Bilgehan Cagiltay

Last Updated on 4th November 2024

Education

SABANCI UNIVERSITY

BS in Computer Sciences

Fall 2019 - Spring 2023 | Turkey

- **GPA:** 3.19
- **Honors**: 2019, Spring 2020, 2021-2023
- **High Honors**: Fall 2020

MS in Computer Sciences

Sep 2023 - Present | Turkey

- **GPA:** 3.5

Links

GitHub **DivinorWieldor**
Linkedin **bilgehan-cagiltay**
OrcID **0009-0004-7612-0516**
Scholar **bilgehan cagiltay**
email **bcagiltay@sabanciuniv.edu**

Coursework

COMPUTATIONAL SCIENCES

Data Science
Logic and Digital Systems Design
Discrete Mathematics
Database Systems
Statistical Modeling and Analysis
Machine Learning - Deep Learning
Algorithms and Analysis
Mobile App Development
Object Oriented Programming

SOCIAL SCIENCES

Mind and Behavior
Cognitive Processes

Technical Skills

PROFICIENCY IN

Python • C/C++ • SQL • Unity • OpenGL • OpenAL • AR/VR • Regex

EXPERIENCE IN

LaTeX • Git • HTML/CSS • Dart • Flutter • ARKit • Swift • Unreal Engine

Activities and Societies

SUDOSK - NATURE SPORTS CLUB

Board Member, Head of education
Sabanci University, Fall 2019-Spring 2023

MUZIKUS - MUSIC CLUB

Choir member
Sabanci University, 2022-2023

Employment Eligibility

Citizen of the United States of America
Open to relocation

Certificates

Toefl-IBT

Score: 112 Feb 2023 - Feb 2025

Academic Interests

I am interested in interdisciplinary research in Human-Computer Interaction, AR/VR systems, Audio in XR, and computer games.
My interests focus on designing, developing, and testing applications on VR platforms, such as HTC VIVE, Quest, as well as on AR platforms, Microsoft Hololens.

Teaching Experience

TA - DATA STRUCTURES (30 STUDENTS)

Fall 2023, Spring 2024 | Sabanci University

TA - COMPUTER GRAPHICS (112 STUDENTS)

Fall 2024 | Sabanci University

Professional Experience

SOFTWARE ENGINEER INTERN, AR/VR

University of Wisconsin-Madison

Jul 2022 - Sep 2022 | Madison, WI, USA

- Advisor: Dr. Kevin Ponto, Virtual Environments Group
- I developed AR measurement tools for a mobile phone app.
- The designed tool helps users accurately measure a room during home inspections, with an intuitive user experience.
- The purpose was to move tedious and error-prone activities to an app that would do these accurately and automatically.

SOFTWARE ENGINEER INTERN, AR/VR

Mr.Holo

Aug 2021 - Oct 2021 | Istanbul, Turkey

- My role was to design, develop, and test the usability of various Hololens and mobile applications.
- I helped develop an AR system that collects eye-tracking data as the user manipulates objects based on given tasks.

Publications

- **ISMAR 2023 poster paper** - *The Benefits of Utilizing Augmented Reality as a Tool for Assessments*
- **IECHCI 2023 conference paper** - *Typing in the Matrix: An Augmented Reality vs. Physical Keyboard Showdown*
- **AVI 2024 poster paper** - *Holomental: Improving Mental Rotation Ability with Mixed Reality*
- **IEEE AIxVR 2025 short paper - submitted** - *The Case for Audio-First Mixed Reality: An AI-Enhanced Framework*

Projects

E-COMMERCE APP

Sabanci University, Spring 2022

- We utilized SCRUM during development
- The backend was developed on Django.
- We Used Git providers (Bitbucket and Atlassian) to coordinate.

UNDERGRADUATE RESEARCH ON MR ATTENTION

Sabanci University, Spring 2023

- Microsoft Hololens 2 research conducted on how attention is divided between physical and virtual environments
- We designed and developed a system to explore attention when using a keyboard in MR and physical environment

RESEARCH ASSISTANTSHIP

Sabanci University, Spring 2024

- EU project for the development of a mooc Metaverse Academy.
- Aims to bridge the skill gaps in AR/VR/XR **(project website)**

My research interests lie in the current and future capabilities of AR/VR technologies, conducting research on novel aspects of these technologies. My research motivation is to help drive forward immersive technologies as best as I can, in any way I can. I believe due to the myriad of ways that XR technologies can convey information to users, they can help in the safety, comfort, and quality of life of every individual. Through the applications of these technologies, people with disabilities can navigate and take caution to imperceptible threats, first responders can make safer and better critical decisions, businesses can demonstrate their capabilities for cheaper, the elderly can have virtual assistants to help with new and unfamiliar technologies, and much more. Given this motivation, I've been involved in several research and development projects that demonstrate my desire to work interdisciplinary, to take part in this advancement, and ability to conduct cutting edge research; which all contribute to me being a strong Ph.D. candidate. Below, I elaborate on my selected projects and relevant achievements...

Currently, I am pursuing my masters degree in Computer Sciences at Sabanci University. Under the supervision of Professor Selim Balcisoy, I am developing audio augmented systems to create an augmented reality environment by giving audio cues to a user, instead of the visual feedback of the more popular AR devices. In my thesis, I am exploring how a realistic sound simulation system within 3D multi-story buildings can be helpful in navigational tasks for blind users, or users in low-vision environments.

In addition to these projects with my professors, I am also designing a MOOC XR usability course for a European Union project, the Metaverse Academy. Details for this project can be found in the following link: metaverse-academy.tech. The course covers usability methods and rules that any developer and designer working on AR and VR applications should know.

These projects showed me how to approach unfamiliar topics and research areas, how to work with big data and the importance of backing up data, as well as the amount of effort that goes into XR products.

Prior to my Masters degree, I received my B.S. from the Computer Science and Engineering program of Sabanci University, one of Turkey's top research universities and ranked in the top 400 universities worldwide (I ranked top 3% among 3 million registered examinees).

I've been involved in several AR/VR development projects during my undergraduate program. I was hired as a freelancer developer for a software company. Using the Unity engine, I developed AR projects for the Microsoft Hololens 2 and for smartphones. I helped build an AR phone app which scanned a car, identified its model, and displayed additional information over the car.

In another research project, I implemented the cognitive mental rotation task in a mixed reality setting. I developed it for the Hololens 2 on the Unity engine, utilizing the built-in eye-trackers. The findings from the user study of this system was later presented at AVI 2024 conference, Italy.

Furthermore, In summer 2022, I was a research intern at the University of Wisconsin-Madison, contributing to an AR development project supervised by Professor Kevin Ponto. I developed AR measurement tools on the Unity engine for a mobile phone that helps measure a room for home and business inspections. The findings from the user study of this system was presented as a poster paper at ISMAR 2023 conference, Australia.

As part of my Human-Computer Interaction class, my team and I conducted a study exploring the changes in users' attention when they are typing using a physical keyboard versus an AR

keyboard. We used the Tobii Eye Tracker and the built-in eye tracker of the Hololens 2 to track user attention. The AR section of the study was built on the Unity engine. Our paper was presented at the IECHCI 2023 conference, Turkey.

In parallel to my masters thesis, I have worked on a project where I was responsible for mapping the network structure between github repositories. I had a pivotal role in data collection, data sanitization, network construction, and analysis of the network properties of this large social structure. This project was supervised by Professor Onur Varol.

I would like to join Columbia University and especially work under the supervision of Prof. Steven Feiner because their research aligns closely with my academic and professional interests. I was particularly intrigued by their projects on the impact of AR documentation for repair tasks, and whether an immersive environment simulating vision impairment would increase the sympathy and empathy of a user. I am interested in working in interdisciplinary projects to learn from and improve myself in various subjects. I aim to contribute to and expand my expertise in a collaborative environment that values cross-disciplinary exploration by joining the Computer Science program at Columbia University.

Throughout my education, I have consistently sought out opportunities to challenge myself and broaden my knowledge. My passion for interdisciplinary studies led me to take courses such as Cognitive Processes, Mind & Behavior, and Basic Concepts of Physics alongside my CS courses. In addition to taking on challenging coursework in areas like Computer Graphics, where I used OpenGL, I also took the initiative to participate in the development of Oculus Quest and Hololens projects to further my skills in XR technologies. Along the way, I learned to use more fundamental tools such as OpenAL, and more high-level tools such as Unity and Unreal engine.

My hands-on involvement in these projects have shown me that I am most suited for research and development in HCI, particularly in XR. I believe that my problem-focused mindset, interdisciplinary background, and technical skills are best suited to make contributions to both research and development in my future career.