Projects

Images 1280x720

Capstone

* A custom-built robotic arm that utilizes a VR headset and controller to mimic a user’s arm movement.
* Many robotic systems that utilize remote user operation have very complicated systems in place for the user to control the robot. These systems can require multiple computers and multiple human operators for the simplest actions. This system is designed to allow for a user to control a robotic arm remotely in the simplest and most intuitive way possible.

Luminosity

* CHARLOTTE
  + CHARLOTTE is developed to operate as a scientific exploration rover tasked with searching permanently shadowed craters on the Lunar south pole in search of water ice and geological signs of other volatiles.
  + CHARLOTTE is an extreme mobility lunar rover tasked with exploring the permanently shadowed craters of the Lunar south pole. The system provides a stable platform that can traverse inclines of up to 60 degrees.
  + I worked on this project while a part of the Luminosity Lab. We were selected as one of the finalists in the 2022 NASA Big Idea Challenge. Through this we were given funding to develop the CHARLOTTE system. Big Idea Challenge 2022 Finalists: <https://bigidea.nianet.org/2022-finalists/>
  + My primary contribution to this project included simulation, mechanical design, and control system/software development.
  + My primary contributions to this project have been in CAD design, simulation analysis for design validation, locomotion control system structuring, and thermal control system design.
  + Simulation
    - For this project I used Ansys to perform numerous simulations both to aid in the design process and to validate physical tests.
    - Pictures
  + Proposal
  + Final Report COMING SOON
* VELOS
  + Simulation
    - Drop test
    - Thermal
    - Random vibration
    - Thermal vac validation
  + Launch Video
  + Final Report
  + VELOS is a configurable multi-probe system that is launched from a lander over 100 meters into a permanently shadowed region of the lunar south pole.
  + My primary contributions to this project included simulation to aid in system design and lunar environment testing.
  + After completing the project, I presented my simulation work at the 2021 Simulation World Conference.
  + An article was written on the official Ansys Blog to talk about how simulation was implemented to support this project.
  + Additionally, I was invited on to the All Things Ansys podcast to talk about my simulation work.
  + Other articles
* Starbucks Washer?
* Axon?
* Landmine
* Starbucks VR?
* NFL Helmet

ADDictive

* ADD-ictive is a mobile game developed using Unity for both iOS and Android. The game is like Suduko but required players to use addition and subtraction to complete the puzzles.
* ADDictive is a mobile game developed using Unity for both iOS and Android. The game is similar to Suduko and requires players to use addition to fill in the missing numbers in a 3 by 3 grid so that all columns and rows add up to the provided solutions.
* App Store: <https://apps.apple.com/us/app/add-ictive/id1468671771>
* Google Play Store: <https://play.google.com/store/apps/details?id=com.Crunchy.Addition>

Clan Base

* Clan Base is a third-party companion website for Destiny 2 that utilized the Bungie API to create a place for users to visualize data related to player interactions.
* Clan Base is a third-party website for the game Destiny 2 developed by Bungie. This website utilizes the Bungie API to provide enhancements to the Destiny 2 player experience in the form of data visualization and player social interactions.
* Image

Controls table and ball

Controls computed torque Chess Robot

* A pick and place robotic arm designed for playing chess. A computed torque control system was designed for this system and simulated using Simulink. The performance of both a PD and PID controllers were compared in simulation for the arm.

Destiny 2 Player Match Making Machine Learning

Skills

* Ansys
  + Structural
  + Thermal
  + Random shock and vibe
  + Dynamic
  + Used static, dynamic, thermal, shock, and random vibe simulations to help with design iteration and testing.
* Flownex
  + Utilized this tool to develop fluid flow simulations as well as thermal control systems.
* Programming
  + C#
    - Used alongside Unity to develop multiple applications.
  + Python
    - Used primarily for machine learning, data manipulation, and http servers.
  + React
    - Built a website and desktop app using React alongside Electron and Next.js.
  + Javascript, CSS, HTML
  + JMP/JSL
    - Created data visualization tools for manufacturing statistics that aided in process decision making.
  + VBA/VBS
    - Used for small tasks such as web scraping, file management, and data manipulation.
  + Java
    - Used to program a robot controller for robotics competitions.
  + Ruby
* MATLAB
  + Wrote many custom functions to solve problems both numerically and analytically. Experience using Simulink
* ROS
  + Utilized this framework to develop a control structure for multiple systems.
* MoveIt
  + Used for motion planning, collision detection, and teleoperated control.
* AR/VR
  + Wrote applications for both VR and AR environments such as the Oculus and HoloLens
* CAD
  + Solidworks CSWP Certificate acquired for mechanical CAD design.
* Unity
  + Developed applications for iPhone, Android, HoloLens, Oculus, and Desktop.
* Git
  + Used both for code version control and to for collaborating on software projects.
* Simulink
  + Used to simulate control system models for non-linear systems.
* Machine Learning
  + Utilized Scikit-Learn and Keras to create many different types of ML models.