Erdem Murat

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Education

George Mason University **January 2022 – May 2023 (Expected)**
Master of Science in Computer Science *Fairfax, VA*

- Member of the Design Computing and eXtended Reality (DCXR) research group.
- Leading member and Secretary of the Computer Science Graduate Students Association (CSGSA).

George Mason University **August 2018 – December 2021**
Bachelor of Science in Computer Science *Fairfax, VA*

Academic Research

Understanding User Experience of Online Education in Metaverse: A Systems Perspective **November 2022**
Ruizhi Cheng, ***Erdem Murat****, Lap-Fai Yu, Songqing Chen, Bo Han*

- Built a Mozilla Hubs server-client system and wrote JavaScript scripts to record platform performance through API.
- Used Python and Jupyter Notebook to compute, visualize and analyze systems data.
- Gave a VR lecture to 23 Graduate students and later assisted a well-established researcher using my platform for a speech.
- Completed study with a total of 4 lectures in which qualitative user data & quantitative systems data have been recorded to document a detailed systems understanding of VR education and user experience through an academic paper.

Machine Learning Automation for Virtual Reality - Master's Thesis **December 2022**

- Developed a system to address a limitation in VR development research and proposed a solution that improves user experience through both qualitative and quantitative user data collected.
- Used procedural game difficulty design to generate various game levels to better understand and test the relationship between game parameters and user experience.
- Obtained IRB certificate for social and behavioral research and collected data from over 50 users playing my VR game.

Experience

Design Computing and eXtended Reality (DCXR) **January 2022 – Present**
Researcher, Lab Member *George Mason University*

- Advisor: Prof. Lap-Fai (Craig) Yu
- Through DCXR, I have led three academic research projects so far. They have primarily been in the field of VR but also include machine learning, game development & engineering, systems analysis, and sports research.
- As a member of the lab, I receive mentorship from Prof. Yu, collaborate with lab members, access equipment required for research, and attend seminars, conferences, and related events.

Global Co Lab Network **July 2022 – Present**
Virtual Reality Director *Arlington, VA*

- Developing and maintaining VR Hubs for the Co Lab to host conferences and present fieldwork addressing social issues.
- Instructor and mentor for three teams participating in the UN Sustainable Development Goals (SDG) Metaverse Competition where contestants develop their own VR environments to address to an SDG.

Reviewer **January 2023**
IEEE VR 2023

Cyber Bytes Foundation **June 2022 – July 2022**
Building in VR Camp Instructor *Stafford, VA*

- Created a 5-day schedule with 7 hours of teaching material each day to teach virtual reality development to a classroom of 20 students.
- Used my knowledge gained in university lectures, scholarly research, seminars, and academic conferences to create content that comes from the field of VR and is highly educational, comprehensive, and unique.
- Integrated advice from the Mozilla Hubs team to further improve the quality of teaching materials on Mozilla Hubs.

Projects

VR Athletics - Foot Tracking VR Simulation System | *Unity, C#, Plastic SCM, VS Studio* **January 2023**

- Developed a foot-tracking system with a unique human-computer interaction system to be used in a sports setting.
- Implemented a detailed physics solution utilizing Unity physics settings as well as scripts to create a realistic interaction system with the foot and virtual objects like ground, environment objects, and sports balls.
- Developed a training system that can also record and play-back user performance.
- Used VS Studio Debugger and Diagnostics tools to debug code and improve performance.

Motion Planning for A Multi-Robot System | *ROS, Gazebo, Python, A.I* **November 2022**

- In a team of three, used Gazebo and ROS to create a multi-robot environment with obstacles and motion-planning to allow for autonomous robot movement.
- Used Continuous Conflict-Base Search to build a motion planner's pipeline for multi-robot navigation without collisions.

Virtual Reality Education | *JavaScript, Distributed Systems, AWS, Code Profiling* **October 2022**

- Utilized Amazon Web Services to deploy a private Mozilla Hubs server on an Amazon AWS EC2 instance (t3.medium) to conduct user studies. Used Glances to monitor its resource utilization and tcpdump to capture and analyze the network traffic on the server side.
- Modified open-source Mozilla Hubs client code and injected custom scripts to track user-data and client-side performance.
- Created an API to collect client-side data sent by scripts and used collected data to detect and debug performance bottlenecks as well as devise solutions for better performance.

Why Did the Chicken Cross the Road? - Virtual Reality Game | *Unity, C#, VS Studio* **November 2021**

- Researched numerous PC, mobile, and VR games to design and build a VR game that is addictive and fun to play.
- Implemented procedural-level design and game development techniques like 3D noise, environmental triggers, and motion sensing to create a well-rounded, and functional game.
- Recorded human motion, E4 wristband data, and gameplay progress data to train a machine learning algorithm.
- Experimented with MCMC optimization to optimize the user experience.

Test the Heights - Virtual Reality Game | *Unity, C#, VS Studio* **November 2021**

- Utilized interactive systems to craft a thrilling and immersive experience.
- Performed user-testing to get feedback from 14 users in various stages of the game to make improvements continuously.

OpenGL Raytracing | *C++, OpenGL, VS Studio* **May 2021**

- Developed C++ code that generates a 3D image by effectively using raytracing.
- Applied Phong's reflection model to accurately calculate a scene's reflections, lighting, and shading.

Technical Skills

Languages: Python, C#, C++, C, Java, SQL, HTML/CSS, JavaScript, R, SAS, MATLAB, Assembly
Developer Tools: Unity, Unreal, Spoke
Softwares/Tools: Visual Studio, Git/GitHub, Eclipse, Blender, Microsoft 365, Photoshop, Plastic SCM

Organizations / Involvements

Computer Science Graduate Students Association (CSGSA) **May 2022 – Present**
Secretary *George Mason University*

- Leading member and Secretary of the Computer Science Graduate Students Association (CSGSA) at George Mason University.
- Responsible for recording meeting progress and organizing networking events for Graduate students.

Fairfax Public Access **October 2022**
360° Video Recording Personnel *Turkish American TV*

- Managed video recording equipment and distributed of 360° content during the 2022 DC Turkish Festival for TATV.