MSc. JOHN SCHAAP

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INTRODUCTION |

I am John Schaap, a passionate software engineer, architect, and accomplished technical lead based in Katwijk. For me, software development transcends mere professional engagement; it is a passion. I pursue the exploration of cutting-edge technology and their practical implementation. My work ethic is characterized by an unwavering commitment to attaining the highest standards of completion in all endeavours.

With an academic and professional foundation rooted in science, I possess a comprehensive grasp of theoretical concepts. This proficiency extends to the practical realm, enabling me to effectively translate theory into tangible results. My objective is to produce software solutions that are not only functional but are also maintainable and scalable, aligning with fundamental software principles such as SOLID, KISS, and YAGNI.

While engaged in software development for volunteer organizations, I predominantly focused on hands-on coding. My corporate engagement within a multinational context involves multifaceted responsibilities. These encompass leadership roles, including guidance for teams, addressing intricate software challenges, designing microservices architecture, conducting requirement analyses for high-value projects, and offering support in project and stakeholder management.

My aptitude for swiftly comprehending intricate systems equips me to effectively address issues and provide solutions with minimal production impact, even in scenarios unrelated to my own or my team's work. Colleagues often characterize me as resolute, dedicated, and detail-oriented, supported by a consistent history of tenaciously tackling challenges and delivering optimal outcomes, irrespective of complexity.

Thank you for considering my qualifications. I look forward to the opportunity to contribute my expertise and passion to your team.

EXPERIENCE |

Tech Lead / Senior Full-Stack .NET Engineer / Solution Architect, Audabit Software Solutions, Year: 2018 (now)
Solution design and development of software solutions over the Full-Stack, hosted in Microsoft Azure or AWS.
Using the latest technologies such as ASP.NET, (No-)SQL, Angular/ React and GraphQL in a SCRUM / agile team.

Tech Lead / Senior Full-Stack .NET Engineer / Solution Architect, Domino's Pizza, Year: 2018 (now)
Extending and maintaining the complete software package for Domino's Pizza globally.
Solution Design and Development of Full-Stack ASP.NET, (No-)SQL, React and GraphQL software hosted in Microsoft Azure and AWS in an agile team.

Tech Lead / Senior Full-Stack .NET Engineer / Angular Developer, Akzo Nobel N.V., Year: 2017 – 2018
Developing Angular web applications hosted in Microsoft Azure as technical lead.
Creation of essential software to connect colorimetric, mixing and weighing instruments from any (web)application.

Software Engineer / Researcher, Science [&] Technology – Vision B.V., Year: 2015 – 2019
Design and development of complex (web)systems and computer vision applications for PC and Mobile.
Develop Angular web apps (hosted in Microsoft Azure) using SCRUM at external companies.

Software Engineer / Researcher, Leiden University Medical Centre, Year: 2014 – 2015
Researching and developing human-computer interaction; 3D object manipulation with hand gestures.
Framework development for medical application with easy sensor integration.

Software Engineer / Researcher, Utrecht University, Year: 2014
Researching and developing a head-mounted display 3D image browser using the Oculus Rift.

Software Engineer, MetrixLab, Year: 2013
Development of marketing tools and immersive 3D worlds using the Oculus Rift.

Software Engineer / Project Lead, Utrecht University, Year: 2013
Creation of a Unity3D plug-in for a crowd simulation engine developed by Utrecht University.

Teaching Assistant (Game Programming, Interaction Technology & Game Technology Introduction), Utrecht University, Years: 2012 – 2015
Designing assignments (Oculus Rift, Wii Mote, Kinect), preparing lectures, and helping students.

EDUCATION |

Master of Science, Computer Science: Game & Media Technology, Utrecht University
Cum Laude, GPA: 4.0 | Start: September 2013, End: October 2015

Bachelor of Science, Computer Science: Game Technology, Utrecht University
Cum Laude, GPA: 4.0 | Start: September 2010, End: July 2013

SKILLS |

Language
Dutch (Native)
English (Full professional)

Design
Requirement Analysis
System Architecture Design
Domain Driven Design
Software Design Patterns
Test Driven Design

Build & Deploy
Source Control (Git)
Continuous Integration & Delivery (CI/CD) (Azure DevOps)
Infra as Code (Terraform / Cloud Formation)
Test Automation (Unit / Integration / E2E) + Specflow

Back-end Development
.NET (C#)
ASP.NET
GraphQL
Entity Framework

Front-end Development
Angular
React (Beginner)
HTML
CSS / SASS / SCCS / LESS
Type / JavaScript
jQuery
Bootstrap

Cloud
Azure Active Directory
Azure Storage Accounts (Files, Blob, Table, Queue)
Azure Cosmos DB
Azure Service Bus
Azure Web Apps
Azure Kubernetes Services
Azure Container Registry
Azure Container Apps
Azure Key Vault
Azure Logic Apps
Azure Application Insights
Containers / Docker
SQL
Redis Caching

Soft Skills
SCRUM / Agile development
Teamwork and Collaboration
Team Lead & Management
Problem-Solving
Solution 'Pathfinder'
Aiding in Project Planning & Management
Stakeholder Management
Communication
(Technical) Documentation
(Scientific) Research

Other: Azure Devops & Jira, Postman, LINQ, Webdriver.io, Open Layers, NodeJS, Android, C++, WPF, Java, Unity3D, Xamarin

CERTIFICATES |

Microsoft Professional Program – Front-End Web Development, Microsoft, 2019
This curriculum consists of the following subjects:

DEV273x: Introduction to Typescript 2, Microsoft, 2018
HTML5.0x: HTML5 and CSS Fundamentals, W3Cx, 2018

CSS.0x: CSS Basics, W3Cx, 2018
DEV218x: Advanced CSS Concepts, Microsoft, 2018
DEV203x: Introduction to Bootstrap - A Tutorial, Microsoft, 2018
DEV208x: Introduction to jQuery, Microsoft, 2018
DEV314x: Angular Fundamentals, Microsoft, 2018
DEV315x: Advanced Angular, Microsoft, 2018
DEV224x: Building Your Azure Skills Toolkit, Microsoft, 2018
DEV212x: DevOps for Developers – How to Get Started, Microsoft, 2018
DEV237x: Microsoft Professional Program – Front End Web Development, Microsoft, 2018
DEV238x: Microsoft Professional Capstone – Front End Web Developer, Microsoft, 2019

ACHIEVEMENTS |

Local Game Jam 2013, Edge of Wolves, 1st place
Creative Game Challenge Student Edition 2012, Breakpoint Revised, Special Award: Most Innovative
Creative Game Challenge Student Edition 2012, Sketchman, Special Award: Art Style
Game Development Award 2011, Breakpoint, 1st place

INTERESTS |

Software Development	(Video)Games	Movies & Series
Innovative Hardware & Multimedia	Lifeguard (Beach)	Sports (F1)
Personal Project using newest tech.	Hiking	

TECH LEAD, SOLUTION ARCHITECT & FULL-STACK .NET SOFTWARE ENGINEER

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DETAILED EXPERIENCE |

Tech Lead / Senior Full-Stack .NET Engineer / Solution Architect, Audabit Software Solutions, Year: 2018 (now)
Solution design and development of software solutions over the Full-Stack, hosted in Microsoft Azure or AWS. Using the latest technologies such as ASP.NET, (No-)SQL, Angular/ React and GraphQL in a SCRUM / agile team.

Audabit Software Solutions is a company founded to provide professional services in the realm of Full-Stack software solution design and development, leveraging cloud platforms such as Microsoft Azure or AWS. I specialize in utilizing cutting-edge technologies, including ASP.NET, various database technologies (SQL/NoSQL), Angular/React for front-end development, and GraphQL for efficient backend communication.

As a freelance Senior Full-Stack .NET Software Engineer and Solution Architect, I am sought after by companies seeking specialized expertise or temporary support from experienced software engineers and solution architects. With a strong focus on agile development, my services are provided within a SCRUM/agile team environment.

Additionally, I am actively involved in volunteering work, contributing my skills and services to projects that benefit organizations like Lifeguard Katwijk. This commitment reflects my dedication to not only professional engagements but also to making a positive impact on the community.

GPS Monitoring System
The GPS monitoring system is designed to track the real-time locations of various active units such as people, cars, and boats. The system utilizes a .NET (C#) application running on a designated machine, which is connected to a set of radios. This application continuously requests the location data of the radios by transmitting string commands via the COM-port.

Upon receiving the GPS information for each radio, the application then forwards this data to an ASP.NET web service hosted on Microsoft Azure. The web service, which utilizes Entity Framework, is responsible for storing the received GPS data in a MySQL database, also hosted on Microsoft Azure.

The front-end interface is developed as a web application using Angular and integrates the Open Layers library for map visualization. This web app is also hosted on Microsoft Azure. Depending on the selected page, the map displayed on the interface will either show the real-time locations of active radios or the historical location data of a specific radio.

Payment System
The payment system has been designed to enable lifeguard members to conveniently make purchases using their membership cards. This functionality is facilitated through a web service built on the ASP.NET web service, hosted on Microsoft Azure. The web service incorporates a Swagger page, where administrators can set product offerings and their respective prices.

To manage the product data efficiently, the web service utilizes Entity Framework to store this information in a MySQL database, which is also hosted on Microsoft Azure. The database is responsible for storing all transaction details and maintaining up-to-date member balances.

The membership cards are equipped with RFID chips, each uniquely associated with a specific member. A user-friendly web application developed using Angular allows members to select their desired products. When making a purchase, members simply need to tap their membership card against the device to complete the payment transaction securely and conveniently.

Beachinfo
The Beachinfo application, developed using Angular, is deployed on Microsoft Azure. Functioning as a Progressive Web App (PWA), it serves as an informative platform providing a range of valuable details about the beach. The application's features encompass the display of information pertaining to missing persons, sea, and beach warnings, as well as general meteorological data such as sun, wind, and water conditions.

A key aspect of the application is its notification capability, enabling users to opt for important alerts. For instance, they may receive notifications about imminent lightning activity and be advised to promptly vacate the water. The notification system relies on ASP .NET to manage and store device registrations, ensuring efficient delivery of popup notifications to the registered devices when necessary.

In the context of all systems, both the front-end and back-end undergo rigorous testing and are integrated into a continuous integration and continuous deployment (CI/CD) pipeline. The infrastructure comprises four distinct environments: Development, Testing, Acceptance, and Production (with staging and production slots).

Team
When engaging in these development endeavors, I typically work independently while adhering to established principles such as software design principles, rigorous testing, continuous integration/continuous deployment (CI/CD), and the employment of pull requests.

Technology and Tools
Front-End: Angular, HTML, CSS / SASS / SCCS / LESS, Type- & JavaScript, Bootstrap, jQuery, Android
Back-End: .NET 6 (C#), ASP.NET, LINQ, Node.js (GraphQL)
Data: Entity Framework, MySQL, SQL, Cosmos DB, Storage Account (Blob, Table, Queue), Service Bus
Hosting: Azure Cloud (Kubernetes & Containers), Infra as Code (Terraform), Azure AD
Testing: Unit, Integration, E2E, TDD, BDD, Specflow, Webdriver.io
Other: Software Design Principles, SCRUM / Agile development, CI / CD, Azure DevOps, Domain Driven Design, System Architecture Design, Requirement Analysis, Problem-Solving, Solution 'Pathfinder', Teamwork and Collaboration, Project Planning & Management, Team Lead & Management, Communication, (Technical) Documentation

Tech Lead / Senior Full-Stack .NET Engineer / Solution Architect, Domino's Pizza, Year: 2018 (now)
Extending and maintaining the complete software package for Domino's Pizza globally.
Solution Design and Development of Full-Stack ASP.NET, (No-)SQL, React and GraphQL software hosted in Microsoft Azure and AWS in an agile team.

Domino's Pizza Enterprises Ltd serves as the master franchise holder for Domino's in various countries, including Australia, New Zealand, Cambodia, Malaysia, Japan, Taiwan, Belgium, France, the Netherlands, Germany, and Luxembourg. The company has established itself as a prominent player in the food-technology realm, pioneering advancements such as drone delivery, app ordering, voice assistants, artificial intelligence, and augmented reality.

During my initial year at Domino's, I assumed the role of technical lead after the previous incumbent's departure. As part of this responsibility, I took charge of the solution architecture for new projects and conducted daily meetings with teams in Australia to ensure seamless coordination. My primary objective was to strategize and facilitate the successful execution of multiple large-scale projects valued at €1M+ in the most optimal manner possible.

At Domino's, a culture emphasizing microservices, Test Driven Development, and Domain Driven Design prevails. Each microservice operates independently in its designated domain. Most microservices are developed using ASP.NET and are hosted on the Microsoft Azure platform in either Azure Kubernetes Services or Azure Container Apps. The front-end is built using React (HTML, SCCS, ES6). Communication between the front-end and the back-end flowed through a GraphQL (Node.js) layer. The data is stored in various repositories, including SQL, Cosmos DB, Blob Storage, and Azure Storage Tables. Communication between microservices involves direct API calls, as well as message transfers through the Azure Service Bus or Azure Storage Queue. Rigorous testing, encompassing unit tests, integration tests (utilizing Specflow), and E2E tests, is conducted on all services. Automated build pipelines are established using Azure DevOps, and certain services are automatically deployed through a release pipeline in the same platform.

Upon joining Domino's, there was an ongoing initiative to shift away from RAZOR and adopt React (Native) as the front-end technology, with a GraphQL Layer serving as an intermediary between the frontend and backend. Concurrently, all microservices were undergoing migration to a newer .NET version. A temporary transition to AWS from Microsoft Azure was undertaken, with a focus on Infrastructure as Code, utilizing Cloud Formation, and Containers (ECS and EC2). However, subsequent evaluation led to the decision to revert to Microsoft Azure, incorporating valuable lessons learned from the AWS experience. Presently, Infra as Code is established using Terraform, and Docker containers and Azure Kubernetes Services (AKS) are extensively employed.

As an integral part of the European teams, my involvement encompassed the entire stack of services. While occasional maintenance and minor feature additions to existing functionalities were addressed, a significant portion

of my time was devoted to substantial projects like order prediction, GDPR sanitization tools, integration with aggregators (JustEat, ThuisBezorgd, etc.), adding tip-the-driver functionality, and PayPal integration, among others. To ensure code quality, every code change underwent both automatic and manual testing in the designated test environment, followed by thorough reviews conducted by other developers through the code review process in a pull request.

As a result of my demonstrated track record of achieving consistently successful outcomes in leadership roles, I was appointed to oversee the management of three critical domains within the company's European operations: Payments, Store Integration, and Legal (with a focus on GDPR and related matters). Furthermore, I provided occasional support to the Australian development team by leveraging my extensive knowledge to assist in their domain development and solution design efforts. My proficiency in swiftly resolving intricate production issues has been instrumental in maintaining operational efficiency. Additionally, I have made significant contributions by standardizing software practices, implementing sound architectural designs, and introducing robust testing standards, leaving a lasting impact on the organization.

Team
I had the privilege of overseeing three European development teams, in total comprising of twelve skilled developers, three quality assurance professionals, and three business analysts. Our operational approach centered around the principles of agility, involving daily stand-up meetings, weekly refinement sessions, and bi-weekly retrospectives to govern our sprint cycles.

Technology and Tools
Front-End: React, HTML, CSS / SASS / SCCS / LESS, Type- & JavaScript, Bootstrap, jQuery, Android
Back-End: .NET 6 (C#), ASP.NET, LINQ, Node.js (GraphQL)
Data: SQL, Cosmos DB, Storage Account (Blob, Table, Queue), Service Bus
Hosting: Azure Cloud (Kubernetes & Containers), AWS, Infra as Code (Terraform / Cloud Formation), Azure AD
Testing: Unit, Integration, E2E, TDD, BDD, Specflow, Webdriver.io
Other: Software Design Principles, SCRUM / Agile development, CI / CD, Azure DevOps, Domain Driven Design, System Architecture Design, Requirement Analysis, Problem-Solving, Solution 'Pathfinder', Teamwork and Collaboration, Project Planning & Management, Team Lead & Management, Communication, (Technical) Documentation

Tech Lead / Senior Full-Stack .NET Engineer / Angular Developer, Akzo Nobel N.V., Year: 2017 – 2018
Developing Angular web applications hosted in Microsoft Azure as technical lead.
Creation of essential software to connect colorimetric, mixing and weighing instruments from any (web)application.

AkzoNobel is a distinguished authority in the art of manufacturing paints and coatings, establishing a benchmark in color and protective solutions dating back to 1792. With its headquarters based in the Netherlands, the company maintains an extensive global presence, operating in more than 150 countries and employing approximately 34,500 skilled professionals devoted to delivering top-tier products and services that meet and exceed customer expectations. During my tenure at AkzoNobel, I had the privilege of contributing to two significant projects.

Paintfinder
Paintfinder is an Angular-based online search tool hosted in Azure, specifically designed for locating Salcomix Coatings. Upon joining the team, I encountered a partially developed web application that aimed not only to provide users with the coating recipe but also enable automatic mixing using an Automated Dosing Unit (ADU) or manual mixing via a scale connected to the computer. To accomplish this, I developed a sophisticated user interface to facilitate the mixing process.

Additionally, to address the limitation of web browsers in directly communicating with external hardware attached to the computer, I implemented a solution. This involved creating a WPF application that could be accessed by the web app through Signal-R. The WPF application acted as an intermediary, enabling communication with the ADU and scale by transmitting string commands over a COM-port.

Instrument Hub
Due to the significant reliance on web applications interfacing with hardware at AkzoNobel, the Instrument Hub project emerged as a crucial endeavor. The primary objective of this project was to consolidate all hardware that AkzoNobel supports into a single application, enabling seamless communication via Signal-R from various web apps.

Over the past decade, multiple attempts were made to achieve this integration, but all prior endeavors proved unsuccessful. However, in this undertaking, we successfully integrated several essential components, such as scales, photo spectrometers, and ADUs, into the Instrument Hub using WPF.

While some devices possessed advanced Software Development Kits (SDKs) that we could readily incorporate, a substantial portion of the hardware required the creation of custom SDKs and direct communication with low-level drivers. Additionally, we developed an Angular-based web application alongside the WPF application, serving as an exemplary tool for demonstrating to other developers at AkzoNobel how to effectively interact with the Instrument Hub and the associated devices.

To ensure efficiency and productivity throughout both projects, we implemented comprehensive Continuous Integration and Continuous Deployment (CI/CD) practices with the aid of Azure DevOps pipelines. This approach facilitated streamlined development and seamless delivery of updates and enhancements, ultimately contributing to the successful realization of the Instrument Hub project's objectives.

Team
The Paintfinder team was comprised of four developers, one QA specialist, and a product owner. On the other hand, the Instrument Hub team was composed of two developers and a product owner, with me serving as the technical lead. Both teams operated as SCRUM teams, adhering to a structured framework that included daily stand-ups, weekly refinement sessions, and conducting a demo and retrospective at the conclusion of each two-week sprint.

Technology and Tools
Front-End: Angular, HTML, CSS / SASS / SCCS / LESS, Type- / JavaScript, Bootstrap, jQuery
Back-End: .NET (C#), ASP.NET, LINQ, MVC
Hosting: Azure Cloud (Web Apps)
Testing: Unit, Integration
Protocols: Signal-R
Other: Software Design Principles, SCRUM / Agile development, CI / CD, Azure DevOps, TeamCity, System Architecture Design, Requirement Analysis

Software Engineer / Researcher, Science [&] Technology – Vision B.V., Year: 2015 – 2019
Design and development of complex (web)systems and computer vision applications for PC and Mobile.
Develop Angular web apps (hosted in Microsoft Azure) using SCRUM at external companies.

Science & Technology (S&T) is a leading provider of Research and Development (R&D) solutions in the fields of Space, Science, and Defense. Within S&T, the specialized division known as S&T Vision focuses on delivering cutting-edge computer vision solutions to its clientele, which includes esteemed organizations such as NCIA, the Ministry of Defense, TNO, and Handicare.

During my tenure at S&T Vision, I had the opportunity to work on several innovative projects, encompassing a wide range of technologies, including Augmented Reality (AR), Virtual Reality (VR), and Computer Vision applications.

VR and AR
One of the significant projects I contributed to was the VR 3D panorama application, which aimed to provide users with a stereoscopic viewing experience of panoramas using their mobile devices mounted on a head-mounted display like Google Cardboard. Developed on the Unity3D platform, the application allowed users to access sets of stereoscopic images by entering a link or scanning a QR code. These images were downloaded from an ASP.NET-based web service. Moreover, the application featured intuitive navigation buttons that facilitated seamless transitions between different images, akin to the navigation experience on Google Maps.

Dronetube
In the Dronetube project, our team developed a comprehensive system to enable easy searching of drone videos based on location and time. The drone videos contained important geographical information in the form of polygons representing the areas being surveyed. This project involved several components, including a C# module with an XML configurator, responsible for retrieving and storing streamed data from the drones, extracting, and storing metadata for future querying. Substantial optimizations were implemented for data handling using SQL with stored procedures to ensure efficient location-based queries. The front-end, built on HTML, CSS, and JavaScript, featured a web

interface allowing users to query and view relevant video segments on a map using Open Layers. The video streaming process was facilitated through various ASP.NET web services. Additionally, the entire application was integrated with Jenkins for automated building and deployment, while extensive automated testing procedures were employed to ensure robustness and reliability.

Door Construct

Another significant endeavour I was involved in was the Door Construct project. Its objective was to digitize the process of recording measurements for door openings and windows, thereby replacing traditional paper-based methods. We developed an Android app using Xamarin, featuring user-friendly input fields to capture measurements. These measurements were then transmitted to a web service built on ASP.NET Core, which securely stored the data in a MySQL database. At the office, personnel could access the data through a WPF application, where additional information could be added before sending instructions to the factory for door and window production. A schedule management system within the WPF application facilitated the assignment of tasks to on-site mechanics. The mechanics, in turn, accessed a dedicated Angular-based website, enabling them to view their assignments, mark their progress, and report completion. As with the previous project, the entire application suite was efficiently managed using Jenkins for continuous integration and deployment, complemented by thorough automated testing to maintain optimal performance.

Markerloos / Markerscan

Lastly, I participated in the Markerloos and Markerscan projects, both of which extended an existing computer vision algorithm designed for precise measurements using markers in photographs. The algorithm allowed for accurate 3D point measurements in the real world, with millimeter-level precision. In the case of Markerloos, the application created a virtual representation of a measured staircase and calculated the corresponding staircase lift rail. Users placed markers on the staircase and captured images using a Windows tablet, and the algorithm utilized augmented reality to display the 3D staircase on the live camera feed. After completing the measurement process, the calculated rail data was sent via an ASP.NET-based web service to the factory. In contrast, Markerscan, a simplified version developed for Android and iOS using Unity3D, enabled users to capture 3D points and export them for various applications, including 3D printing.

These projects exemplify the depth of technological expertise and innovation within S&T Vision and its commitment to delivering advanced solutions to diverse industries.

Team
The team comprised four members who convened on a weekly basis to deliberate on the progress of individual tasks.

Technology and Tools
Front-End: Angular, HTML, CSS / SASS / SCCS / LESS, Type- / JavaScript, Bootstrap, jQuery, WPF, Android
Back-End: .NET (C#), ASP.NET, LINQ, MVC, C++, Java
Data: Entity Framework, MySQL, MongoDB
Hosting: Azure Cloud (Web Apps)
Testing: Unit, Integration
Other: Software Design Principles, SCRUM / Agile development, CI / CD, Jenkins, System Architecture Design, Requirement Analysis

Software Engineer / Researcher, Leiden University Medical Centre, Year: 2014 – 2015
Researching and developing human-computer interaction; 3D object manipulation with hand gestures. Framework development for medical application with easy sensor integration.

Leiden University Medical Centre (LUMC) is an affiliated university hospital with Leiden University, encompassing its medical faculty. LUMC serves as a contemporary university medical center dedicated to research, education, and patient care. Research activities span from fundamental medical research to practical clinical applications. Within the radiology department, an IT team is tasked with investigating how information technology can further aid doctors and patients.

3D object manipulation with hand gestures

During surgical procedures, maintaining a sterile environment is crucial, and the use of computer-based 3D data visualization often requires the surgeon to interact with a mouse, which may compromise sterility. In response to this concern, I conducted research aimed at identifying a more hygienic and intuitive approach to interact with virtual 3D objects.

The primary objective of this research was to evaluate the performance and usability of hands-free manipulations using hand gestures as an alternative to mouse-based manipulations. The goal was to ascertain if hands-free interactions are viable for surgical settings without requiring extensive learning periods.

To gather the necessary data, I developed an application in Unity3D, enabling users to manipulate 3D objects both with a mouse (using widgets) and hand gestures via Leap Motion technology. The application presented two objects, one gray and one red, with identical shapes but differing in position, rotation, and scale. The participants were required to align both objects through the chosen interaction method. The study recorded usability, speed, and accuracy metrics during these experiments.

The findings of the research indicate that hand gestures outperform mouse interactions in terms of speed, user-friendliness, and accuracy for 3D object manipulation. Consequently, a finalized application was delivered, enabling individuals to import 3D data and interact with it hands-free using Leap Motion technology.

Unity3D sensor framework

Another project involved creating a versatile framework in Unity3D, incorporating state-of-the-art interaction devices such as Oculus Rift, Leap Motion, Intel Real Sense, and Kinect. The framework's purpose was to provide a unified solution for integrating these devices into various projects seamlessly. Emphasizing simplicity and intuitiveness, the user interface allowed easy integration, sparing developers from repetitive integration efforts for each new project.

Team
I was primarily responsible for the execution of both projects, with occasional demonstrations provided to surgeons and medical rehabilitation personnel.

Technology and Tools
.NET (C#), C++, LINQ, Unity3D, SCRUM, Software Design Principles, System Architecture Design, Requirement Analysis, Virtual Reality

Software Engineer / Researcher, Utrecht University, Year: 2014 (Unpaid)
Researching and developing a head-mounted display 3D image browser using the Oculus Rift.

With the increasing popularity of Virtual Reality (VR) and Augmented Reality (AR), the landscape of computer usage is expected to undergo significant transformations in the future. One potential evolution is the adoption of a 3D environment for browsing photos. The aim of this research was to determine the optimal user placement within the 3D world and to explore navigation methods for a grid of images displayed on a cylinder. Additionally, the study sought to assess performance and usability across various configurations.

The research employed a Unity3D application, which was utilized in conjunction with a Head Mounted Display (HMD) such as the Oculus Rift. Test subjects were able to interact within the 3D environment, enabling them to explore and examine the grid of images. Navigation and image selection were facilitated using an Xbox360 controller, providing users with the ability to rotate the grid and locate specific images of interest.

Throughout the experiment, various performance metrics and measurements were collected and subsequently subjected to analysis. These data points were crucial in evaluating the effectiveness and user-friendliness of the 3D photo browsing system.

Team
The team comprised two developers and one professor, and they convened regular meetings.

Technology and Tools

.NET (C#), C++, LINQ, Unity3D, SCRUM, Software Design Principles, System Architecture Design, Requirement Analysis, Virtual Reality

Software Engineer, MetrixLab, Year: 2013

Development of marketing tools and immersive 3D worlds using the Oculus Rift.

MetrixLab is a distinguished market research agency specializing in brand engagement, product innovation, and customer value. Leveraging cutting-edge digital technologies, global resources, and an agile approach, the company empowers its clients to make informed business decisions with greater speed and precision. One of their clients has expressed the need for in-store product placement research to optimize their sales strategies.

Previously, the research method employed a web-based interface, wherein test subjects would view a simulated shelf with products. They were required to use a mouse to indicate their visual focus and click on desired items. However, due to the significant disparity from real-world shopping experiences, the client sought a more immersive and true-to-life research approach.

To address this requirement, MetrixLab embarked on a project involving the development of a virtual store within Unity3D, modeled after an existing physical store. The new research method enables test subjects to wear a Head Mounted Display (Oculus Rift), creating an immersive shopping environment where they can freely look around and feel as though they are present in the store. Additionally, an Xbox360 controller allows subjects to navigate the virtual store, examine products closely, and add items to their virtual shopping cart.

Throughout the testing process, diverse data points are collected and recorded for subsequent analysis. The subjects' paths within the virtual store are accurately tracked and can be visualized on a map, providing valuable insights into their browsing behavior. Furthermore, gaze tracking technology has been integrated to monitor how the subjects scan the shelves and locate their preferred products. The use of this advanced data collection approach has proven to be more precise and valuable compared to the previous, more detached research method.

Team

The team comprised three remotely located developers, and monthly, they presented a demonstration at MetrixLab to showcase their ongoing progress.

Technology and Tools

.NET (C#), C++, LINQ, Unity3D, SCRUM, Software Design Principles, System Architecture Design, Requirement Analysis, Virtual Reality

Software Engineer / Project Lead, Utrecht University, Year: 2013 (Unpaid)

Creation of a Unity3D plug-in for a crowd simulation engine developed by Utrecht University.

Utrecht University conducted extensive research on the realistic simulation of large crowds, a prominent challenge within the realm of computer science. As part of this research, a system was developed to address this concern. To enhance the accessibility of the system for public use in simulations and games, it was imperative to integrate it with the Unity3D game engine.

The primary objective of the project was to integrate the crowd simulation system seamlessly into the Unity3D environment. However, notable challenges arose due to the inherent programming language differences, with the crowd simulation system being written in C++ and Unity3D supporting C#.

Consequently, a significant task involved developing a wrapper that bridged the gap between the C++ codebase of the crowd simulation system and the C# environment of Unity3D. Additionally, another crucial aspect was devising an algorithm capable of extracting Unity3D meshes to an .obj format, while intelligently removing non-walkable triangles and structuring the data in a format compatible with the crowd simulation system.

Moreover, a promotional website was created to showcase the project and its functionalities. Alongside software development, I assumed the responsibility of project leadership and engaging in constructive communication with clients to comprehensively understand their requirements, ensuring their satisfaction with the final product.

Team

The team was comprised of ten students majoring in computer science from Utrecht University, accompanied by two

graphic designers from the Hogeschool Utrecht. Our collaborative efforts were organized following SCRUM principles, which involved conducting daily stand-up meetings and utilizing a SCRUM board for task management.

Technology and Tools

C#, .NET, LINQ, C++, HTML, CSS, JavaScript, jQuery, Unity3D, SCRUM, Software Design Principles, System Architecture Design, Requirement Analysis

Teaching Assistant (Game Programming, Interaction Technology & Game Technology Introduction), Utrecht University, Years: 2012 – 2015

Designing assignments (Oculus Rift, Wii Mote, Kinect), preparing lectures, and helping students.

The responsibilities of a Teaching Assistant (TA) encompass assisting students enrolled in the course with their assignments as required and conducting evaluations of assignments and exams. Specifically, in the Game Programming course, which serves as the introductory course in the curriculum, the primary focus is on instructing students in programming while guiding them through the process of developing small games using the XNA gaming engine, such as "Pong" and "Tetris."

In the Interaction Technology course, students are instructed on the principles and considerations related to utilizing both traditional and innovative human-computer interaction technologies. As part of my involvement in this course, I designed assignments that require students to employ new interaction technologies, such as Oculus Rift, Wii Mote, Kinect, among others, to create applications tailored for individuals with disabilities.

Moreover, I fulfilled the role of a TA for the Game Technology Introduction course, which entails providing support to teams of six students as they collaborate to create retro games. My responsibilities extended to handling administrative tasks and coordinating events like game showcases.

Team

The team comprised one or two professors and three or four Teaching Assistants. Knowledge was collaboratively shared within the team through scheduled meetings.

Technology and Tools

.NET (C#), C++, LINQ, XNA, Software Design Principles, System Architecture Design, Requirement Analysis