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ARCHITECTURE AND FINE ARTS

COMPUTER ENGINEERING

COMPUTER ENGINEERING DRAFTING AND DESIGN

CPEP223-A

SUMOBOT AND HOCKEYBOT

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INTRODUCTION

RATIONALE

A **Sumobot** is a small autonomous robot designed to compete in a circular ring, where its main objective is to locate and push its opponent out of the boundary, much like traditional Japanese sumo wrestling. These robots are usually built using microcontrollers such as Arduino or Raspberry Pi and are equipped with various sensors, including infrared, ultrasonic, and line sensors. These allow the Sumobot to detect its opponent, avoid going out of bounds, and respond to changes in its environment during battle. Unlike remote-controlled robots, Sumobots are programmed to act independently, making real-time decisions based on sensor input and pre-defined strategies. They are widely used in educational environments to introduce students to important concepts in science, technology, engineering, and mathematics (STEM), including coding, electronics, mechanics, and problem-solving. Sumobot competitions are also common in schools and robotics events, promoting creativity, teamwork, and innovation. In addition to their educational value, they serve as a stepping stone for understanding real-world applications of autonomous systems, such as self-driving cars, automated manufacturing, and artificial intelligence. Through hands-on experience in building and programming Sumobots, learners gain practical skills and a deeper understanding of how intelligent machines interact with their surroundings.

Sumobots come in various designs and sizes, often limited by competition rules that specify weight, dimensions, and power sources. Builders can customize their Sumobots with different chassis materials, wheel configurations, and sensor placements to improve performance and strategy. Some robots are designed to be aggressive, charging straight at opponents with speed and force, while others rely on smarter tactics like waiting for the opponent to make a move or using sensors to dodge and counterattack. Programming plays a crucial role in a Sumobot's effectiveness, as it determines how the robot reacts in different scenarios whether to advance, retreat, turn, or spin.

A **Hockeybot** is a type of mobile robot designed to simulate the gameplay of ice or table hockey by automatically tracking, aiming, and hitting a puck into a goal. Typically used in robotics competitions and educational projects, Hockeybots are equipped with various components such as wheels for

movement, sensors (like infrared or ultrasonic) for puck detection and obstacle avoidance, and actuators or servo motors to control the striker or stick mechanism. These robots are often programmed using platforms like Arduino or Raspberry Pi, allowing them to respond intelligently to the movement of the puck and the opposing player. Hockeybots can be autonomous or remotely controlled, depending on the design and competition rules. Their main functions include locating the puck, navigating the playing field, positioning themselves strategically, and accurately hitting the puck toward the goal. Beyond competition, Hockeybots are excellent tools for learning robotics, physics, mechanical design, and real-time control systems. They provide a fun and interactive way to understand how automation, sensor integration, and algorithmic decision-making work together in dynamic environments, mirroring real-world applications in sports technology, automation, and AI-based control systems.

Sumobots and Hockeybots are two popular types of educational and competitive robots designed to simulate real-world scenarios through engaging and interactive challenges. A **Sumobot** mimics sumo wrestling by autonomously detecting and pushing opponents out of a ring using strategically placed sensors and programmed movement. Meanwhile, a **Hockeybot** is built to play a game of hockey, locating and striking a puck toward a goal while navigating around obstacles or opponents. Both robots typically use microcontrollers like Arduino or Raspberry Pi and rely on components such as wheels, motors, sensors, and mechanical frames to perform their tasks. These robots are commonly used in robotics competitions, school projects, and workshops to teach important STEM concepts such as electronics, programming, mechanical design, and problem-solving. By building and programming these bots, students and hobbyists gain hands-on experience with real-time decision-making, automation, and control systems. More than just fun machines, Sumobots and Hockeybots foster creativity, teamwork, and innovation, making them excellent tools for developing future-ready skills in robotics and technology.

SCOPE AND LIMITATION

Sumobot and Hockeybot

Scope:

Sumobots and Hockeybots are widely used in educational, research, and competitive settings to introduce learners to the fundamentals of robotics, automation, and programming. They serve as practical tools for applying concepts in electronics, mechanics, control systems, and artificial intelligence. In schools and robotics clubs, these robots encourage critical thinking, collaboration, and innovation. **Sumobots** are designed for autonomous combat, using sensors and logic to locate and push opponents out of a ring, while **Hockeybots** focus on real-time object tracking and striking a puck toward a goal, simulating fast-paced gameplay.

Limitations:

Despite their educational value, Sumobots and Hockeybots have several limitations. They often operate in **controlled environments** with clearly defined boundaries, which means their sensors and programming may not perform well in unpredictable or real-world settings. Their **decision-making is limited** by the complexity of their code and the capabilities of their sensors, often relying on basic logic rather than advanced AI. The physical design is also constrained by competition rules such as size, weight, and power limits. Additionally, **Sumobots** may struggle with complex strategies or identifying multiple opponents, while **Hockeybots** can face difficulties in precise aiming and responding to rapid changes in puck position or speed.

Problem Requirements

PURPOSE

The main **purpose** of both **Sumobot** and **Hockeybot** is to serve as educational tools for teaching and applying fundamental concepts in **robotics, electronics, and programming**. These robots are designed to provide hands-on learning experiences that help students and hobbyists understand how sensors, motors, microcontrollers, and logic work together in real-time systems. The **Sumobot** focuses on autonomous decision-making, object detection, and strategic movement, while the **Hockeybot** emphasizes object tracking, aiming, and motion control. Both are widely used in **robotics competitions** to encourage creativity, teamwork, and problem-solving skills in a fun and challenging environment. Additionally, they help learners develop critical thinking, coding skills, mechanical design abilities, and an understanding of automation—all of which are valuable in modern technology and engineering fields. Beyond education, these robots also promote interest in **STEM careers** and introduce basic principles used in more advanced technologies like self-driving cars, industrial robots, and artificial intelligence systems.

The main objective of both the Sumobot and the Hockeybot is to offer practical and engaging platforms for learning the basics of robotics, programming, and engineering. These robots are crafted to instruct students and enthusiasts on how to merge hardware and software by utilizing sensors, actuators, microcontrollers, and control algorithms. The Sumobot particularly focuses on cultivating skills in autonomous navigation, opponent detection, and strategic decision-making within a competitive setting, whereas the Hockeybot emphasizes object tracking, precision control, and real-time interaction with a moving puck. Both robots enhance problem-solving skills, creativity, and teamwork through hands-on projects and competitions. Beyond technical expertise, these robots promote innovation and iterative design, as builders are required to test and improve their robots for enhanced performance. They also act as motivational instruments to spark interest in science, technology, engineering, and mathematics (STEM) fields by making learning interactive and enjoyable. Furthermore, Sumobots and Hockeybots assist users in grasping significant real-world applications of robotics, such as autonomous vehicles, industrial automation, and robotic sports technologies. Their development encourages critical thinking,

adaptability, and the capability to troubleshoot complex systems, which are vital skills in today's swiftly changing technological environment. In summary, these robots serve not only as educational resources but also as gateways to further exploration in robotics and automation careers.

OVERALL DESCRIPTION

Sumobot and Hockeybot are two types of educational and competitive robots designed to mimic real-life activities **sumo wrestling** and **hockey**, respectively while providing a hands-on platform for learning robotics, electronics, and programming. A **Sumobot** is an autonomous robot built to detect and push an opponent out of a circular ring using sensors and pre-programmed logic. It focuses on strategy, movement, and opponent detection in a confined arena. On the other hand, a **Hockeybot** is designed to track and strike a puck toward a goal, simulating a hockey game. It requires real-time object detection, precise aiming, and movement control. Both robots use microcontrollers like **Arduino**, along with components such as motors, wheels, and sensors, to function effectively. These projects help students and enthusiasts understand core STEM concepts, including automation, sensor integration, and control systems. They are commonly used in robotics competitions, workshops, and school projects due to their engaging nature and strong educational value. While both robots are limited to controlled environments and simple tasks, they provide an excellent foundation for building more advanced robotic systems in the future.

SYSTEM REFERENCES

https://www.youtube.com/shorts/LZvMaApFwWQ

https://www.youtube.com/watch?v=psZZB96vRXw

https://www.youtube.com/shorts/OkZgY_RemiA

Analysis

INPUT REQUIREMENTS

Sumobot; A **Sumobot** is a small autonomous robot designed to compete in a Sumo-style match, where the goal is to push the opponent out of a ring (dohyo).

Key Features:

- **Autonomous operation** (no remote control).
- Uses **infrared or ultrasonic sensors** to detect the edge of the ring and opponents.
- Usually built with **powerful motors** for pushing.
- Has a **low, wide frame** for stability and to avoid flipping.

Objectives:

- Stay inside the ring.
- Detect and push the opponent out of the ring.
- Avoid self-elimination.

Programming Focus:

- Obstacle detection.
- Line detection (to avoid going out of the ring).
- Attack and defense strategies.

A **Hockeybot** is a robot designed to play a robotic version of hockey, either autonomously or via remote control, pushing a puck into the opponent's goal.

Key Features:

- Can be **autonomous or manually controlled**.
- Equipped with **puck-detecting sensors** (e.g., color or IR sensors).
- May use a **kicker or striker mechanism**.
- Uses wheels for faster movement and direction control.

Objectives:

- Detect and follow the puck.
- Navigate the field.
- Score goals while defending your own.

Programming Focus:

- Object (puck) tracking.
- Motion planning and strategy.
- Offensive and defensive behavior.

Comparison Table

Feature	**Sumobot**	**Hockeybot**
Goal	Push opponent out of ring	Score goals with puck
Control	Fully autonomous	Autonomous or remote-controlled
Sensors	Line, distance, IR	IR, color, camera (optional)

SUMOBOT AND HOCKEYBOT

Feature	Sumobot	Hockeybot
Mobility	Fast, stable, torque-focused	Fast, agile, often omni-directional
Complexity	Moderate	Higher (esp. with vision or AI)
Competition Type	1v1 or small brackets	Team-based or 1v1

OUTPUT REQUIREMENTS

The **output requirements** of a **Sumobot** and **Hockeybot** are the specifications related to how the robot performs its tasks. These include its **actuators**, movement behavior, sensors' reactions, and other response mechanisms. Here's a breakdown for each:

Sumobot Output

A **Sumobot** is a type of robot designed for sumo-style competitions, where it tries to push the opponent out of a ring.

1. Motion/Actuation

- Must drive forward, backward, and turn (left/right) precisely.
- Quick and responsive movement to avoid being pushed.
- High-torque motors to push opponents.

2. Motor Control

- Motors must respond to sensor inputs (e.g., line sensors or distance sensors).
- Controlled speed for attack or retreat.
- Sudden bursts for pushing actions.

3. Sensors Feedback Actions

- **IR or Ultrasonic Sensors**: Output must include motor direction changes when detecting an opponent.
- **Line Sensors**: Robot must stop, back up, or turn when detecting the ring boundary (white edge).

A **Hockeybot** is designed to play a robotic version of hockey chasing a puck and trying to shoot it into a goal.

1. Motion/Actuation

- Must be able to move in all directions (forward, backward, turn).
- Smooth and controlled movement to approach the puck.

2. Motor Control

- Motors must adjust based on puck position.
- Can include kicking/shooting mechanisms (solenoid, servo, or motor-based striker).

3. Sensors Feedback Actions

- **IR or Camera (Puck Detection)**: Output includes motor direction changes to follow the puck.
- **Goal Detection**: After scoring, robot stops or changes strategy.

4. Puck Handling Mechanism

- Mechanical striker or servo motor to shoot the puck.

Summary Table

Feature	Sumobot	Hockeybot
Movement	Push, evade, spin	Track puck, shoot, reposition
Sensors	IR/Ultrasonic, Line sensors	IR/Camera for puck tracking
Actuators	High-torque motors	Motors + Puck kicker (servo/solenoid)
Special Output	Push action, boundary avoidance	Puck shooting mechanism

NECESSARY FORMULA AND THEIR DESCRIPTION

N/a

Design

User Interface Design

In robotics competitions like **Sumobot** and **Hockeybot**, the **user interface design** plays a crucial role in enhancing control, monitoring, and debugging. Here's a breakdown of how **UI design applies to both** types of bots:

1. Sumobot UI Design

Sumobot is an autonomous robot designed to push its opponent out of a ring. It usually runs without human intervention during matches, but UI is still important in the following contexts:

Setup and Configuration UI

- **Purpose:** Configure sensors, test motors, calibrate movement.
- **Design Features:**
    - Sensor status indicators (IR, ultrasonic, line sensors).
    - Motor test buttons (forward, backward, turn).
    - PID tuning sliders (for speed and turning behavior).
    - Battery level indicator.

Pre-Match Control Panel (Optional)

- Select strategy mode (aggressive, defensive).
- Start/Stop system test.
- Save/load configuration profiles.

Post-Match Debugging UI

- Log viewer (collision logs, sensor triggers).
- Replay path or sensor map of the last match.
- Error reports or fault codes.

Tools Used:

- PC/Mobile App (Python GUI, Processing, web-based).
- Simple OLED or LCD displays onboard the robot.
- Serial monitor (via Arduino IDE or custom dashboard).

2. Hockeybot UI Design

Hockeybot involves more real-time control, so the UI is more **interactive and dynamic**, often involving human control (e.g., joystick, gamepad, remote app).

Real-Time Control Interface

- **Purpose:** Allow manual or semi-automatic control.
- **Design Features:**
    - Joystick/gamepad mapping display.
    - Live camera feed (if FPV or visual aid is used).
    - Motor power and direction indicators.
    - Goal counter or puck possession status.

Control Modes:

- Manual (via Bluetooth, WiFi, RF controller).
- Autonomous (UI to toggle modes).
- Hybrid (assisted targeting or puck tracking).

Performance Metrics UI

- Speed, battery level, and temperature readings.
- Match timer or countdown.
- Real-time score update.

Tools Used:

- Android app (MIT App Inventor, Flutter, or custom).
- PC dashboard (Python, C#, Unity-based).
- Web UI (HTML/JS with ESP32 or Raspberry Pi).

Summary Comparison Table

Feature/Aspect	**Sumobot UI**	**Hockeybot UI**
Control Type	Mostly autonomous	Manual / hybrid
Main UI Use	Configuration, debugging	Real-time control, gameplay stats
Display	LCD/OLED or PC serial monitor	Phone/tablet/PC, gamepad display
Input	Buttons, sliders, mode selectors	Joystick, touch screen, buttons
Feedback	Logs, LED indicators	Live feedback, HUD, audio cues

Features of the Project

Here are the **user interface features** for both **Sumobot** and **Hockeybot**, categorized by function:

Configuration Features

1. **Sensor Calibration Panel**
    - IR/ultrasonic sensor test.
    - Threshold adjustment sliders.
2. **Motor Control Test**
    - Forward/backward/turn test buttons.
    - Speed control sliders.
3. **PID Tuning Interface**

- Adjust proportional, integral, and derivative values.

4. **Mode Selection**
    - Select from different fight strategies (e.g., defensive, aggressive).
5. **Start/Stop Control**
    - Manual override to begin or stop the bot before match.

Monitoring & Feedback

6. **Sensor Readout Display**
    - Live distance or line sensor values.
7. **Battery Level Indicator**
    - Real-time voltage or battery percentage.
8. **Status Indicators**
    - LEDs or screen indicators for "Ready", "Fighting", "Error", etc.
9. **Event Logs**
    - Display log of movements or collision detections.

Post-Match Analysis

10. **Match Replay (Optional)**
    - Show a path or movement map.
11. **Error Reports**
    - Fault detection and suggestions (e.g., “Right motor unresponsive”).

Hockeybot – User Interface Features

Control Features

1. **Joystick/Gamepad Support**
    - Analog stick or D-pad mapping.
2. **Touchscreen Controls (if on mobile)**
    - On-screen buttons for movement/shooting.
3. **Mode Switch**
    - Toggle between Manual / Assisted / Auto modes.

Visual Feedback

4. **Live Camera Feed (FPV)**
    - Real-time video stream for aiming/navigation.
5. **Puck Tracker Display**
    - Show puck position if vision system is used.

Game Status Monitoring

6. **Scoreboard**
    - Track goals for both teams.
7. **Match Timer**
    - Countdown or stopwatch for game duration.
8. **Power Indicators**
    - Battery voltage, motor status, or overheating alerts.

Audio/Visual Alerts

9. Beep/Warn for Low Battery or Goal Events
    - Sound notifications or visual flash indicators.

Settings and Profiles

10. Save/Load Configurations
    - Store preferred control sensitivity, speed settings, etc.
11. User Profiles (Optional)
    - Different control layouts or modes per player.

Summary Table of Key Features

Feature Category	Sumobot Features	Hockeybot Features
Control	Mode selector, test motors	Joystick/gamepad, touchscreen controls
Sensor Data	Live IR/ultrasonic values	Camera feed, puck tracker
Feedback	Logs, battery, error reports	Scoreboard, timer, battery, alerts
Settings	PID tuning, strategy modes, config profiles	Control sensitivity, mode switch
Visual Display	LCD/PC dashboard	Mobile/PC app with dynamic HUD
Alerts	Error messages, LEDs	Sound/visual alerts for goals/battery

Security and Audit Considerations

For both Sumobot and Hockeybot, preventing unauthorized access is essential. Access to the robot's configuration interface should be protected with a PIN code or login system, especially when updating firmware or adjusting advanced settings. Physical ports like USB or debug pins should be locked or disabled after initial setup to prevent tampering.

In the case of wireless communication (common with Hockeybots), Bluetooth or Wi-Fi connections must be secured using encryption and secure pairing methods. Communication between controllers and the bot should use encrypted protocols such as TLS or HTTPS to prevent data interception or control hijacking.

Firmware integrity is another key consideration. Firmware updates should be restricted to authorized users, and update processes should include checksum verification or encryption. For additional protection, code signing methods and write-protection features (such as fusing programming pins) can be used to block unauthorized code uploads.

To prevent potential exploits or malfunctions, input rate-limiting should be implemented so that the bot doesn't react to spammed or conflicting commands. Sensors—such as infrared or ultrasonic modules should be shielded and validated to avoid spoofing or interference from external sources like sunlight or IR jammers. Additionally, both types of bots should have built-in failsafe mechanisms that automatically stop motors if invalid data is received or communication is lost.

Audit Considerations

From an audit perspective, it’s important to maintain logs of user actions and system behavior. For Sumobots, which are typically autonomous, logging match start and end times, sensor triggers, and motor events helps in post-match analysis and debugging. Hockeybots, which are often human-controlled, benefit from activity logs that capture joystick movements, scoring events, and timing data.

Both bots should log critical system events such as low battery warnings, motor malfunctions, or sensor errors. These logs can be output through a serial monitor, stored on an SD card, or displayed on an onboard screen.

Changes to robot settings such as PID values, control sensitivity, or strategy modes—should also be tracked, especially in team-based or competition settings where multiple users may interact with the same robot. Finally, results of sensor calibration and motor tests should be recorded and time-stamped to ensure accountability and traceability during robot preparation.

IMPLEMENTATION

- Url of the saved source code:

Software Package Files and Their Descriptive Information

The software package will include:

Here's a breakdown of **Software Package Files and Their Descriptive Information** for both **Sumobot** and **Hockeybot** projects. These files are commonly used in robotics projects involving platforms like **Arduino**, **Raspberry Pi**, or **ESP32**, and they support everything from control logic to user interfaces.

File Name	Description
main.ino / sumobot.ino	The main Arduino sketch file containing robot control logic (movement, sensors).
hockeybot.ino	Main control code for Hockeybot, including motor control and input handling.
config.h	Header file storing constants (e.g., pin mappings, sensor thresholds).
motorControl.cpp/h	Custom motor driver file, used to abstract motor logic into reusable functions.
sensorManager.cpp/h	Manages all sensor inputs like IR, line sensors, or ultrasonic.
bluetoothControl.cpp/h	Handles Bluetooth communication for controller or mobile app integration.
ui_display.cpp/h	Optional file for managing UI components (LCD/OLED).

File Name	Description
PIDControl.cpp/h	PID control algorithm for smooth motor control and turning (especially in Sumobot).
wifi_server.ino	For Hockeybot with Wi-Fi—serves a web-based control dashboard.
app.apk / mobile_ui.aia	Android control app for Hockeybot, created via MIT App Inventor or Flutter.
README.md	Describes the project, setup instructions, and usage guidelines.
LICENSE	Software license file (MIT, GPL, etc.) stating usage rights.
package.json	For web/mobile dashboards (Node.js), contains dependencies and metadata.
data_log.csv	Optional file storing match or test logs for audits or debugging.

FUNCTION DECLARTIONS AND THEIR DESCRIPTITVE PURPOSES

1. .ino files (e.g., main.ino, sumobot.ino)

These are the main Arduino program files that define the behavior of the robot. They include setup routines, loop functions, and calls to sensors and motors.

2. .cpp and .h files (e.g., motorControl.cpp)

These are source and header files for modular code. They separate different components like motor logic, sensor management, or communication into reusable modules. This improves code organization and maintainability.

3. config.h

Stores all customizable values such as sensor thresholds, robot speed, PID constants, and pin configurations. It helps users tune the robot without digging into the main logic.

4. PIDControl.cpp/h

Implements PID (Proportional-Integral-Derivative) control algorithms used in precise motor control, especially useful for maintaining direction or balance in autonomous bots.

5. wifi_server.ino or bluetoothControl.cpp

Handles wireless communication with external devices such as smartphones or web apps. Used more in Hockeybot for real-time control.

6. app.apk / mobile_ui.aia

Mobile apps created with MIT App Inventor or other platforms. These provide a graphical interface for controlling the bot via Bluetooth or Wi-Fi.

7. README.md

A markdown documentation file typically found on GitHub. It explains the purpose of the project, how to install it, and how to use it. Great for users and collaborators.

8. LICENSE

Defines the legal terms under which the software can be used, modified, or distributed. Common licenses include MIT, GPL, and Apache.

9. data_log.csv

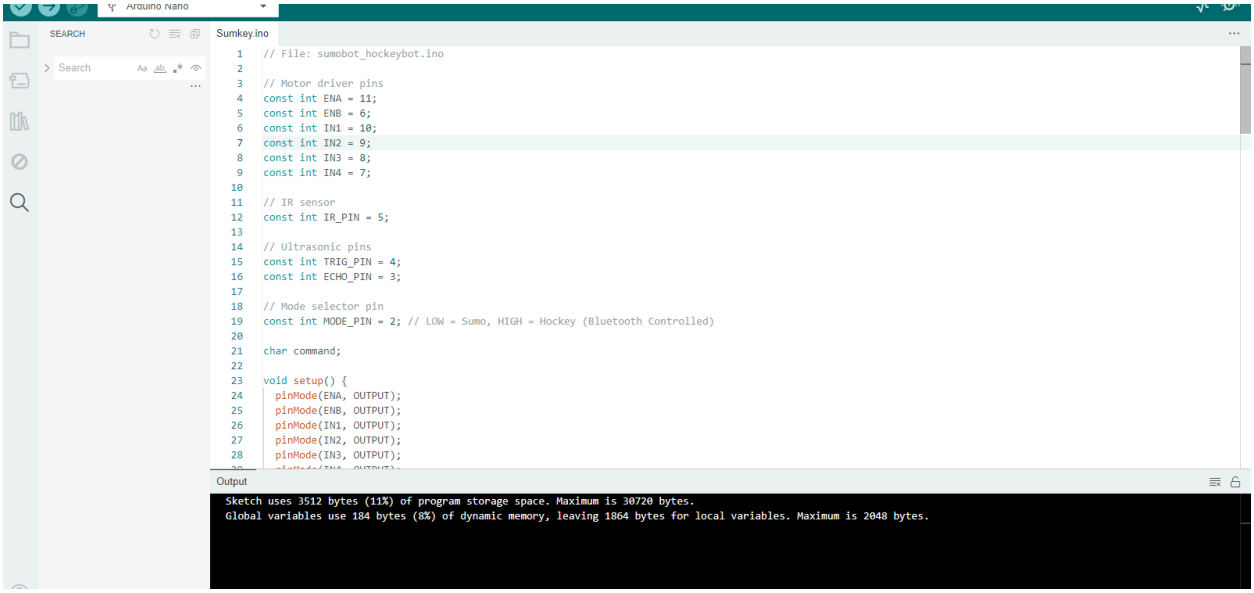
A file where runtime data such as sensor readings, errors, and control events are stored for later analysis. Useful for audits, debugging, or improving performance.

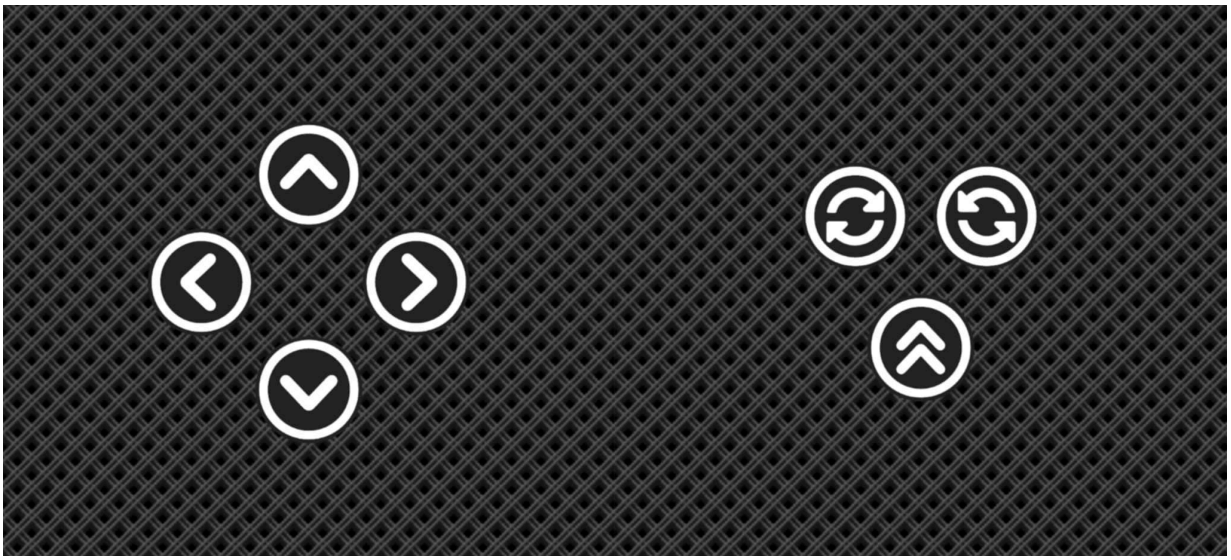
10. package.json

If your project uses Node.js (e.g., for web dashboards), this file lists dependencies, scripts, and metadata for your project.

TESTING AND DEBUGGING

Sample Run





The Team

Names and Tasks

Teves, Jayzee Joel A.

- Project Developer − Overseeing project development
- Writer − Designing the user interface and user experience

SUMOBOT AND HOCKEYBOT

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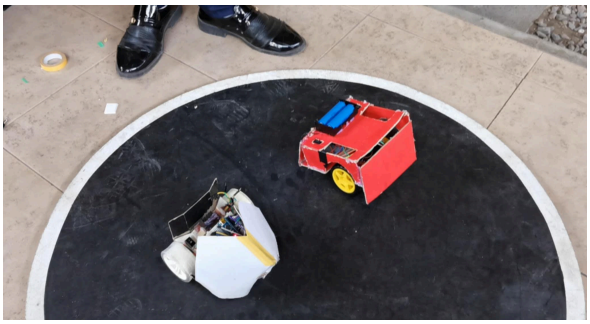
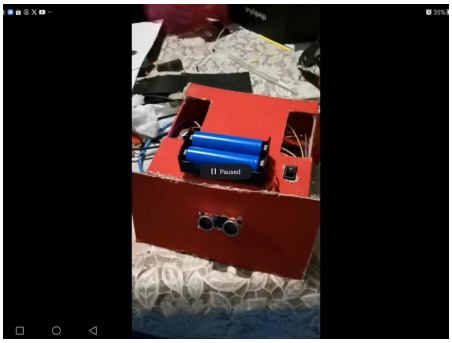
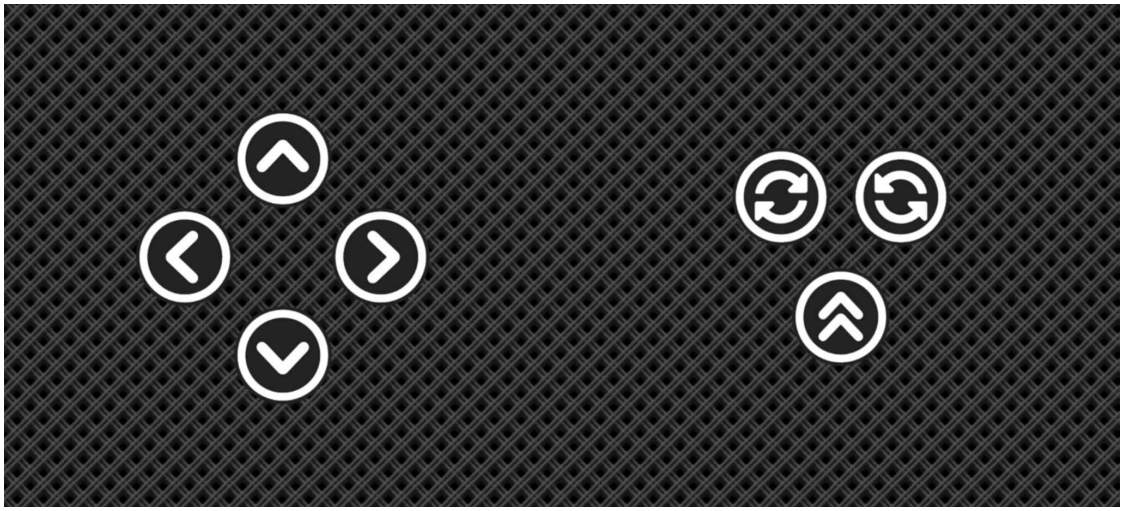
S.Y. 2016 – 2022

ELEMENTARY: TAGBILARAN GRACE CHRISTIAN SCHOOL
S.Y. 2010 – 2016

Documentation







FUTURE DEVELOPMENT

Creating a **Sumobot** or **Hockeybot** can be a rewarding project that blends mechanical design, electronics, and programming. For future development of such a project, here's a roadmap focusing on

progressive enhancements and **advanced features** to transition from a basic bot to a more intelligent and competitive one.

The development of a Sumobot or Hockeybot offers an exciting blend of mechanical engineering, electronics, and artificial intelligence. As robotics technology advances, the future of these bots is marked by increasing autonomy, adaptability, and competitiveness. This essay outlines the key areas of future development that can transform a basic robot into a high-performance, competition-ready machine.

One of the primary areas of advancement lies in hardware design. Future bots should employ lightweight but durable materials such as aluminum or carbon fiber to enhance speed and agility. Modular construction will also allow for easy upgrades and maintenance. High-torque motors with encoders will provide precise movement control, while smart battery management systems will ensure consistent power delivery and prevent system failures during critical moments.

PROJECT COST

This project cost was as follow;

1. Arduino (Nano)	- 218.00
2.Ultrasonic	- 140. 00
3. Lead (3m)	- 50. 00
4. IR sensor	- 50.00
5. Bluetooth module	- 238.00
6. Wirings	- 50.00

7. Motor driver	- 60.00
8. Wheels and Gear	- 504.00
9. Battery	- 52.00
10. Battery holder	- 50.00
11. Chasis	- 50.00
12. Breadboard	- 108.00
13. Switch	- 30.00

Glossary

Autonomous - responding, reacting, or developing independently of the whole.

Robotics - Robotics is a branch of engineering and computer science that involves the conception, design, manufacture and operation of robots. The objective of the robotics field is to create intelligent machines that can assist humans in a variety of ways.

Electronics - is the branch of science that deals with the study of flow and control of electrons (*electricity*) and the study of their behavior and effects in vacuums, gases, and semiconductors, and with devices using such electrons.

Hockey - is a term used to denote a family of various types of both summer and winter team sports which originated on either an outdoor field, sheet of ice, or dry floor such as in a gymnasium. While these sports vary in specific rules, numbers of players, apparel, and playing surface, they share broad characteristics of two opposing teams using sticks to propel a ball or disk into a goal.

Hockeybot- In the realm of robotics, where innovation meets excitement, robo-hockey competitions have emerged as a captivating spectacle of technology, strategy, and teamwork.

Programming - is, quite literally, all around us. From the take-out we order, to the movies we stream, code enables everyday actions in our lives. Tech companies are no longer recognizable as just software companies — instead, they bring food to our door, help us get a taxi, influence outcomes in presidential elections, or act as a personal trainer.

Sumobot -is an engineering and robotics competition in which two robots attempt to push each other out of a circular arena, in a similar fashion to the sport of sumo. The robots used in this competition are called "sumo robots", "sumobots" or simply "sumos.

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