SICSA Pre-CHI Day 2017

27 April 2017, 10am – 5pm.
Venue: Dalhousie Building, University of Dundee

10:00-10:15   Arrival and registration

10:15-10:30   Opening address

10:30-10:50   Social Printers: A Physical Social Network for Political Debates

* Honourable Mention

Katerina L Gorkovenko, DJCAD University of Dundee, Dundee, Scotland
Nick Taylor, DJCAD University of Dundee, Dundee, Scotland
Jon Rogers, DJCAD University of Dundee, Dundee, Scotland

Social Printers are physical devices that create a pseudonymous social network between households during televised political debates. Through studies conducted around the Scottish Parliamentary Election and EU Referendum in 2016, we aimed to understand how physical devices could be used to engage viewers with televised political debates. By displacing the interaction from conventional social media and second screens we observed that the printers were successful in encouraging the participants to share their thoughts and create a personal social experience. Based on the results we discuss potential implications for conventional social media and second screens in the context of political television programs.

10:50-11:10 A Framework for Speechreading Acquisition Tools

Benjamin M Gorman, School of Computing University of Dundee, Dundee, Scotland
David R Flatla, School of Computing University of Dundee, Dundee, Scotland

At least 360 million people worldwide have disabling hearing loss that frequently causes difficulties in day-to-day conversations. Traditional technology (e.g., hearing aids) often fails to offer enough value, has low adoption rates, and can result in social stigma. Speechreading can dramatically improve conversational understanding, but speechreading is a skill that can be challenging to learn. To address this, we developed a novel speechreading acquisition framework that can be used to design Speechreading Acquisition Tools (SATs) - a new type of technology to improve speechreading acquisition. We interviewed seven speechreading tutors and used thematic analysis to identify and organise the key elements of our framework. We then evaluated our framework by using it to: 1) categorise every tutor-identified speechreading teaching technique, 2) critically evaluate existing conversational aids, and 3) design three new SATs. Through the use of SATs designed using our framework, the speechreading abilities of people with hearing loss around the world should be enhanced, thereby improving the conversational foundation of their day-to-day lives.

11:10 – 11:30 Investigating Tilt-based Gesture Keyboard Entry for Single-Handed Text Entry on Large Devices

Hui-Shyong Yeo, School of Computer Science University of St Andrews, St Andrews, Scotland
Xiao-Shen Phang, NEC Corporation of Malaysia, Kuala Lumpur, Malaysia
Steven J Castellucci, York University, Toronto, Ontario, Canada York University, Toronto, Canada
Per Ola Kristensson, Department of Engineering University of Cambridge, Cambridge, United Kingdom
Aaron Quigley, School of Computer Science University of St Andrews, St Andrews, Scotland

The popularity of mobile devices with large screens is making single-handed interaction difficult. We propose and evaluate a novel design point around a tilt-based text entry technique which supports single handed usage. Our technique is based on the gesture keyboard (shape writing). However, instead of drawing gestures with a finger or stylus, users articulate a gesture by tilting the device. This can be especially useful when the user's other hand is otherwise encumbered or unavailable. We show that novice users achieve an entry rate of 15 words-per-minute (wpm) after minimal practice. A pilot longitudinal study reveals that a single participant achieved an entry rate of 32 wpm after approximate 90 minutes of practice. Our data indicate that tilt-based gesture keyboard entry enables walk-up use and provides a suitable text entry rate for occasional use and can act as a promising alternative to single-handed typing in certain situations.

11:30-11:40 Break

11:40-12:00 Bottom-up vs. Top-down: Trade-offs in Efficiency, Understanding, Freedom and Creativity with InfoVis Tools

Gonzalo Gabriel Méndez, University of St Andrews, St Andrews, Scotland
Uta Hinrichs, SACHI School of Computer Science, St Andrews, UK
Miguel A. Nacenta, University of St Andrews, St Andrews, Scotland

The emergence of tools that support fast-and-easy visualization creation by non-experts has made the benefits of InfoVis widely accessible. Key features of these tools include attribute-level operations, automated mappings, and visualization templates. However, these features shield people from lower-level visualization design steps, such as the specific mapping of data points to visuals. In contrast, recent research promotes constructive visualization where individual data units and visuals are directly manipulated. We present a qualitative study comparing people's visualization processes using two visualization tools: one promoting a top-down approach to visualization construction (Tableau Desktop) and one implementing a bottom-up constructive visualization approach (iVoLVER). Our results show how the two approaches influence: 1) the visualization process, 2) decisions on the visualization design, 3) the feeling of control and authorship, and 4) the willingness to explore alternative designs. We discuss the complex trade-offs between the two approaches and outline considerations for designing better visualization tools.

12:00-12:20 Multi-moji: Combining Thermal, Vibrotactile & Visual Stimuli to Expand the Affective Range of Feedback

Graham Wilson, School of Computing Science University of Glasgow, Glasgow, Scotland
Stephen A Brewster, School of Computing Science University of Glasgow, Glasgow, Scotland

This paper explores the combination of multiple concurrent modalities for conveying emotional information in HCI: temperature, vibration and abstract visual displays. Each modality has been studied individually, but can only convey a limited range of emotions within two-dimensional valence-arousal space. This paper is the first to systematically combine multiple modalities to expand the available affective range. Three studies were conducted: Study 1 measured the emotionality of vibrotactile feedback by itself; Study 2 measured the perceived emotional content of three bimodal combinations: vibrotactile + thermal, vibrotactile + visual and visual + thermal. Study 3 then combined all three modalities. Results show that combining modalities increases the available range of emotional states, particularly in the problematic top-right and bottom-left quadrants of the dimensional model. We also provide a novel lookup resource for designers to identify stimuli to convey a range of emotions.

12:20-12:40 Transitions in digital personhood: Online activity in early retirement

Abigail C Durrant, Northumbria University, Newcastle upon Tyne, United Kingdom
David S Kirk, Northumbria University, Newcastle upon Tyne, United Kingdom
Diego Trujillo Pisanty, Open Lab, Newcastle University, Newcastle upon Tyne, United Kingdom
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Wendy Moncur, Duncan of Jordanstone College of Art & Design/ School of Nursing & Health Sciences
University of Dundee, Dundee, Scotland
Kathryn M Orzech, Duncan of Jordanstone College of Art & Design University of Dundee, Dundee, Scotland
Tom W Schofield, Culture Lab Newcastle University, Newcastle upon Tyne, United Kingdom
Chris Elsden, Open Lab Newcastle University, Newcastle upon Tyne, United Kingdom
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University, Newcastle upon Tyne, United Kingdom

We present findings from a qualitative study about how Internet use supports self-functioning following the life transition of retirement from work. This study recruited six recent retirees and included the deployment of OnLines, a design research artifact that logged and visualized key online services used by participants at home over four-weeks. The deployment was supported by pre- and post-deployment interviews. OnLines prompted participants' reflection on their patterns of Internet use. Position Exchange Theory was used to understand retirees' sense making from a lifespan perspective, informing the design of supportive online services. This paper delivers a three-fold contribution to the field of human-computer interaction, advancing a lifespan-oriented approach by conceptualizing the self as a dialogical phenomenon that develops over time, advancing the ageing discourse by reporting on retirees' complex identities in the context of their life histories, and advancing discourse on research through design by developing OnLines to foster participant-researcher reflection informed by Self Psychology.

12:40-13:30 Lunch

13:30-13:50 Audible Beacons and Wearables in Schools: Helping Young Visually Impaired Children Play and Move Independently

Euan Freeman, School of Computing Science University of Glasgow, Glasgow, Scotland
Graham Wilson, Computing Science University of Glasgow, Glasgow, Scotland
Stephen Brewster, School of Computing Science University of Glasgow, Glasgow, Scotland
Gabriel Baud-Bovy, Italian Institute of Technology, Genova, Italy
Charlotte Magnusson, Department of Design Sciences Lund University, Lund, Sweden
Hector A. Caltenco, Certec Dept. of Design Sciences, Lund University, Sweden

Young children with visual impairments tend to engage less with their surroundings, limiting the benefits from activities at school. We investigated novel ways of using sound from a bracelet, such as speech or familiar noises, to tell children about nearby people, places and activities, to encourage them to engage more during play and help them move independently. We present a series of studies, the first two involving visual impairment educators, that give insight into challenges faced by visually impaired children at school and how sound might help them. We then present a focus group with visually impaired children that gives further insight into the effective use of sound. Our findings reveal novel ways of combining sounds from wearables with sounds from the environment, motivating audible beacons, devices for audio output and proximity estimation. We present scenarios, findings and a design space that show the novel ways such devices could be used alongside wearables to help visually impaired children at school.

13:50-14:00 An Evaluation of Input Controls for In-Car Interactions

Alexander Ng, School of Computing Science University of Glasgow, Glasgow, Scotland
Stephen A Brewster, School of Computing Science University of Glasgow, Glasgow, Scotland
Frank Beruscha, Corporate Sector Research and Advance Engineering, User Technologies Robert Bosch GmbH, Renningen, Germany
Wolfgang Krautter, Corporate Sector Research and Advance Engineering, User Technologies Robert Bosch GmbH, Renningen, Germany

The way drivers operate in-car systems is rapidly changing as traditional physical controls, such as buttons and dials, are being replaced by touchscreens and touch-sensing surfaces. This has the potential to increase driver distraction and error as controls may be harder to find and use. This paper presents an in-car, on the road driving study which examined three key types of input controls to investigate their effects: a physical dial, pressure-based input on a touch surface and touch input on a touchscreen. The physical dial and pressure-based input were also evaluated with and without haptic feedback. The study was conducted with users performing a list-based targeting task using the different controls while driving on public roads. Eye-gaze was recorded to measure distraction from the primary task of driving. The results showed that target accuracy was high across all input methods (greater than 94%). Pressure-based targeting was the slowest while directly tapping on the targets was the faster selection method. Pressure-based input also caused the largest number of glances towards to the touchscreen but the duration of each glance was shorter than directly touching the screen. Our study will enable designers to make more appropriate design choices for future in-car interactions.

14:00 – 14:20 ForgetMeNot: Active Reminder Entry Support for Adults with Acquired Brain Injury

Matthew Jamieson, Institute of Health and Wellbeing University of Glasgow, Glasgow, Scotland
Brian O'Neill, The Disabilities Trust Graham Anderson House, Glasgow, Scotland
Breda Cullen, Institute of Health and Wellbeing University of Glasgow, Glasgow, Scotland
Marilyn Lennon, Computer & Information Sciences University of Strathclyde, Glasgow, Scotland
Stephen A Brewster, School of Computing Science University of Glasgow, Glasgow, Scotland
Jonathan Evans, Institute of Health and Wellbeing University of Glasgow, Glasgow, Scotland

Smartphone reminding apps can compensate for memory impairment after acquired brain injury (ABI). In the absence of a caregiver, users must enter reminders themselves if the apps are going to help them. Poor memory and apathy associated with ABI can result in failure to initiate such configuration behaviour and the benefits of reminder apps are lost. ForgetMeNot takes a novel approach to address this problem by periodically encouraging the user to enter reminders with unsolicited prompts (UPs). An in situ case study investigated the experience of using a reminding app for people with ABI and tested UPs as a potential solution to initiating reminder entry. Three people with severe ABI living in a post-acute rehabilitation hospital used the app in their everyday lives for four weeks to collect real usage data. Field observations illustrated how difficulties with motivation, insight into memory difficulties and anxiety impact reminder app use in a rehabilitation setting. Results showed that when 6 UPs were presented throughout the day, reminder-setting increased, showing UPs are an important addition to reminder applications for people with ABI. This study demonstrates that barriers to technology use can be resolved in practice when software is developed with an understanding of the issues experienced by the user group.

14:20-14:30 Tangible Educational Toys for Children with Type-1 Diabetes

Charalampos Kyfonidis
Doctoral consortium paper.

14:30-14:50 Understanding Public Evaluation: Quantifying Experimenter Intervention
Best Paper Award

Julie R Williamson, University of Glasgow, Glasgow, Scotland
John H Williamson, University of Glasgow, Glasgow, Scotland

Public evaluations are popular because some research questions can only be answered by turning "to the wild." Different approaches place experimenters in different roles during deployment, which has implications for the kinds of data that can be collected and the potential bias introduced by the experimenter. This paper expands our understanding of how experimenter roles impact public evaluations and provides an empirical basis to consider different evaluation approaches. We completed an evaluation of a playful gesture-controlled display – not to understand interaction at the display but to compare different evaluation approaches. The conditions placed the experimenter in three roles, steward observer, overt observer, and covert observer, to measure the effect of experimenter presence and analyse the strengths and weaknesses of each approach.

14:50-15:20 Coffee break

15:20-15:40 Understanding Concept Maps: A Closer Look at How People Organise Ideas

Honourable Mention

Stefano Padilla, School of Mathematical & Computer Sciences Heriot Watt University, Edinburgh, Scotland
Thomas S. Methven, School of Mathematical & Computer Sciences Heriot-Watt University, Edinburgh, Scotland
David A. Robb, School of Mathematical & Computer Sciences Heriot-Watt University, Edinburgh, Scotland
Mike J. Chantler, School of Mathematical & Computer Sciences Heriot-Watt University, Edinburgh, Scotland

Research into creating visualisations that organise ideas into concise concept maps often focuses on implicit mathematical and statistical theories which are built around algorithmic efficacy or visual complexity. Although there are multiple techniques which attempt to mathematically optimise this multi-dimensional problem, it is still unknown how to create concept maps that are immediately understandable to people. In this paper, we present an in-depth qualitative study observing the behaviour and discussing the strategy used by non-expert participants to create, interact, update and communicate a concept map that represents a collection of research ideas. Our results show non-expert individuals create concept maps differently to visualisation algorithms. We found that our participants prioritised narrative, landmarks, abstraction, clarity, and simplicity. Finally, we derive design recommendations from our results which we hope will inspire future algorithms that automatically create more usable and compelling concept maps better suited to the natural behaviours and needs of users.

15:40-15:50 Was my message read?: Privacy and Signaling on Facebook Messenger

Roberto Hoyle, Oberlin College, Oberlin, Ohio, United States Oberlin College, Oberlin, United States
Srijita Das, School of Informatics and Computing indiana university, Bloomington, United States
Apu Kapadia, School of Informatics and Computing Indiana University Bloomington, Bloomington, United States
Adam J Lee, Department of Computer Science University of Pittsburgh, Pittsburgh, United States
Kami Vaniea, School of Informatics The University of Edinburgh, Edinburgh, Scotland

Major online messaging services such as Facebook Messenger and WhatsApp are starting to provide users with real-time information about when people read their messages, while useful, the feature has the potential to negatively impact privacy as well as cause concern over access to self. We report on two surveys using Mechanical Turk which looked at senders' (N=402} use of and reactions to the

`message seen' feature, and recipients' (N=316) privacy and signaling behaviors in the face of such visibility. Our findings indicate that senders experience a range of emotions when their message is not read, or is read but not answered immediately. Recipients also engage in various signaling behaviors in the face of visibility by both replying or not replying immediately.

15:50-16:00 Workshop paper. Beyond Accessibility: Lifting Perceptual Limitations for Everyone.
Michael Mauderer, University of Dundee.

16:00-16:20 ProbUI: Generalising Touch Target Representations to Enable Declarative Gesture Definition for Probabilistic GUIs

* Honourable Mention

Daniel Buschek, University of Munich (LMU), Munich, Germany
Florian Alt, University of Munich (LMU), Munich, Germany

We present ProbUI, a mobile touch GUI framework that merges ease of use of declarative gesture definition with the benefits of probabilistic reasoning. It helps developers to handle uncertain input and implement feedback and GUI adaptations. ProbUI replaces today's static target models (bounding boxes) with probabilistic gestures ("bounding behaviours"). It is the first touch GUI framework to unite concepts from three areas of related work: 1) Developers declaratively define touch behaviours for GUI targets. As a key insight, the declarations imply simple probabilistic models (HMMs with 2D Gaussian emissions). 2) ProbUI derives these models automatically to evaluate users' touch sequences. 3) It then infers intended behaviour and target. Developers bind callbacks to gesture progress, completion, and other conditions. We show ProbUI's value by implementing existing and novel widgets, and report developer feedback from a survey and a lab study.

16:20-16:40 Designing Game-Based Myoelectric Prosthesis Training

Aaron Tabor, University of New Brunswick, Fredericton, Canada
Scott Bateman, University of New Brunswick, Fredericton, Canada
Erik Scheme, University of New Brunswick, Fredericton, Canada
David R. Flatla, University of Dundee, Dundee, UK
Kathrin Gerling, University of Lincoln, Lincoln, UK

A myoelectric prosthesis (myo) is a dexterous artificial limb controlled by muscle contractions. Learning to use a myo can be challenging, so extensive training is often required to use a myo prosthesis effectively. Signal visualizations and simple muscle-controlled games are currently used to help patients train their muscles, but are boring and frustrating. Furthermore, current training systems require expensive medical equipment and clinician oversight, restricting training to infrequent clinical visits. To address these limitations, we developed a new game that promotes fun and success, and shows the viability of a low-cost myoelectric input device. We adapted a user-centered design (UCD) process to receive feedback from patients, clinicians, and family members as we iteratively addressed challenges to improve our game. Through this work, we introduce a free and open myo training game, provide new information about the design of myo training games, and reflect on an adapted UCD process for the practical iterative development of therapeutic games.

16:40-17:00 Wrap up