User System Interaction
Eindhoven University of Technology
Industrial projects 2011
User System Interaction

Technische Universiteit Eindhoven

3TU. School for Technological Design
Stan Ackermans Institute

Visiting adress
Main Building 3.07
Den Dolech 2
5612 AZ Eindhoven
The Netherlands
Tel. +31 (0)40 247 52 30
www.usi.id.tue.nl

Postal adress
Postbus 513
5600 MB Eindhoven
The Netherlands
The User System Interaction program (USI) started in 1998 with 19 students as one of the design programs offered by the Stan Ackermans Institute at the Eindhoven University of Technology. Since the start of the program we have established a solid reputation. Our students (USI’s) and graduates are in high regard as professionals. They distribute and pass on the knowledge and experience that is required to really understand how people want to be served by technology. The USI program strikes the balance between challenging technological developments, exploiting design opportunities and fulfilling the needs and requirements of people.

USI graduates are trained to improve the interaction between people and systems and to make technology truly accessible and beneficial for all people. They are prepared to work on challenging problems, in multidisciplinary projects and in international environments. USI’s work on solutions and services for people in their home, work and social environments by employing user-centered design methodologies, accounting for the benefits for stakeholders and users, and balancing between system functionality and user experience. The program is organized in modules that are taught by specialists in the domain, who bring in their international experience from universities and industries.

The USI design program is characterized by its:
• Focus on design – Students are positioned as designers throughout the program, that is, as intermediate between market demand and technical possibilities, between user needs and product satisfaction.
• Focus on Industry – Students work in their second year on a project in industry or government supervised by university staff and the host organization.
• Focus on applicability – Students work on assignments and case studies throughout the program.
• Teamwork – Students with backgrounds in the engineering, behavioral and physical sciences work in small interdisciplinary teams.
• Cross-cultural and international orientation – Students with different national and cultural backgrounds work together.

A very important part of the USI program is the nine-month industrial assignment, which is carried out in the second year of the curriculum. The general requirements for this assignment are, amongst others, a conceptually challenging problem, participation in a multidisciplinary team, and a strong design and evaluation orientation. We would like to thank the companies and coaches for their support and effort to make these projects into a success. The results of these projects are summarized in this booklet.

We wish the graduates of the year 2011 success in pursuing their professional careers.

October 06, 2011

Prof. dr. Panos Markopoulos and Drs. Mia Jelsma
User System Interaction Program
I was born in Thessaloniki, a rather radical, influential and full of life city in the north of Greece. I returned there to study Electrical Engineering at the Aristotle University of Thessaloniki and right after my studies, I started working on multimedia processing at the Centre for Research and Technology Hellas (CERTH). Then I decided that I wanted to address the social impact of engineering; how people use tools and their environment to achieve their goals. So, I joined USI, a postgraduate program at TU/e. After fourteen full months of practicing fundamental design skills, namely brainstorming, prototyping and user testing, I started working on my industrial project at Philips. The goal of the project is to provide to the listener an immersive surround sound experience by overcoming limitations such as asymmetric speaker placement. My personal objective is to gain insights and use engineering and design to improve people’s lives and I am driven to serve that purpose from every possible perspective.

Surround Sound Systems are designed to faithfully reproduce a movie soundtrack and provide an immersive sound experience to the user, when the loudspeaker installation and the listening position comply with certain standards. However, in real living rooms this is rarely the case; decoration and furniture dictate the placement of the speakers, as well as the listening positions. Deviation of the optimal setup can cause a distorted or an unnatural sound image. In order to address the importance of the setup to the sound perceived by the listener, two Philips Surround Sound Systems, the Ambisound Soundbar and a 5.1 Home Theater Sound System, were integrated with Ultra-Wideband (UWB) localization technology for the design of two demonstrators. Each demonstrator is composed of two parts; a localization module providing speakers’ and user’s coordinates and audio tuning algorithms which use this information for the calculations of the signals sent to the speakers. Performance tests were conducted and the results have shown that the surround sound tuning based on location information created a clear perceptible difference that was in most cases appreciated by the majority of participants.

This project has been supervised by Dr.ir. Jun Hu (TU/e) and Pejman Hefez (Philips Consumer Lifestyle)
I have always been interested in technology and the way people interact with it. After having received a degree in Psychology, I enrolled for USI, where I finally found a place where the theoretical knowledge I had acquired during my bachelor and masters could be applied. I learned that in the technological domains, one can actually make a lot of use of theoretical knowledge about psychology and human cognition, and that one should not only look at products from a technological perspective, but also through the eyes of the actual user. I was glad I finally stepped into a discipline where I could fully make use of and release my knowledge, skills, and creativity. Also, cooperating with people from various backgrounds at USI proved to be very instructive (and fun).

In the future, I will continue my career at the Philips High Impact Innovation Centre in Leuven. Here, I will continue trying to narrow the gap between technology and its users. More concretely, I will be looking at the way users interact with several audio, video, and multimedia products, and aiming to make them better!

The Philips High Impact Innovation Centre Leuven is a predevelopment site of the Lifestyle Entertainment business of Philips Consumer Lifestyle. One of its main focus areas is to drive highly innovative features into audio, video, and multimedia products. The success of such features goes hand in hand with the way users interact with their products. By introducing touchscreens in several multimedia devices, it becomes possible to also enable richer forms of user interaction, which can unlock the full potential of new and innovative features.

The main focus of this internship was to investigate how exactly these new and innovative features can be enabled in multimedia devices through introducing touchscreen interfaces. To answer this question, two main topics were taken as carriers: a multimedia sharing platform called SimplyShare, and an MP4 player called the GoGear Muse. The effects of introducing touchscreens in both application areas were elaborated thoroughly, user needs were investigated, use cases were defined, and UI concept proposals were made to demonstrate how touchscreens can indeed be beneficial from multiple points of view.

This project has been supervised by Prof.dr.ir. A.C. Brombacher (TU/e) and R. Cuypers, MSc. (Philips Consumer Lifestyle)
Miroslav Bojic’s background lies in computer science and human-computer interaction. After earning a Master’s degree with his work on interfaces on mobile devices, he worked as a researcher on projects involving navigation support and augmented reality. As a designer trainee at USI he further enhanced his skills in interaction design and prototyping while working on many small projects. A couple of highlights are the projects involving medical visualization, tangible interaction, and video-prototyping. During his internship at Philips he used his experience to contribute to various European joint research programs, designing interfaces and interaction for internet enabled TV’s.

Miroslav is an author of several scientific publications on mobile interfaces, navigation support and video prototyping. His interests include navigation, thinking-out-of-the-box interface design, artificial intelligence techniques, machine learning, computer graphics and animation.

Net TV is a functionality available on higher-end Philips television sets, allowing access to the internet and various online services. Designing services or adapting existing services for use through a TV set requires understanding of the platform, its benefits, and its limitations. The report explores how interaction and interface design methods can be applied in best way in order to tackle various design tasks and problems.

The Net TV platform is being used within many European joint R&D projects. Three projects, in various stages of development, are presented as examples. The ICE-WISH project had very limiting specifications regarding hardware and cost, and required design of a easy-to-understand interface for a wide audience. The SIMPLE project was very technical, requiring highly detailed specification of use-cases and diagrams of proposed service functionality and its integration in the proposed middleware. Finally, one facet of the HOMEdotOLD project required for specification and development of interface elements that could be easily inserted into existing and future services offered through Net TV.

Drawing on experience within these projects, the report concludes by giving recommendations regarding interface and interaction design for the Net TV platform.

This project has been supervised by Dr. Jun Hu PDEng MEng (TU/e) and Kees Tuinenbreijer (Philips CL)
I'm an Industrial Engineer from Argentina. While studying, I founded two startups: South American Business Forum, a forum of future and current leaders where they debate freely to achieve awareness of their responsibility towards the sustainable development of the world, and Consorciar, an Internet based administration of buildings and closed neighborhoods.

For as long as I can remember I have been fascinated by the way things work, during my childhood I used to open my toys to see how they were inside. Later I studied Industrial Engineering because I was sure that it would mix my interest of understanding the way things work with the capability to build and sell products.

I also have experience working in multinationals like Techint, were I worked as an Analyst of Management Control of their steel sector, and in Staples where I worked as an Interaction Designer, in charge of improving the conversion rate of key areas of their site, like the products’ page, registration and checkout areas.

As I wanted to learn the fundamentals of User Centered Design in an academical environment, applying for the User System Interaction program was a logical step in my career.

After the introduction of computers to every industry, workers have access to huge datasets to work with, and working directly with the dataset is a large waste of time. In the case of software maintainers, which are in charge of correcting bugs, improving performance, or adding new features, gaining overall understanding of a program counts as half of time allocated for maintenance. In 2006, ExtraVis a software visualization tool was created to address this problem.

This project serves as a guideline for a future implementation of a web and mobile version of the ExtraVis, and to understand how the tool could be used in other industries apart from software maintenance. Advantages of creating a mobile web version are discussed, stating how the market is shifting from desktop computers to smartphones and tablets.

Users tests of the actual implementation of ExtraVis and user research to understand how it could be use in other industries was conducted. A prototype was developed and tested with the users in a tablet. Small improvement opportunities were found for ExtraVis in the user test and the user research showed that there is an interesting future for an information visualization tool like ExtraVis. The participants coming for the same industry gave the same meaning to a fake dataset, showing immediate understanding of the visualization. The main driver for adoption is seamless integration with the systems already in use by companies.

This project has been supervised by Prof.dr.ir. J.B.O.S. (Jean-Bernard) Martens (TU/e ID), ir. H.T.G. Weffers PDEng, Director at LaQuSo and Dr.ir. Danny H. R. Holten, CTO & Founder at SynerScope B.V.
I was born and raised in India and where I completed my bachelors in Industrial Engineering. While working for a year as a Programmer, I realized Human Factors – designing interfaces between humans and technology – was my calling. Thus inspired, I started MS in Industrial Engineering with Human Factors specialization at Penn State University, US. Culture and its implications for design have always fascinated me and this inclination led to a Masters’ Thesis titled “Culture and Interface Design”– later published as a book. During my masters, I completed an internship in Norway and returned to US convinced about of the value of working in multi-disciplinary and multi-cultural teams. I joined User System Interaction Program at TU/e in 2009, to learn hands-on prototyping and, dynamics of a work-environment with varied disciplines and cultures. I am graduating with a project related to designing solutions to support information needs of and shared decision making for cancer care patients.

We live in an era of information explosion, and yet it is difficult for a cancer patient to access key information related to their treatment. Philips Research is working on initiatives to address this problem and empower patients. CareNav application is a part of this initiative. CareNav is a companion for the cancer patients’ during their difficult journey through the terrain of their treatment. It provides personalized information related to all aspects of cancer care cycle including tips and advice. Further, it aids the Shared Decision Making between patients and health professionals by helping the patient navigate through their treatment options and express their preferences. CareNav is targeted at users who want to stay informed throughout their care cycle, but do not want to be overwhelmed by irrelevant information. CareNav was developed using input from various stakeholders including patients, doctors and nurses through diary study, interviews and user evaluations. It received highly positive feedback during user evaluations and is scheduled to move to a pilot study next year.

This project has been supervised by Prof.dr.ir. Jean-Bernard Martens (TU/e) and Pavan Dadlani, PDEng (Senior Scientist, Philips Research).
In 2006 I obtained a Bachelors in Computer Science in Thessaloniki, Greece. There, I attended a handful of courses in Graphic design, Information visualization and Multimedia design which sparked my interest in the field of Human Computer Interaction. Thus, pursuing a Master degree in the area came very naturally to me.

During my studies for a Master’s degree at KTH, in Stockholm, Sweden, I also developed my professional experience in Yahoo! as well as in the Ericsson Headquarters where I did my Master thesis. My work there involved performing a full scale usability evaluation of the main interface of their Interactive Personalized Television (IPTV) system; the deliverable included a set of design recommendations to be included in the second release of the product. The User System Interaction program gave me the chance to further extend and diversify my skillset by participating in various internal projects. The final stage of the program, the industrial placement project, gave me the chance to apply all the knowledge I had gained. This project took place in TomTom in Amsterdam, where as a part of their User Experience Design team, I worked on making their products intuitive for drivers to use hands and eyes free and most importantly safe.

Personal Navigation Devices (PND) that provide driving directions based on a vehicle’s GPS location are widespread these days. While their instructions help the drivers get to their destinations easily, the fact that users interact with the devices by touch may however distract them from the primary task of driving.

Hands-free operation of a PND through Voice User Interfaces (VUI) aims at reducing the amount of attention drivers have to devote to the device, resulting in a better driving performance and in less cognitive demand when compared to operating the device by touch. However, a number of characteristics of VUIs pose unique design challenges.

Literature reviews, phone interviews, test driving sessions, expert reviews of competitor products, and a benchmarking study conducted showed practices to follow or to avoid when designing VUIs for use in vehicles.

This project, by providing a step-by-step procedure taken when designing five new features of the TomTom navigation devices’s VUI, offers insights on how to promote good User Experience to all users using VUIs when driving. Technical limitations and solutions taken to design challenges are discussed along the way. The results include sets of design guidelines for VUIs for use in vehicles, speech-based interaction flows, and guidelines for dialogue design.

This project has been supervised by M. Bukowska, PDEng (TomTom International BV) and Dr.ir. J. Terken (TU/e)
My name is Rafał Kocielnik. I was born in 1984 in Warsaw, Poland. As far as I can remember I was interested in understanding how things work and how they are made. This interest was especially focused on computer software and led me to start my education at the Polish-Japanese Institute of Technology in Warsaw. I completed my bachelor’s degree in Computer Game Programming and continued on a master’s level at the Multimedia department. During this time I became increasingly interested in the areas of usability and design. I realized that it is important not only how things work, but also how they can be used and understood.

Driven by this new interest I became a User System Interaction (USI) trainee. At USI I had an opportunity to immerse in various fast-paced projects connecting a number of different specializations. I worked along-side psychologists, designers and other technical people. I met a lot of skilled and inspiring individuals who taught me a lot and broadened my life outlook. All this allowed me to grow as a professional.

At Philips I engaged in an exciting area of human emotions and stress working on a prototype of a completely new and futuristic solution. This allowed me to apply my skills in a very practical setting. In User-Centred Design the most exciting for me is its multidisciplinary nature and I would like to continue my work in this field.

This project was done in the context of a larger initiative “Service Spaces for Health and Well-being”, which aims at enabling easy cooperation of various services in the domain. In this context the project was meant as a demo of cooperation of such services, but also as a pilot for a bigger study. The topic of the project was stress prediction and coaching at work. It consisted of two main parts. A longitudinal data gathering using a prototype device meant as a feasibility study and the development of a working stress coaching demo.

In the first part, bio-signal measurements from 5 busy employees correlated with events at work were collected for a period of 7 weeks. The analysis of the collected data led to identification of various stress patterns and discovery of a number of improvement points for the process as well as the prototype device.

In the second part, a stress coaching approach has been designed following literature review and a participatory design process. Part of the concept was implemented as a working demo that cooperates with MS Outlook and communicates with the underlying stress predictor. The results of the evaluation indicate that there might be a room for such a solution, though more as a support tool at this point. Participants were interested in predictions and advices, but still expected to have the final control. In general, the interface was regarded as simple and easy to use. The main concerns were related to the trust in the accuracy of stress predictions and coaching advices. Following these results the project will be continued and extended to include other target groups.

This project has been supervised by Leszek Holenderski, Senior Scientist (Philips Research) and Dr.ir. R.M.C. Ahn (TU/e)
I was born and raised in Spain, where I completed my Bachelors in Industrial Design Engineering (UPV). During that period, I became passionate about user experience design. A half-year internship in the design agency Fabrique (Delft) fuelled this passion further. A Masters in Design for Interaction (TUDelft), helped me build on the right knowledge and toolbox to tackle more advanced design challenges. During this period, UX factors such as emotions, and usability caught my attention. The combination of UCD methods, design vision, and inspiration became basic ingredients for upcoming projects.

For my masters graduation, I undertook a project for enhancing social presence through ambient communication, in Philips Research. At the end of the project, I had filed two patents and three publications. To further hone my research and prototyping skills, I joined a Professional Doctorate in User System Interaction (USI) at TU/e. For two years I worked on diverse USI projects ranging from the research of an innovative presentation remote, to a video prototype perception study, and design of a fitness-feedback product. My graduation project, done at Philips Research, deals with the challenging field of elderly care: Caresensus.

Since the 1990s, elderly care issues have been gaining much attention. This is primarily because of increasing aging population and the resulting increase in care costs, especially in western countries and China. The growing elderly population limits the available resources thereby compromising the care received. Many studies have suggested providing support for aging in place as a potential solution, and telehealth and technology as a suitable path for it. Awareness of seniors’ life patterns to detect exacerbations, emergencies, or other potential issues has been addressed by previous studies or commercial solutions with promising results. Despite those attempts, there is room for improvement.

This work sheds light upon the transition from elderly lifestyle awareness research projects, to real-life caregiving support commercial products. Special emphasis was placed on the agents involved in elderly care: the children, and the professional caregivers. Their needs and wishes were gathered through field trials, interviews, cultural probes and cardsorting exercises. These produced insights for the design of CareSensus, an elderly care support system based on elderly monitoring sensors, and an ecosystem of user specific user interfaces.

This project has been supervised by Prof.dr. Panos Markopoulos (TU/e) and Pavan Dadlani (Philips Research).
Creating a system that works well is no easy task. What’s worse, it’s not enough either. The user is one of the most essential components of almost any system, the one that relates to it and can make the best out of it. This realization made me appreciate the value of HCI from the early days of my studies. I was born in Athens and I always wanted to be a Computer Scientist, a Psychologist or a Musician. I decided for the first, but never forgot any of my other two passions. After completing my Bachelor’s and Master’s in Computer Science in Athens, I came to the Netherlands to educate myself on the human aspect of technology and I did not regret it. I met amazing people, both colleagues and instructors, and gained hands-on knowledge and solid theoretical education on all the important aspects of HCI. Now, after having obtained my PDEng degree, I am ready to engage to the next step of this journey, hoping to enjoy it as much as I did the last. After all, the journey is what matters the most.

Multi-touch interaction allows the simultaneous registration of two or more points on a touch enabled input device, such as a touch screen or a multi-touch track pad. This capability affords for the use of finger gestures while interacting with the device. Well known examples of such a way of interaction include popular Apple products, Android-based smart phones, as well as tabletop devices, such as Microsoft Surface.

There has been shown interest in multi-touch interaction within Philips Healthcare. This project aimed to elaborate on this potential and suggest a set of touch gestures and guidelines in the context of image manipulation. Eventually, a basis of a standard for multi-touch interaction, in line with existing Philips standards was suggested.

Initially, the requirements of several business units were gathered and the intuitive gestures used by experts for image manipulations were analyzed. Available prototypes were tested and a demonstrator using multi-touch interaction was developed, in order to evaluate the concept created. The demonstrator went through an iterative design cycle, during which evaluations with application specialists of Philips Healthcare were performed and the concept was refined. Finally, a set of touch gestures was suggested, to support the development of future solutions in the company.

This project has been supervised by Paul Kaufholz (Philips Healthcare), Rosaria Salpietro (Philips Healthcare) and Dr. Ir. Mark de Graaf (TU/e).
I am a devoted interaction designer with social sciences background. I did my USI internship at Alcatel Lucent Bell, working as an interaction designer in visual communication team. My background is in User System Interaction and in social psychology with specialization in new media and communication which gave me a fair insight into art history, photography theory, contemporary art and multimedia. While doing my masters, I was also working as an Information Architect and Usability Expert.

The User System Interaction Program was a great chance for me to combine my knowledge in psychology with my interests in computers and technology. It allowed me to work in multi-disciplinary and multicultural teams on designs that varied from web sites to musical instruments, speech interfaces, wifi detecting wristbands, squeezable presentation remote controls to board games that assist physiotherapy for children with cerebral palsy. This variety makes me enjoy being interaction designer - I get to interact with many different people, from many different fields.

This is both challenging, motivating and rewarding. As much as I love what I do, I find it refreshing to lose myself in a bit of a different world sometimes. I do that by being an active member of Couch-Surfing – hosting people from all over the world, participating in various multicultural events and, of course, by traveling a lot.

The Immersive Communication project focuses on user’s immersive experience during a multi person video conference call. Immersion is defined in the paper as the feeling of presence and togetherness. The researched way of achieving that is through the use of a directing algorithm. The main idea behind it is that, during a multi person video call a user sees only the person they are interested in seeing, e.g. the speaker, instead of video streams of all participants shown next to each other on the users screen. In the first part of the paper, user research leading to designing this algorithm is described and then followed by the illustration of the actual algorithm that has been implemented and is to be tested with users. The second part of the paper investigates tracking users’ eye - gaze and communicating to other user’s who is looking at them as another mechanism that could add to the immersive experience of multi person video conferencing. It is argued that making the tool more socially translucent in a matter of making eye - gaze information openly available to all the users would make them more engaged in the computer mediated video conversation. Together with eye - gaze tracking concept, a video prototype of newly designed interface was created and tested with users opening the way for developing the concept further. More user tests and further research on the implication of eye - gaze information on users’ experience during a multi person video conference call should be held in order to understand it’s actual impact and added value.

This project has been supervised by Prof.dr. Panos Markopoulos (TU/e), Dr. Wijnand IJsselsteijn (TU/e) and Jan Bouwen (Alcatel).
Ryo is an interaction designer with a multi-disciplinary background in medical illustration and computer science. His previous work focus on the creation and evaluation of multimedia tools, such as illustrations, videos, and interactive web-based applications for teaching and learning. Studying a wide range of topics in HCI during User System Interaction program, Ryo has gained a user-centric perspective, with which he wishes to develop visualization tools to help scientists answer their research questions and communicate findings effectively in the near future.

Mobile collaboration and communication are of increasing importance to healthcare professionals for improving their workflow. The aim of the project was to design a mobile application for radiologists by applying these concepts to the MR workflow. By closely working with an application specialist and through observational studies at hospitals, the use cases for the mobile application were developed and refined iteratively. In order to gather feedback from prospective users, a graphic user interface and interaction were designed and implemented in a video prototype and a web-based touch application prototype. The evaluation of these prototypes with radiologists and technologists showed a match with their communication needs and provided important information for refining the requirements for future development of this mobile application.

This project has been supervised by Dr. Mark de Graaf (TU/e), Angelique Brosens-Kessels and Peter Bingley (Philips Research)
Hi, my name is Leoni. In 2008, I finished my master Applied Cognitive Psychology at Leiden University. During this study I gained knowledge about human behavior and I learned how to conduct solid research. At the end of my master, I followed the course Human-Computer Interaction, which showed me that knowledge about perception, cognition, and memory (i.e. the user) is needed to develop effective and efficient interactive products. Because I loved to conduct (user) research and I liked to be working on innovative projects, after my master I applied for the User-System Interaction program. This program gave me hands-on experience with user centered design, information visualization, prototyping, multimodal interaction, and more, and taught me how to cooperate in multicultural and multidisciplinary teams. During my industrial project at Smart Homes, I further developed my design skills by redesigning the graphical user interface of the Smartest Home of the Netherlands. By now, I feel ready to work as an interaction designer, focusing on user needs and human capabilities. In the future, I would like to work on innovative products that enhance the quality of people’s lives.

The aim of my industrial project at Smart Homes, an expertise centre on home automation and smart living, was twofold. On the one hand the level of appreciation of existing (concepts of) domestic technologies was examined. In order to do so, domestic technologies were first collected through field research, literature, and European and national projects done by Smart Homes. Afterwards, these collected technologies were filtered based on the smart homes classification by Aldrich (2003) and its appreciation was tested by means of a questionnaire. Based on the results of this questionnaire, the technologies that were most appreciated were visualized. Ideally, these movies will be shown in the Smartest Homes of the Netherlands, a test and demonstration home located in Eindhoven, to show visitors the added value of domotica.

On the other hand the graphical user interface used to control the Smartest Home of the Netherlands was redesigned. First, the current user interface was evaluated by means of heuristic evaluations and usability testing. Next, the user interface was redesigned, based on the results obtained during these evaluations. Finally, this redesign was evaluated using a PowerPoint prototype. In general, participants were quite positive about the redesign of the graphical user interface. They described the interface with quotes like “A serene and clearly structured interface”, “Clearly readable and easy to use”, and “Very efficient”. In the upcoming month, Smart Homes will implement this design in the Smartest Home of the Netherlands.

This project has been supervised by Dr. Jun Hu PDEng MEng (TU/e) and Claire Huijnen MTD MSc (Smart Homes)
Flavio Signorelli Mendes was born in 1979 and raised in Rio de Janeiro (Brazil). Soon after starting his B.Sc. in Computer Science at the Federal University of Rio de Janeiro, he joined a Computer Architecture research laboratory working with topics such as high-performance computing and compiler code generation. During his M.Sc., he worked on real-time and distributed systems applications for Robotics and Oil & Gas fields.

Deciding to seek new challenges in industry after his M.Sc., he started working as a consultant on projects for Petrobras and Globo TV Network. He noticed the importance of Usability and how users define the success or failure of a product during this experience. In order to get a solid foundation in this field, he joined the User System Interaction program at the Eindhoven University of Technology in 2009.

During this last two years, he worked with his colleagues in several projects including multimodal interaction, information visualization, tangible interfaces, and other topics in Human-Computer Interaction. Together, they designed and evaluated concepts and systems using a user-centered approach, always aiming at bridging the gap between technology and people.

The NLR (National Aerospace Laboratory) is the key center of expertise for aerospace technology in the Netherlands. NLR has been participating in space experiment facility operations coordinated by European Space Agency (ESA).

With an increasing number of experiment opportunities made possible with the International Space Station (ISS) and the European contributions via ESA, more and more scientific data has been generated. The access of this data by a broader scientific community should be enabled by the creation of tools which improve data distribution and presentation. This motivated the study of the application of Virtual Reality techniques for space experiment post-analysis and of the design issues for the user interface.

Virtual Reality models of the European Technology Exposure Facility (EuTEF), which was mounted on the Columbus module of ISS, and a subset of the data generated have been used as the starting point. The study was conducted to better understand the users (post-analysis personnel), the use context of such tool, and the domain. It was followed by a requirement gathering process conducted with experts, which have contributed in various roles during the operations and preparations. Then, an interface design study was conducted in order to generate a suitable specification. Finally, a functional prototype was developed for further usability testing on the interface and suggestions for further work are presented based on the experiences and qualitative studies during the process.

This project has been supervised by ir. E.A. Kuijpers (NLR) and Prof.dr.ir. J.B.O.S. Martens (TU/e).
Who is Charl Smit? I was born and raised in Rotterdam, in the Randstad of the Netherlands. After finishing a bachelor’s degree in Industrial Design Engineering at the Delft University of Technology, I completed the master Integrated Product Design at the same faculty. During my master graduation project I designed a sustainable light plan for a campus in the north of the country. Afterwards, I continued working as a lighting designer at a Rotterdam-based design agency. This is when my interest for user experience got bigger, and specifically the interaction between the user and (in)tangible objects. Applying for User-System Interaction (USI) has therefore been a logical step to combine design and cognitive psychology. My toolbox has expanded with knowledge about various user-centered design methods. In addition, I gathered experience in user interface design and conducting quantitative data analyses, among others. But most importantly, I learned at least as much from the courses as from my fellow USI’s. Being in such a melting pot of people with various cultural and academic backgrounds, I feel enriched by everything they have offered. In January I started my internship at Philips Research in Eindhoven. Here I continued gathering more experience and knowledge, this time in practice again. This professional environment made me ready for the next phase: the post-USI era!

Personal care is an activity that has been done for centuries. As knowledge advances, natural products are combined with synthetic ingredients that are supposed to be more effective. Technology is simultaneously developed to create devices that cater to the same goals. Eventually, new products aim for better and/or faster results, or require less effort. The goal of the project is to define and create new archetypes for shaving and skin rejuvenation that have a relevant match with technologies that are under development. These technologies are fundamentally different from the current working principles. Since they will possess different requirements, the archetypes could offer new ways of interaction between the user and the device. The design of the archetypes and the creation of mock-ups are done in iterations. Design proposals are materialized in simple mock-ups to find improvement points and process them in redesigns. The new shaving archetype has higher precision, enables multitasking, has higher reproducibility and avoids over-treatment of a skin patch. The skin rejuvenation archetype can be characterized by a device that prevents muscle strain, by placing the heavy components of the device in a base station. The user interacts with a lightweight hand piece that is connected to the base station with an intelligent cable that knows what to be flexible and when to become rigid. Since the technologies are still in a very early stage of development, non-functioning mock-ups were made of the archetypes and evaluated with users.

This project has been supervised by Dr. Jacques Terken, (TU/e) and Rufus Driessen MSc. (Philips Research)
I am a User Experience Designer with a background in Human Factors and User System Interaction Design. My interests and experiences range from aviation to art and from industry to philanthropy. I focused my education in Human Factors to be able to combine engineering techniques with human and business components. After earning my master’s degree, I was able to work alongside the designers and engineers at Boeing Commercial Aviation. Working with them was inspiring and provided me with deep insights on the industry and the field as a whole.

I chose to continue my education for a Professional Doctorate degree in Engineering (PDEng) because I believed it would provide me with a stronger backbone in Human Factors and User Experience Design. The opportunity to work at TomTom for my industrial case further solidified my interest in the field. The biggest challenge was to design for mobile platforms that are used during very critical and complex environments, but I took the challenges as a welcome opportunity to learning and expanding my knowledge of Human Factors and User Experience.

It is my aim to continue to contribute to an industry that takes users as a central part and motivation for design; an industry concerned with advancing human capabilities and creating positive social impacts and experiences.

The Western Wall in Jerusalem, the Obelisk of Buenos Aires, the Daytona International Speedway in Daytona Beach and the Dam Square in Amsterdam are all places recognized as points of interest, or POIs. They are specific point locations that someone may find useful, interesting or of particular importance. The term is widely used in cartography, especially in electronic variants including GPS navigation software.

TomTom International BV, as the leading provider of navigation solutions, supplies over six million POIs to its users across the world. Also, it has recently opened a new department, TomTom Places, to manage such important resources. Providing new features with this data is a high level interest of the company, and with those features an optimal user experience is required.

When driving, users might have specific needs related to POIs such as taking a break, fuelling the car or stopping at a tourist destination. Currently, quickly and safely finding POIs along the way is not optimally supported by TomTom Portable Navigation Devices (PND).

The project aimed at contributing to TomTom’s vision to always redefine their solutions to keep up to date with customer demands. For this reason a user centered approach was used to provide an innovative solution for finding POIs along the way.

This project has been supervised by Dr. Jacques Terken (TU/e) and Simone Tertoolen (TomTom)
I am originally from Antwerp, Belgium, where I completed my Bachelor and Master in Product Development. As I was always interested in both art and science, this was a natural step for me after my pre-university education. During Product Development, I got really passioned about the creative process within graphical and interface design. I'm often motivated by existing technologies but am primarily guided by users needs. This is why I chose to make a user centered design for a running device as my Master thesis. When I graduated, I felt like I was lacking specific knowledge to pursue a career in interaction design, which is why I applied for the User System Interaction program at TU/e. During the program I enjoyed working in international multidisciplinary teams and developing several interface design projects. In these projects I learned to apply design methodologies and evaluate the created designs. I specifically like creating concepts after user research for establishing requirements, and using my graphical and technical skills for making interface wireframes and prototypes for evaluation and refinement.

In my internship at Native Instruments in Berlin, I was able to apply the knowledge I collected over the past years in a company environment, which was a challenging, fulfilling experience.

The complexity of music production systems can easily become an obstacle to the music creation process. Music producers with limited technical expertise can spend a great deal of time and effort going through parameter settings, disrupting the creative process of music production. This is a common problem that occurs during computer mediated creative activities.

This project covered the design and evaluation of an integrated music production concept that addresses these issues. The design supports the creative process and minimizes complexity by providing easy access to commonly used audio modifiers. The concept takes the wide variation of knowledge and skills between music producers into account and provides different levels of interaction, ‘hiding’ unwanted levels of complexity.

The system was developed through iterative design and evaluation. The design was built around user experiences that allow for producing music through fluid and engaging interactions. Concepts were defined after analyzing usage patterns and literature research within the company.

During this iterative process, different concepts where illustrated by means of interactive prototypes. Each prototype was created with sufficient visual fidelity, content and functionality to suit the context of the evaluation.

These design and evaluation iterations serve as the input for the next stage in the design of the system, where further occurring problems will be solved and full design solutions will be created.

This project has been supervised by Prof.dr.ir. J.H. (Berry) Eggen (TU/e), Florian Schneidmadel and Frank Elting (Native Instruments)
While I was doing my bachelor project in Biomedical Engineering for a clinical decision support system, I found my real interest in Human Computer Interaction and was lucky to extend my studies by learning the fundamentals of behavioral science and design two years later in the User-System Interaction program. Over the past two years, USI supported me to become a professional designer. It both extended my theoretical knowledge of human factors and psychology and provided me hands-on experience in the design, implementation and evaluation of interactive systems. Moreover, I have the chance to combine what I learned in USI and my biomedical background in my final project, and could continue it in a PhD program.

Chronic patients’ self-management could improve adherence to medical standards and reduce health care utilization. However, there is no self-management system (SMS) with safety and usability validation yet; besides, it is also important to coach the patients so that they can conduct self-management correctly and stay motivated. Therefore, a self-management system for renal transplant patients has been designed. In this project, we conducted experts review of this system focusing on its usability in order to improve it. In addition, to investigate patients’ and care-givers’ trust and acceptance of self-management and a virtual coach for it, scenarios, use cases, and a prototype of a proposed SMS were made, and focus group discussions were hold. In future, the usability need to improve and a more personalized coach are to develop.

This project has been supervised by Dr. Jacques Terken (TU/e) and Dr.ir. Willem-Paul Brinkman and Ing. Ton Rövekamp
I started my educational career with a Bachelor's degree in Applied Physics. During this Bachelor's degree I realized that my interests and qualities extended beyond technology and physics. With great pleasure I continued with a Master's degree in Human-Technology Interaction. Along the way I discovered the field of user-centered design. Being greatly motivated to become the next usability expert, I felt that I needed more training in this field before labeling myself as such. Applying for the User-System Interaction program was the next logical step in my career. The USI program has greatly contributed to my knowledge and confidence in being a usability expert. It helped me to identify my own strengths, and to recognize individual fields within user experience design.

My final project at FEI Company provided a great opportunity to combine my background knowledge in physics with my new field of interest - interaction design. The project has been greatly valuable for my own experience, and I have been able to contribute actively to an ongoing industry project. The usability tests I have performed at FEI Company have been a valuable source of information for improving FEI's new microscope user interface. At the same time, conducting these usability tests in a commercial and technical context has greatly contributed to my experience as a usability expert.

FEI Company is a leading developer of electron microscopes. These high-end microscopes are used to visualize, analyze and manipulate materials in the atomic scale range. Application domains range from material science and life science to industry and quality control. Electron microscopes have evolved from hardware-driven devices to systems fully operated via conventional PC's. This evolution has triggered a change in focus from hardware development to include software and application design. As a result, the software to control microscopes and to analyze the acquired data has evolved in response to demands from the field.

To maintain a leading position in the market and to enable researchers, developers and engineers, efforts are taken to increase the user experience of FEI's microscope software. During this project, usability tests have been conducted with the new user interface being developed for FEI's Transmission Electron Microscopes. This new user interface is the result of an ongoing “UI Harmonization project”, in which the user interfaces of both major lines of FEI microscopes are brought closer together in terms of content, appearance and interactive behaviour. The goal of the assignment is to contribute to the research and development of the new microscope user interface. Two series of usability tests are conducted with internal FEI employees, allowing identifying and solving usability issues. During this project important usability issues have been identified and solved, contributing to a measureable increase in usability of FEI’s new microscope user interface.

This project has been supervised by Prof. dr. D.G. Bouwhuis (TU/e) and Dr. ir. H. van Leeuwen (FEI Company)
Professionals in User System Interaction Design
3TU. School for Technological Design, Stan Ackermans Institute offers two-year postgraduate technological designer programmes. This institute is a joint initiative of the three technological universities of the Netherlands: Delft University of Technology, Eindhoven University of Technology and University of Twente. For more information please visit: www.3tu.nl/sai.