2017, October 18). When VR meets reality – how live concerts could be enhanced by 21st-century opera glasses. Retrieved from http://www.independent.co.uk/life-style/gadgets-and-tech/how-live-concerts-could-be-enhanced-by-21st-century-opera-glasses-a8002606.html

Esteves, A. (2017, October 10). When VR meets reality – how live concerts could be enhanced by 21st-century opera glasses. Retrieved from http://theconversation.com/when-vr-meets-reality-how-live-concerts-could-be-enhanced-by-21st-century-opera-glasses-85409

2016 BBC (2016, March 2). Controlling a smartwatch with your eyes. Retrieved from http://www.bbc.co.uk/news/technology-35578976

Boxall, A. (2016, January 25). See how eye-tracking may make your smartwatch easier to use in the future. Retr. from http://finance.yahoo.com/news/see-eye-tracking-may-smartwatch-131903743.html

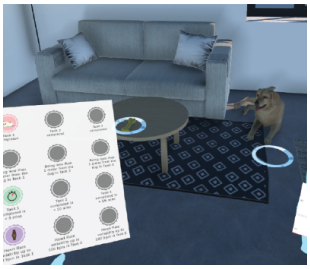
Burgess, M. (2016, January 22). Scientists create eye tracking software for smart watches (Wired UK). Retrieved from http://www.wired.co.uk/news/archive/2016-01/22/eye-tracking-smartwatch

Blending Spaces: Cross-Reality Interaction Techniques for Object Transitions Between Distinct Virtual and Augmented Realities, ITI / LARSyS, IST, University of Lisbon

This work explores the impact of vibrotactile haptic feedback on heart activity when the feedback is provided at four different body locations and with two feedback rates. A user study found that the neck placement resulted in higher heart rates and lower heart rate variability, and higher frequencies correlated with increased heart rates and decreased heart rate variability. The chest was preferred in self-reported metrics, and neck placement was perceived as less satisfying, harmonious, and immersive.

https://youtu.be/EOf0NUL2Ciw

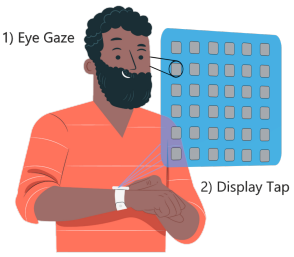
MeetingBenji: Tackling Cynophobia with Virtual Reality, Gamification, and Biofeedback
ITI / LARSyS, IST, University of Lisbon



MeetingBenji is a virtual reality exposure theraphy system for cynophobia that uses (i) gamification to enhance motivation and engagement, and (ii) biofeedback to facilitate self-control and reduce physiological responses. In a study (N=10) that compared the effects of displaying dogs in 3D scenes and 360º videos using the Behavioural Approach Test, participants reported feeling more anxiety with 3D content than 360º video (60%), lower heart rates in the presence of biofeedback (between 1.71% and 7.46%), and improved self-control across the three exposure levels.

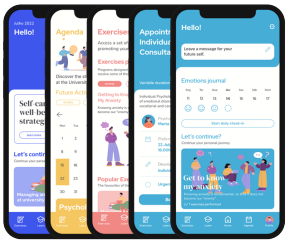
https://youtu.be/3d9ViuK41yo

Between Wearable and Spatial Computing: Exploring Four Interaction Techniques at the Intersection of Smartwatches and Head-mounted Displays, ITI / LARSyS, IST, University of Lisbon



In this project we introduce four bi-directional interaction techniques that sit between smartwatches and head-mounted displays (HMDs): gaze dwell, gaze and tap, mid-air touch, and trackpad. Our goal is to expand the input and output space of smartwatches while leveraging this as a familiar anchor for digital content that also provides HMDs with an inconspicuous and available input space. In an initial study (N=12) we characterize user performance, experience, and preference with the techniques in a task involving discrete and list-based selections, where interface targets were anchored to participants' wrists and heads.

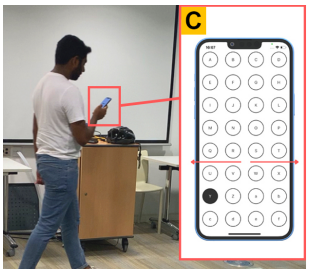
Designing for Mental Health in Higher Education: a Collaborative Approach to Digital Interventions
ITI / LARSyS, IST, University of Lisbon



Here we present the outcomes of a process of co-design and validation of a digital mental health intervention in a university setting. We draw on findings from (1) design cycles and (2) validation workshops of a digital intervention to identify preferences of engagement and ethical responsibility for real-world applicability. Our findings emphasise the importance of involving end-users and clinicians throughout the process to improve existing support systems for students' well-being, challenge stigma, and promote context-sensitive mental health care in academia.

Comparing Dwell time, Pursuits and Gaze Gestures for Gaze Interaction on Handheld Mobile Devices
ITI / LARSyS, IST, University of Lisbon

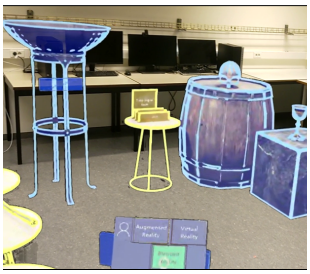
This project presents the first experiment in a mobile setting that compares three of the most commonly used gaze interaction methods while sitting and walking: Dwell, Pursuits, and Gaze gestures. Results show that input using Pursuits is faster than Dwell and Gaze gestures, especially when many targets are on-screen. Users prefer Pursuits when stationary, but prefer Dwell when walking. While selection using Gaze gestures is more demanding and slower when there are many targets, it is suitable for contexts where accuracy is more important than speed.



https://youtu.be/YgEl5WbTDaQ

Blending Spaces: Cross-Reality Interaction Techniques for Object Transitions Between Distinct Virtual and Augmented Realities, ITI / LARSyS, IST, University of Lisbon

Cross-Reality involves interaction between different modalities and levels of immersion such as Virtual and Augmented Reality. Whereas previous work assumed similarity between their respective Virtual and Augmented Environment (VE and AE), we explore the case in which VE and AE are distinct. This gives rise to novel and critical problems, such as how to visualise and interact with the other environment. In this context we investigate the fundamental interaction of transitioning an object across environments, to which we contribute five interaction techniques.



https://youtu.be/BqwdRGxvWkA

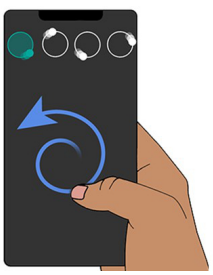
A First Exploration on the Use of Head-Mounted Augmented Reality in the Context of the Portuguese Military, ITI / LARSyS, IST, University of Lisbon

We present the design and implementation of a first iteration of an augmented reality (AR) system for dismounted soldiers in the Portuguese military. When compared to a representative baseline using a paper map and radio in a hostage extraction simulation, our first AR iteration, and despite a short practice session, increased the quality of the information available and decreased the complexity, temporal demands, and effort required to complete the study tasks; leading to an overall decrease in perceived workload. Overall, participants described the AR experience as more user-friendly.

https://youtu.be/TnZbPvQ5IKg

One-handed Input for Mobile Devices via Motion Matching and Orbits Controls
ITI / LARSyS, IST, University of Lisbon

We introduce a novel one-handed input technique for mobile devices that is not based on pointing, but on motion matching – where users select a target by mimicking its unique animation. We expand on current motion matching implementations and present a design space that illustrates six ways in which motion matching can be embedded into mobile interfaces via a camera prototype application.



https://youtu.be/ZQg70bXqh8M

Empathic AuRea: Exploring the Effects of an Augmented Reality Cue for Emotional Sharing Across Three Face-to-Face Tasks, ITI / LARSyS, IST, University of Lisbon

Past emotional sharing works have elicited emotional understanding between remote collaborators using bio-sensing, but how face-to-face communication can benefit from biofeedback is still fairly unexplored. This work introduces an AR communication cue from an emotion recognition neural network model and ECG data. A study where pairs of participants engaged in three tasks found our system to positively affect performance and emotional understanding, but negatively affect memorization.

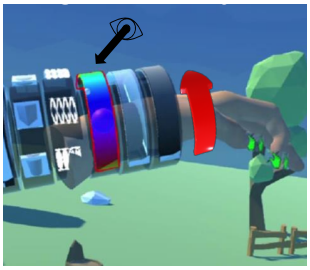
https://youtu.be/5BTiwRZgcds

Immersive Speculative Enactments: Bringing Future Scenarios and Technology to Life Using VR
ITI / LARSyS, IST, University of Lisbon

In this work we present the concept of Immersive Speculative Enactments (ISEs), a novel approach extending conventional Speculative Enactments to Virtual Reality. To explore this concept, we designed four scenarios with increasing technological uncertainty. We present the concept of ISEs and contrast them to other forms of speculation, provide guidelines on how to design them, as well as reflecting on the challenges, limitations, and potential associated with the role of ISEs in the HCI.

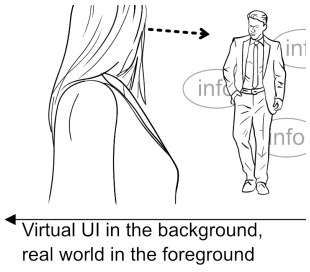
https://youtu.be/vA4Px06Jnuk

Look & Turn: One-handed and Expressive Menu Interaction by Gaze and Arm Turns in VR
ITI / LARSyS, IST, University of Lisbon



A user's free hands provide an intuitive platform to position and design virtual menu interfaces. We explore how the hands and eyes can be integrated in the design of hand-attached menus: gaze indicates menu selection, and rotational turn of the wrist navigates the menu and manipulates continuous parameters. This technique allows users to interact with the hand-attached menu using only that hand, while keeping the other free for primary task input such as drawing, etc.

ARtention: A Design Space for Gaze-adaptive User Interfaces in Augmented Reality
ITI / LARSyS, IST, University of Lisbon



ARtention is a design space for gaze interaction tailored to in-situ AR information interfaces. It highlights three important dimensions to consider in the UI design of such gaze-enabled applications. Such transitional aspects bring previously isolated gaze interaction concepts together to form a unified AR space, enabling more advanced application control mediated by gaze.

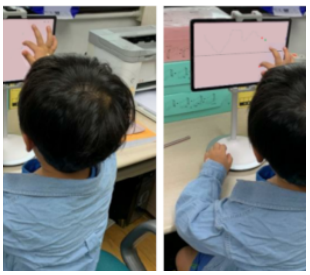
https://youtu.be/A_gUI4dhehc

From A-Pose to AR-Pose: Animating Characters in Mobile AR
ITI / LARSyS, IST, University of Lisbon

AR-Pose is a mobile app that generates keyframe-based animations of rigged humanoid characters. The smartphone's positional and rotational degrees of freedom are used as a 3D cursor to interact with inverse kinematic controllers placed on or near the character's joints; and as a virtual camera that enables users to freely move around.

https://youtu.be/UqW9qr8sWPo

DtD: Pre-reading Assessment of Literacy Risk via a Visual-Motor Mechanism on Touchscreen Devices
ITI / LARSyS, IST, University of Lisbon

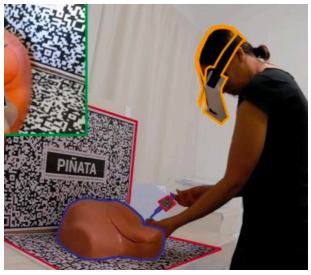


In this work we expand on Dot-to-Dot (DtD), a non-linguistic visual-motor mechanism aimed at facilitating the detection of the potential reading difficulties of children at pre-reading age. Our findings suggest that there is a significant correlation among DtD task and a series of language tests. We conclude the work by suggesting different ways in which DtD could be embedded into everyday mobile devices.

GaitWear: a Smartwatch App for In-the-Wild Gait Normalisation based on a Virtual Field Study Assessing the Effects of Visual & Haptic Cueing, ITI / LARSyS, IST, University of Lisbon

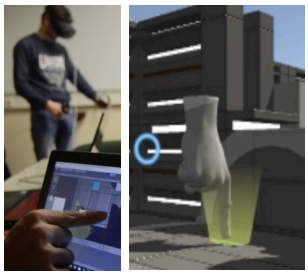
We explored the use of VR to simulate field studies via what is known as Virtual Field Studies. We relied on this to assess the effects of four different cues in normalising gait performance in a simulated environment. We found that the haptic baseline was the preferred cue and led to an overall better performance. We concluded our work with GaitWear, a smart watch app that produces this haptic baseline in the real-world.

PIÑATA: Pinpoint Insertion of Intravenous Needles via Augmented Reality Training Assistance
ITI / LARSyS, IST, University of Lisbon



The purpose of this work is to explore the benefits of optical see-through augmented-reality (OST-AR) in needle insertion training and to verify if the proposed OST-AR tool complements conventional training practices. A comparison study was conducted between our tool and the conventional method to train central venous catheter (CVC) insertion using a dummy of the upper torso and neck. The overall results show that the OST-AR tool proposed can complement conventional training.

Exploring Bi-Directional Pinpointing Techniques for Cross-Reality Collaboration
ITI / LARSyS, IST, University of Lisbon

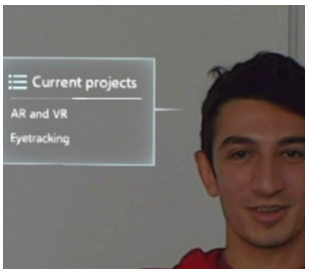


In this work we implemented two systems where we explore how an external user in the real world can interact across realities with a user immersed in virtual reality (VR), either locally or remotely. In the first we investigate three cross-reality techniques for the external user to draw the attention of their VR counterpart on specific objects present in the virtual environment. In the second we expand on these two techniques to explore an even starker cross-reality interaction between users in VR and users interacting via a tablet computer to direct each other to pinpoint objects in the scene.

Comparing Selection Mechanisms for Gaze Input Techniques in Head-mounted Displays
ITI / LARSyS, IST, University of Lisbon

Head movements are a common input modality on VR/AR headsets. However, although they enable users to control a cursor, they lack an integrated method to trigger actions. Many approaches exist to fill this gap: dedicated "clickers", on-device buttons, mid-air gestures, dwell, speech, and new input techniques such as motion matching. These proposals are diverse and there is a current lack of empirical data on the performance of, experience of, and preference for these different techniques. We conduct two studies that address this problem.

StARe: Gaze-Assisted Face-to-Face Communication in AR
ITI / LARSyS, Instituto Superior Técnico, University of Lisbon



This research explores the use of eye-tracking during AR supported conversations. Users can obtain relevant information to the conversation without being distracted by this. We propose using gaze gradually reveal information on demand. Information is indicated around the user's head and becomes fully visible when being gazed upon.

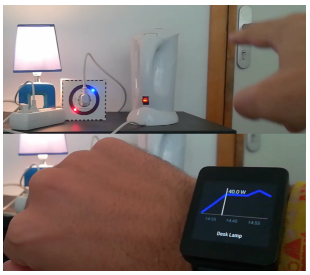
https://youtu.be/GyQG2Zb8V1w

Designing Motion Matching for Real-World Applications
Centre for Interaction Design, Edinburgh Napier University

This work explores the product possibilities and implications of motion matching, a novel interaction technique where users interact by rhythmically moving their bodies to track the continuous movements of different interface targets. Through the development and qualitative study of four novel and different real-world applications, we elaborated on the suitability of motion matching in different multi-user scenarios and further developed three interactive lamps with motion matching controls.

https://youtu.be/7KIW18pbyng

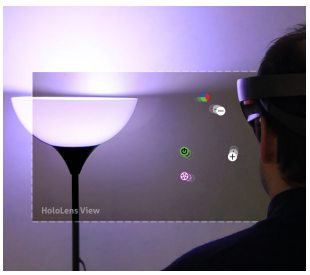
Wattom: a Consumption and Grid Aware Smart Plug with Mid-Air Controls
Centre for Interaction Design, Edinburgh Napier University



Wattom is an interactive ambient eco-feedback smart plug that aims to support a more sustainable use of electricity by being tightly coupled to users' energy-related activities. We describe three use cases of the system: powering connected appliances and understand the environmental impact of their use in real time; scheduling these power events; and presenting users with personal consumption data desegregated by device.

https://youtu.be/LtYrlFp91fY

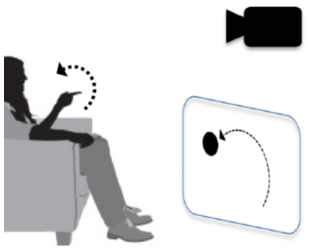
SmoothMoves: Smooth Pursuits Head Movements for Augmented Reality
Centre for Interaction Design, Edinburgh Napier University



SmoothMoves is an interaction technique for AR based on smooth pursuits head movements. It works by computing correlations between the movements of on-screen targets and the user's head while tracking those targets. We report error rates and acquisition times on different types of AR devices and present an interactive lighting system prototype that demonstrates the real-world benefits of our system.

https://youtu.be/vd4tXIetAz4

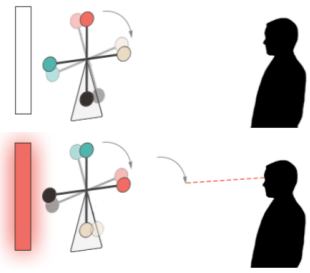
Remote Control by Body Movement in Synchrony with Orbiting Widgets
Centre for Interaction Design, Edinburgh Napier University



We consider how users can use body movement for remote control with minimal effort and maximum flexibility. TraceMatch is a novel technique where the interface displays available controls as circular widgets with orbiting targets, and where users can trigger a control by mimicking the displayed motion. The technique uses computer vision to detect circular motion as a uniform type of input, but is highly appropriable as users can produce matching motion with any body part.

https://youtu.be/ffRmXRGcC5M

AmbiGaze: Direct Control of Ambient Devices by Gaze
Centre for Interaction Design, Edinburgh Napier University



AmbiGaze is a smart environment that employs the animation of targets to provide users with direct control of devices by gaze only through smooth pursuit tracking. AmbiGaze enables robust gaze-only interaction with many devices, from multiple positions in the environment, in a spontaneous and comfortable manner.

https://youtu.be/CoIR6FFEGS4

Head-Mounted Displays as Opera Glasses
Centre for Interaction Design, Edinburgh Napier University

This work explores the use of head-mounted displays (HMDs) to deliver a front row experience to any audience member during a live event. To do so, it presents a two-part user study that compares participants reported sense of presence across three experimental conditions. The reported sense of presence in the HMD condition was significantly higher in five measures including spatial presence, social presence (SP), passive SP, active SP, and social richness.

The ATB Framework
Interactions Lab, Ulsan National Institute of Science and Technology

The ATB (Artifact, Tool, and Body) framework contributes to our understanding of how epistemic actions are used in human problem-solving tasks, providing researchers with a video-coding tool to assess this complex type of behaviour more systematically. It is intended as a mechanism to evaluate tangible systems in terms of the type, diversity, and appropriateness of the epistemic actions they support, and in terms of the impact these actions can have on more traditional metrics such as performance time or errors.

A Look at the Effects of Handheld and Projected AR on a Collaborative Task
Centre for Interaction Design, Edinburgh Napier University

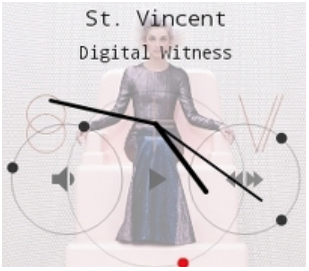
We designed a comparative study between handheld and projected AR systems during a collocated, collaborative game-inspired task. The goal of the work is to start a body of knowledge that describes the effects of different AR approaches in users' experience and performance – i.e., to look at AR not as a single entity with uniform characteristics. This includes engagement, collaboration strategies, and performance.

Looking for Info: Evaluation of Gaze Based Information Retrieval in Augmented Reality
ITI / LARSyS, IST, University of Lisbon

This works presents the results of an empirical study and a real-world deployment of a gaze-adaptive UI for AR. We present an empirical study comparing gaze-adaptive to always-on interface in tasks that vary focus between reality and virtual content. Across tasks, we find most participants prefer the gaze-adaptive UI and find it less distracting. When focusing on reality, the gaze UI is faster and is perceived as easier and more intuitive. When focusing on virtual content, access to always-on content is faster but it not consensual among users.

https://youtu.be/IQjZhArMGU4

Orbits: Gaze Interaction for Smart Watches
InfoLab21, Lancaster University



Orbits is a novel technique that enables gaze-only input in a design that accounts for both the limited display space of smart watches and the spontaneous nature of glancing at a watch. Orbits relies on interface controls with targets that move continuously in circular trajectories. They can be used for both discrete and continuous control.

https://youtu.be/x6hbicxEFbg

Beats: Tapping Gestures for Smart Watches
Interactions Lab, Ulsan National Institute of Science and Technology

Beats is a new type of multi-finger input that is specifically designed for the very small touch screens of smartwatches. It is based on what we term beating gestures, pairs of simultaneous or rapidly sequential touches (and optionally one or more releases) made by the index and middle finger of one hand.

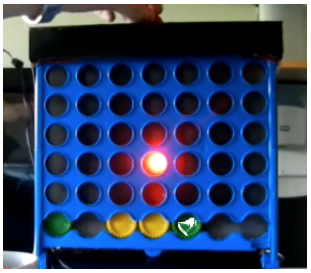
https://youtu.be/7Dkbfv_JQD0

Touchcloud
Interactions Lab, Ulsan National Institute of Science and Technology

Touchcloud is novel service that enables users to tag their physical environment with their Dropbox files. This is achieved through a set of bespoke NFC stickers and an application running on NFC-enabled Android mobile phones. The system is simple. Firstly, users attach the stickers to, on or in objects in their environment. Secondly, they choose specific Dropbox files or folders to physically tag and select the Touchcloud command from a context menu.

https://youtu.be/9HkVjlG10eE

Physical Games or Digital Games?
User Centred Engineering, Eindhoven University of Technology



This work explored how different interfaces to a problem-solving task affect how users perform it. Specifically, it focused on a customised version of the game of Four-in-a-row and compared play on a physical, tangible game board with that conducted in mouse and touchscreen driven virtual versions. Our results highlight the relevance of projection and epistemic action to this problem-solving task and suggest that the different interface forms afford instantiation of these activities in different ways.

jamTable: Can Physical Interfaces Support the Collaboration between Novice and Experienced Musicians? Centre of Exact Sciences and Engineering, University of Madeira

jamTable enables the collaboration between users playing a standard musical instrument and users interacting with a tangible musical sequencer. In an introductory study both qualitative and quantitative data were collected from eight participants in two setup conditions: Musician-Musician and Novice-Musician pairs. By comparing the performance of participants in these two groups, we gathered relevant insights regarding the ability of a tangible musical application such as the jamTable to support musical collaborations between novice and experienced musicians.

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2024 HORIZON-CL2-2024-HERITAGE-01: Reframing European Gastronomy Legacy through Innovation, Sustainability, and Heritage (*international*), Co-I

2023 Ministry of National Defence (CINAMIL): Dismounted Soldier AR System (*national*), Co-I

2022 HORIZON-WIDERA-2021-ACCESS-03: Fostering Digital Civics Research & Innovation (*int.*), Co-I

2021 Pedagogic Innovation Projects (*internally funded*), Co-I

2020 H2020-WIDESPREAD-2018-2020-6: Blockchain Technologies for Social Good (*international*), Co-I

FCT RESEARCH 4 COVID-19 2nd Edition (*national*), Co-I

COST Action 19142: Leading Platform for European Citizens, Industries, Academia and Policymakers in Media Accessibility (*international*), Co-I

2019 Carnegie Research Incentive Grant (*national*), PI

Pedagogic Innovation Projects (*internally funded*), Co-I

2018 SICSA: Postdoctoral and Early Career Researcher Exchanges (*national*), PI

Edinburgh Napier University: Research Funding Competition (*internally funded*), PI

2017 H2020-LCE-02-2016: Secure, Clean and Efficient Energy (*international*), Co-I

Edinburgh Napier University: Research Funding Competition (*internally funded*), PI

2016 Carnegie Research Incentive Grant (*national*), PI

Santander Mobility Grant (*national*), PI

Edinburgh Napier University: Summer Internship Scheme (*internally funded*), PI

H2020-SMEINST-1-2015: SME Instrument Award (*international*), Co-I