Robotics Club Themes

Theme	Mentors
Micro mouse	Vishnu, Skandha
Warehouse bot	Skandha, Rahul
Bomb Diffuser	kaanan, Rahul
Gesture Controller bot	Vikranth, Ananya
Robo Soccer(Automatic)	Extra

Theme Description

Micro Mouse(Maze solving bot) :

Overview:

Welcome to "Maze Mastery with Micromice," an engaging guide that invites you to roll up your sleeves and dive into the exciting world of maze-solving bots! Whether you're a curious beginner or a seasoned tinkerer, this interactive journey will empower you to craft a Micromouse using the popular ESP and Arduino microcontroller boards. Let's unlock the secrets of autonomous navigation together!

Ideating on Micromouse🤔

Let's Begin🙂:

1. **Meet the Micromouse:**

Let's start with the basics! What is a Micromouse, and why are these little bots so fascinating?

Explore the evolution of Micromouse technology and its real-world applications

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2. **Choosing Your Tech Toolbox:**

Time to decide! Arduino or ESP**(or any other microcontroller board you are comfortable with)**? Delve into the features of each microcontroller and decide which one suits your Micromouse vision.

Discuss the essential hardware components, making it a personalized choice based on your preferences.

3. **Coding Adventures:**

Jump into the world of programming with easy-to-follow examples.

Code basic movements, integrate sensors, and witness your Micromouse make its first steps autonomously.

4. **Sensor Shenanigans:**

Sensors, our Micro Mouse's eyes and ears! Explore the variety of sensors, from infrared to ultrasonic, and learn how to integrate them seamlessly.

Get hands-on with calibration techniques to ensure your Micromouse can see and sense accurately.

Once everything is done build a maze for your Micromouse and let it solve by itself.😁

Bonus points will be provided based on the time taken by the bot to complete the maze.

Detailed description about the theme and judging criteria will be provided once the competition starts.

Warehouse Bot :

Overview:

Ever wondered how a modern day warehouse functions 🤔. Big warehouses maintained by Ecommerce companies like amazon, flipkart etc… will have lots of packages and parcels to handle. To cater to this problem and reduce human labor various robots are used to carry and navigate these packages from one place to another inside the warehouse. This technology enhances inventory accuracy, minimizes errors, and accelerates order fulfillment, ultimately revolutionizing the modern warehouse ecosystem.

Now that we are familiar with the novelty behind this theme, let's break this into small tasks to accomplish the end goal

1. **Arena** : Create an arena or a map that portrays a warehouse which includes following elements :
   - Start point
   - End point
   - Obstacles
   - Pick up point
   - Drop off point

Once this is done we can use image processing to recognise various elements and communicate the same to the robot. This also involves path planning to identify the shortest path possible.

2. **Electronics involved** : Ideate on the sensors and actuators used to navigate through the arena.
   Note : You are totally free to use any sensor that serves the purpose.

3. **Chassis design** : Design a robust chassis that could navigate swiftly and is capable of carrying packages. To indicate the pick up and drop off of various packages, an RGB led can be used.

   Bonus points : MDF people are encouraged to design a CAD model of pick and place arm used for picking the packages.

Detailed description about the theme and judging criteria will be provided once the competition starts.

Bomb Diffuser

Overview:

Welcome to the cutting-edge world of Robotic Defence Systems! Let's embark on a thrilling journey to design a state-of-the-art Bomb Defusal Robot that can tackle any challenge thrown its way.🫡

Now that we are familiar with the novelty behind this theme, let's break this into small tasks to accomplish the end goal.🤔

1. **Traverse Tough Terrains:**
   a. Imagine a chassis built like a high-tech tank, equipped with rugged wheels designed for optimal traction.
   b. Add a suspension system for smooth navigation over rocky surfaces and stairs, ensuring the robot conquers every obstacle with ease.
2. **The Disposal Tool:**
   a. Envision a versatile robotic arm armed with precision tools to handle bomb defusal like a pro.
   b. Implement a cutting-edge mechanism with multiple attachments for different scenarios, ensuring the robot can safely neutralize any threat.
3. **Communication:**
   a. Picture a remote operator with a high-tech control station, seamlessly guiding the robot through the most perilous situations.
   b. Incorporate a real-time video feed from the robot's perspective, allowing the operator to make informed decisions with confidence.
4. **Electronics:**

a. Dive into the heart of the robot's intelligence, featuring cutting-edge microcontroller boards orchestrating its every move.
b. Integrate motor drivers for the Drive Train and Arm, ensuring precise and responsive control during critical operations.

This Bomb Defusal Robot isn't just a machine; it's a futuristic marvel designed to safeguard lives and navigate the most challenging scenarios with finesse.

Bonus points are provided for design and ergonomics of the robot.

Detailed description about the theme and judging criteria will be provided once the competition starts

Gesture Controlled bot

Overview:

Step into the future of robotics with Gesture-Controlled Bot, a revolutionary creation designed for intuitive and hands-free interaction. This bot utilizes advanced gesture recognition technology, enabling users to control its movements effortlessly through a series of predefined hand gestures.

Gesture-controlled bots for cars are innovative systems that allow users to control the movement of a car using hand sign gestures. This technology leverages computer vision and machine learning techniques to interpret hand gestures and translate them into commands for the car. This overview provides a high-level understanding of the components and functionalities of a gesture-controlled bot for a car :

1. **Gesture Recognition System :** Implement a gesture recognition system using sensors and cameras. This system should be capable of interpreting a wide range of gestures, enabling control.The bot should understand and respond promptly to the operator's commands.
2. **Electronics :** Ideal microcontroller and sensors for implementing the functionality of the bot.
   (Feel free to use any hardware to serve the purpose)
3. **Learnings :** Hardware, Wireless communication, OpenCV, Python Programming, Chassis Design
4. **Communication :** The gestures made by the operator must be interpreted, and the movement must be communicated to the bot using any suitable strategies (like sockets)

Bonus points are provided for any extra features implemented in the robot.

Detailed description about the theme and judging criteria will be provided once the competition starts.