Sanju Sathiyamoorthy

Mechatronics Resume

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Relevant Experience

Baja SAE – Design Team *(July 2022 – present)*

- Involved in design team working to design, manufacture & test off road vehicle for racing competition
- Worked with another team member to design chassis using Solidworks
- Repurposed previous steering system to fit on new chassis design
- Analyzed variety of factors such as weight, width & ply to decide on optimal wheel/tires
  - Designed mounting hub to connect wheels to drive shaft

Relevant Projects

Smart Stop

- Created inexpensive parking device to make parking easier after hitting the curb when parking my car (view in portfolio)
- Used Arduino Uno, HC-SR04 ultrasonic sensor and LED to detect and signal when an object is within a certain distance using C++
- Designed a minimalistic casing to house the electrical components and mount to car front bumper using Solid works
- Performed a Granta material analysis to determine optimal material
- 3D printed final design using Ender 3D pro

Balsa Wood Truss Design

- Involved in design, construction, and testing of a truss competition with specific constraints and finished 7th place with efficiency of 400x
- Optimized bridge over 3 iterations to bear 300% more weight while reducing mass using stress/mechanics knowledge from class
- Created efficient cad designs to minimize wasted balsa wood
- Used laser cutting technology to cut wood and assemble bridge

Odyssey - *(1 month)*

- Created an arcade game from scratch with its own physics engine (Click to Play)

Toyota Innovation Challenge – *(2 Days)*

- Tasked with developing system to detect moving vehicles on manufacturing line using machine vision processing
- Used 3D depth camera input to detect a moving toy car using C++
  - Developed algorithm to draw box around the car using a given depth function that would output the depth at any given pixel input

Skills

CAD

- Used SolidWorks on various school & side projects
- AutoCad to create 2D drawings

Mechanical

- Familiar with GD&T principles
- 3D printing & laser cutting to prototype parts
- Used Granta to determine optimal material choice
- Stress and deformation analysis using truss simulators
- Fluent with Excel, Word & PPT

Electrical / Software

- Created Real-Time OS using UVision 5 and C/Assembly programming
- Soldering & Circuit Design
- Microcontroller programming experience in C++
- MATLAB

Education

University of Waterloo (ON)

(Sept 2020 – April 2025)

- Bachelor's of Mechatronics Engineering (82% average)

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Software Resume

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Relevant Experience

Application Developer – Teranet *(Sept 2021 – Dec 2021)*

- Worked on google maps API based **web application** "Geowarehouse"
- Fixed backend bugs (network, content display, database retrieval) using **Object-Oriented Java (Spring boot) and SQL**
  - performed **API testing** using POSTMAN to verify fixes
- Fixed UI bugs and created responsive content for the client side using **HTML, CSS/LESS, Async JS and AngularJS**
- Improved company's backend client dashboard by Implementing **JS sorting algorithm** to organize database results
- Worked with **Json Web Tokens** to authorize users

Software Developer – OpenText *(May 2022 - Aug 2022)*

- Shipped code to production for the "Case Management" web application
- **Created automated tests** to test the front-end and back-end using **Selenium and JBehave**
- Fixed backend bugs and issue using **OOP Java (Spring boot framework)**
  - Created endpoints for the applications **Public API**

Web Developer/Designer - Communitech *(January 2021 - April 2021)*

- Worked closely with UX/UI Designer and analysts to help small businesses **negatively affected by the Pandemic**
- Created sites from scratch, implemented product catalogue, online delivery function, and SEO work

Skills

Languages/Frameworks

- C++, Java (Spring Boot), Python , HTML, CSS/LESS, Async JS ES6, Angular JS, SQL, MATLAB
- Selenium, Jbehave, JWT
- OOP, data structures & algorithms, microprocessors & digital logic

Dev Tools:

- Postman, Jira, Jenkins
- Tomcat, Jboss, Maven
- Command Line, Eclipse, IntelliJ

Interests:

- Artificial Intelligence & neural networks
- Blockchain & economics
- Big data
- Optimization, numerical methods

Education

University of Waterloo (ON)

(Sept 2020 – April 2025)

- Candidate for Bachelors of Mechatronics Engineering

Projects

Twitter Journal - *(2 weeks)*

- Created a web-application with other interns that allowed users to view trending Twitter content and create their own personal blog and interact with content
- Set up **controller, service, and repository layers** to facilitate **CRUD operations** on Postgres database
- Integrated **public twitter api** to fetch and display trending topics and tweets

Odyssey - *(1 month)*

- Created an arcade shooter game with its own physics engine (Click to Play)
- Practice with UX/UI for the game design (ex: sprites, animations, sounds, menus, loading screens)

Personal Portfolio - *(Still Under Development)*

- Using HTML, CSS, JavaScript created a static website using GitHub Pages (Click to view)

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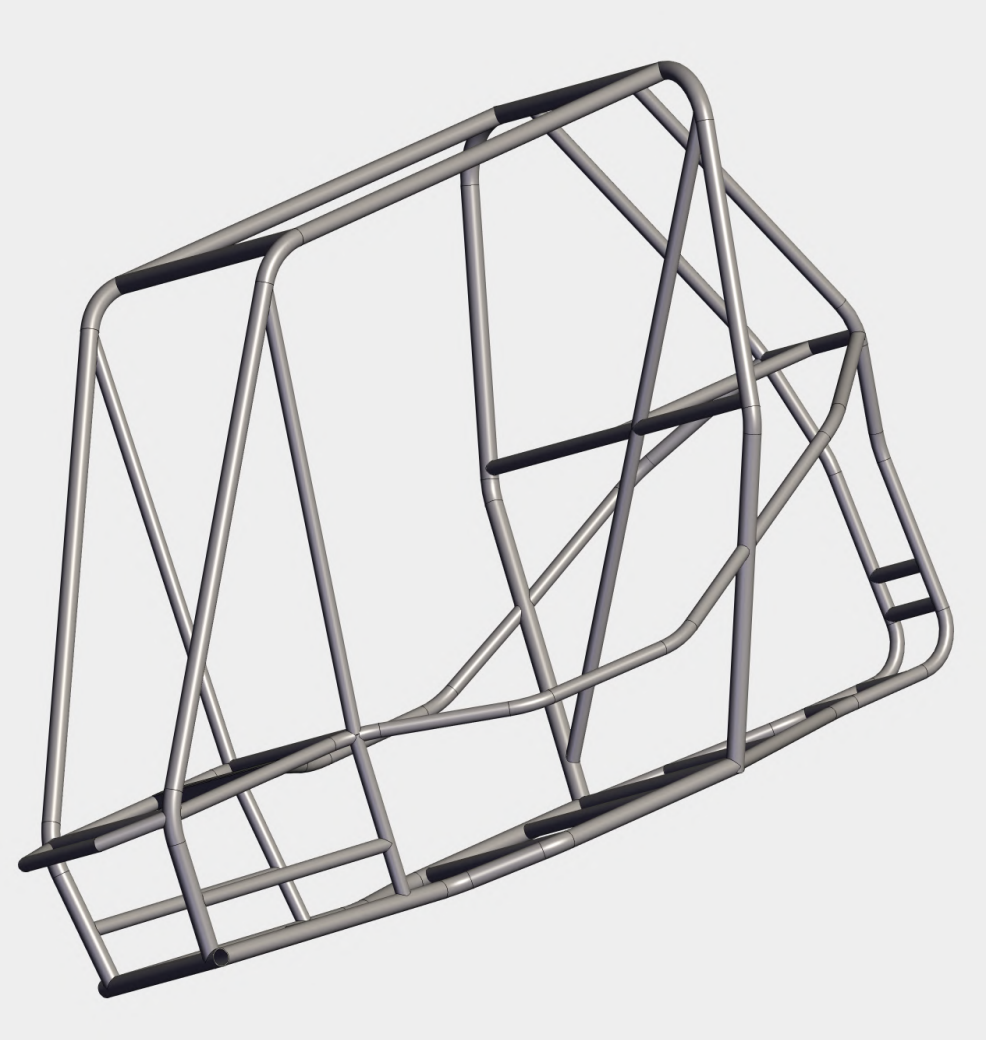
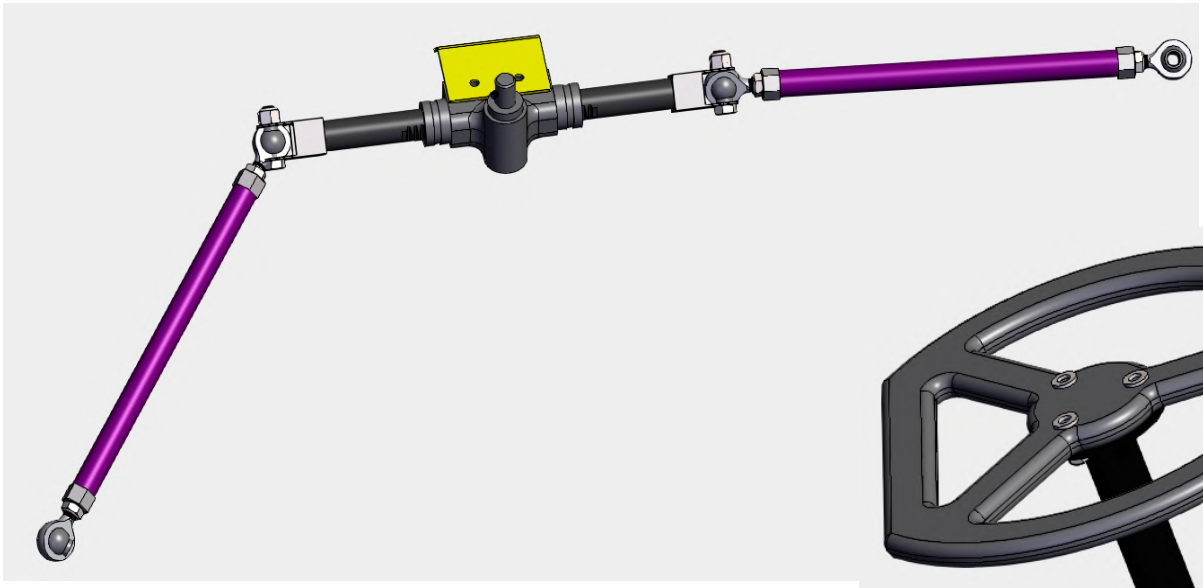
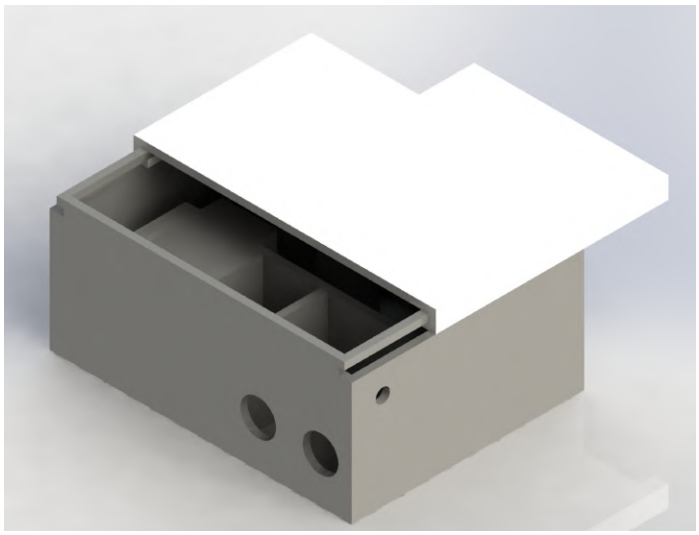
Baja - Research and Design (3 months)

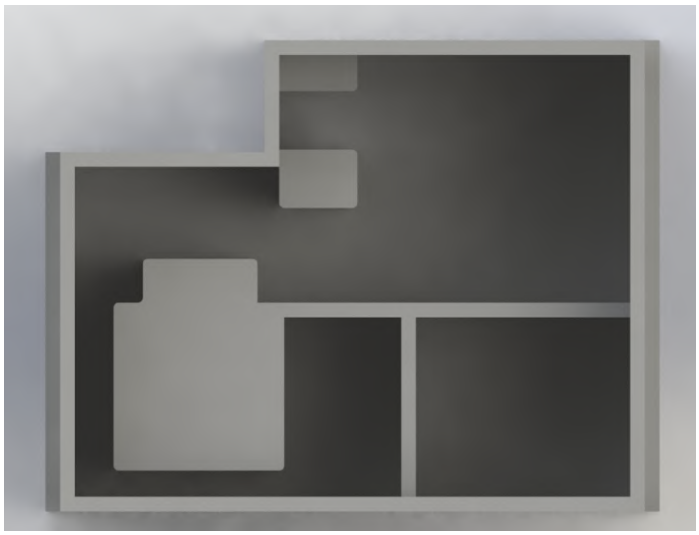
- Involved in the Baja SAE waterloo design team working to build a 4-wheel off road vehicle
- Vehicle will compete in international 2023 Baja SAE competition in a variety of competitions that will test the vehicle's performance, drivetrain, suspension, traction and much more
- Worked with another chassis team members to CAD the chassis using weldments (Solidworks)
- Repurposed previous years steering system to work with new chassis design
- Currently in charge of researching potential rims/tires and subsequently designing mounting hub to connect to the drive shaft
    - Considering factors such as weight, material, rim size/diameter, wheel offset, tire ply etc. on the performance of the car

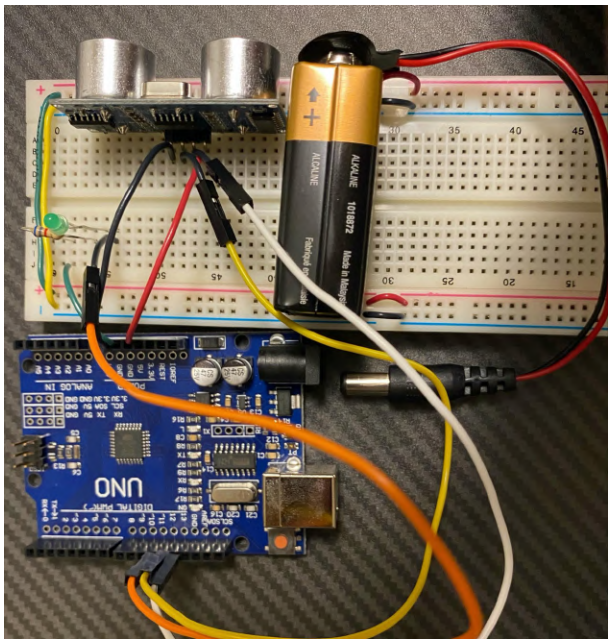


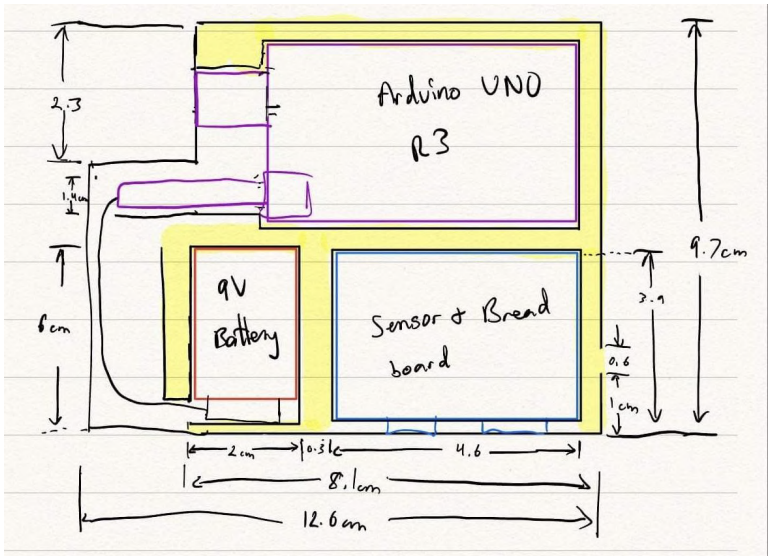


Smart Park - Parking Collision Detector





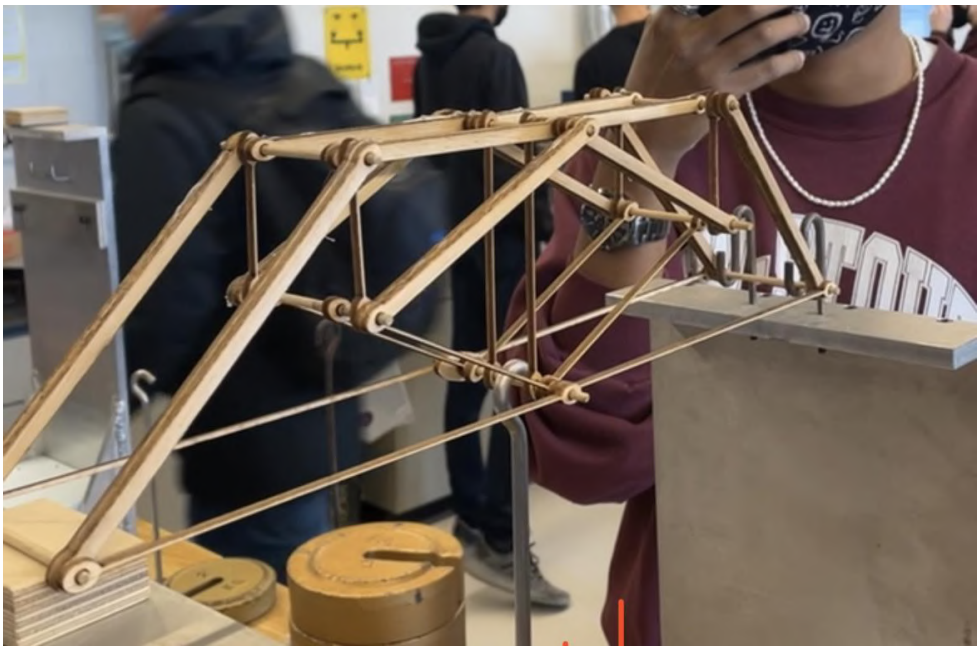




- Created inexpensive parking device to make parking easier after hitting the curb
- Used Arduino Uno, HC-SR04 ultrasonic sensor and LED to continuously detect and signal when an object is within 50cm accurate within 0.05 cm
- Designed a minimalistic casing to house the electrical components safely and securely and mount to car front bumper using Solid works
- Performed a Granta material analysis to determine optimal material type to withstand debris, sudden impacts (if it falls off) while still being relatively cheap

Balsa wood Truss Bridge Competition

- Lead the design, construction and testing of a balsa wood bridge that was made to withstand the maxim load possible under specific constraints (varied supports, specific load points)
- Optimized bridge to bear 300% more weight over 3 design iterations through applying stress and mechanics knowledge learned in class
- Created efficient cad designs to minimize wasted balsa wood as there was a limit to the available balsa wood
- Used laser cutting technology to cut wood and assemble bridge
- Finished 7th place with efficiency of 394

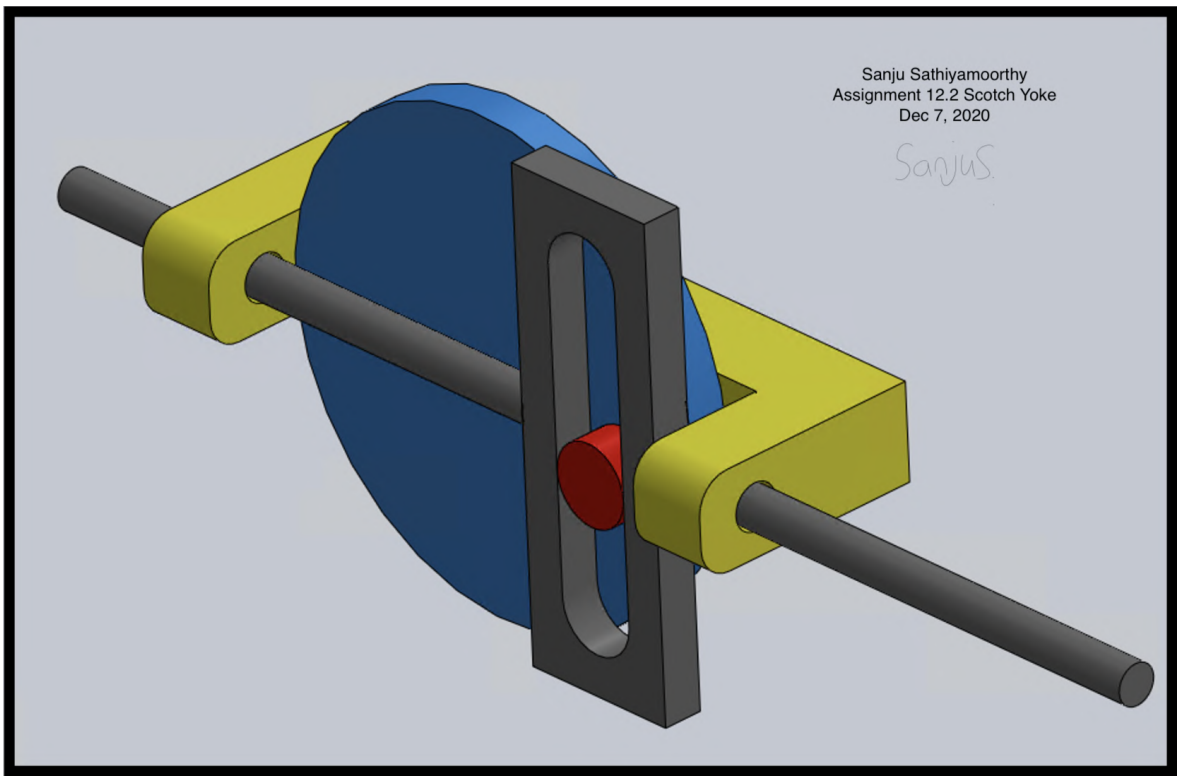


Odyssey - Created simple physics engine

- Designed, coded & published arcade video game from scratch using code block technology
- The game had its own physics engine (using dynamics and kinematics knowledge)
    - This was used to control the 2D motion of the player (spaceship), incoming rockets that followed the player and incoming lasers that had a constant velocity
- There used to be cool arcade music in the background but has been taken down by the side
- Click to play!

Reciprocating Motion Mechanism Design

- Used Solidworks to create the Scotch Yoke
    - a reciprocating motion mechanism that converts linear motion into rotational motion



Phone Stand Design:

- Designed a minimalistic phone stand to hold my phone upright to play music using solidworks