

PROJECT SUMMARY

INTELLIGENT & INTERACTIVE ROBOTIC INTERFACE

Tools: *Python, ROS, JASP, Excel, Git, OpenCV, Bash, Linux, Research, Software Engineering, DevOps, Front-end, Game Design,* **Skills:** *Statistics, Data analysis, User*

- Created a teleoperation system to remotely control a robot using Python and Robot Operating System (ROS) to evaluate the effects of social interfaces on user trust in AI systems.
- Established data requirements to address our research question, designed an experiment based on the requirements and performed QA testing on the system to ensure consistency.
- Collected and organized data from various data sources including Google Forms, and Python application, ensuring there were no inconsistencies or missing values in the data.
- Implemented a chatbot and animation system in Python using tkinter, following the Model-View-Controller (MVC) pattern. It enables the AI in robot to chat with users and display various emotions. Dialogues and animations are stored in Excel sheets for easy customization without the need of altering the Python codebase.
- Utilized GitHub Flow version control strategy by creating a branch for each new feature and integrating it after testing. Also, developed a customized pipeline by shell scripting to setup the robotic system in bash.
- Summarized data using descriptive statistics with Excel, performed statistical testing such as multivariate variance of analysis, t-tests and chi-square tests using JASP software, and created reports, graphs, and charts to visually present results in an accessible way for various audiences.
- Conducted a series of semi-structured interviews with participants and employed thematic analysis, both deductive and inductive, to gather valuable insight from interview transcripts.
- Designed game-like missions for the experiment, followed game-design principles and created a linear narrative where every part of the experiment is engineered to induce specific feelings and experiences in order to answer our research question, without the participant knowing it.
- Conducted literature reviews on the state of the art in “Shared Autonomy” and “Social Interfaces” to introduce a product that can fill the gaps in “Trust in Automation”.

TRA BLOCKCHAIN WALLET

Tools: *C#, .NET Core, Entity Framework, PostgreSQL* **Skills:** *Database, Back-end, Teamwork*

- Served as the backend developer in a three-member team where I contributed to the development of a digital wallet for a new cryptocurrency called Tra.
- Created a RESTful API to manage a PostgreSQL database for user authentication, modeled data using the Entity Framework and wrote a client controller to handle HTTP requests performing CRUD operations.

MACHINE LEARNING IN COMPETITIVE GAMES

Tools: *Unity MLToolkit, C#* **Skills:** *Reinforcement Learning, Deep Learning*

- Trained an intelligent agent to compete in a 1 vs. 1 grid-based game of soccer by creating a feedback loop where the first-generation agent learns to beat a randomly behaving opponent, and the n'th generation agent learns to beat the (n-1)'th generation agent.
- Defined a series of policies, inputs, and outputs, to improve the performance of an agent created using Proximal Policy Optimization (PPO) with a deep reinforcement learning (DRL) algorithm.

AUGMENTED REALITY FOR CONSTRUCTION

Tools: *Unity, C#, Mixed Reality Toolkit, MS HoloLens 2* **Skills:** *A/B Testing, Interaction Design, Agile, Debugging*

- Developed an experimental augmented reality solution made with Unity, C# and MixedRealityToolkit for inspection of construction products where civil engineers use Microsoft HoloLens 2 headset to detect faults.
- Brainstormed several interaction ideas such as virtual ruler system, virtual/physical object alignment, and sub-component object manipulation, where I utilized an agile approach to prototype each idea based on priority in one-to-three-week iterations.
- Created a novel approach to align the virtual model with the physical using QR Codes and implemented debugging procedures to lessen time for testing.
- Conducted extensive user experience study to evaluate the effectiveness of the solution and Coached civil engineers on how to use the system and interviewed them for future updates.

ANDROID THRILLER GAME

Tools: *Unity, C#* **Skills:** *Optimization, Game Design*

- Implemented a proof-of-concept for a unique thriller android video game in a 3-month period while brainstorming with other team members on narrative and art style.
- Introduced innovative interaction elements to support top-down camera angle by utilizing navigation mesh for a novel input system so players can play the game with only tapping.
- Increased framerate from 20 to 40 by using optimization techniques and profiling.

USER EXPERIENCE FOR VIDEO GAMES

Tools: *Unity, C#* **Skills:** *Research, Experiment Design, Interview, Testing*

- Researched about psychological aspects of video games for optimized game design and administered a user study session to evaluate different models of dynamic difficulty systems. Programmed a flexible dynamic difficulty system with different versions.

SKILLS

Programming Languages: Python, C#, HTML, CSS, JavaScript, C, Bash, SQL

Tools and Frameworks: Robot Operating System (ROS), Tkinter, OpenCV, .NET Core, Entity Framework, scikit-learn, Astro

WORK EXPERIENCE

Unity Developer (Volunteer)

DEFEND

March 2023 - Present

Toronto, Canada

- Working as a part-time unity developer on a social media called 65square which focuses on safety and healthy habits.
- Contributing to an immersive virtual social media focuses on gamification elements.

MITACS Accelerate Intern

Offsite Construction Research Institute

Jan 2023 – Aug 2023

Fredericton, Canada

- Responsible for developing and user testing a Mixed Reality application for construction product.
- Supervised by Dr. Scott Bateman and collaborated with the civil engineering department.

Graduate Research Assistant

University of New Brunswick

Sep 2021 – Dec 2023

Fredericton, Canada

- Researched about interaction problems, developed solutions, did QA and analyzed collected data to enhance user experience.
- Conducted literature reviews on the state of the art in “Shared Autonomy” and “Social Interfaces” to introduce a product that can fill the gaps in “Trust in Automation”.
- Helped other members of the lab in various tasks such as setting up robot, doing projects, etc.

Graduate Teaching Assistant

University of New Brunswick

Sep 2021 – Sep 2022

Fredericton, Canada

- Graded labs, projects, and assignments for Operating Systems and Introduction to Game Development and provided students with detailed feedback on ways to improve.
- Acquired deeper understanding of low-level programming while marking OS assignments.

Unity Developer Intern

Gilamard Company

May 2019 – Aug 2019

Rasht, Iran

- Prototyped a top-down thriller game in C# and Unity for android devices.
- Created a new interaction scheme and developed it using C#.
- Collaborated with other members for brainstorming ideas.

Author

Digiato Magazine

Nov 2016 – Aug 2018

Tehran, Iran

- Write articles, reviews, and hands-on preview for new video games.

EDUCATION

Master of Computer Science

University of New Brunswick

Sep 2021 – Dec 2023

Fredericton, Canada

- Created an INTELLIGENT & INTERACTIVE ROBOTIC INTERFACE as my thesis research project.
- GPA of 4/4.3 and passed the following courses such as Research Methods, Advanced Software Process, Natural Language Processing and Machine Learning.

Bachelor of Computer Engineering

University of Guilan

Sep 2015 – Jan 2020

Rasht, Iran

- GPA of 3.2/4 and passed the following courses such as Internet Engineering, Artificial Intelligence, and Computational Intelligence.