**22AIE442 – Robotic Operating System & Robot Simulation**

**Project Abstract**

**Group : 14**

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**Spidey: Your interactive, autonomous assistant :**

The "Spidey" project introduces a quadruped robot designed as a personal assistant, capable of both autonomous movement and interactive engagement. Spidey is equipped with a language model agent, allowing it to understand and execute user commands, such as navigating a room or performing gestures like waving. Its four-legged design provides stability and flexibility, enabling it to move across different environments with ease.

In addition to physical tasks, Spidey enhances user interaction through its conversational abilities, making it capable of talking back and providing feedback. It also features a display that shows emojis and task status, making the interaction more engaging and dynamic. This combination of autonomy, interactivity, and real-time feedback makes Spidey a versatile tool for both practical and entertainment purposes.

**Purpose:**

Spidey is designed to assist users in everyday tasks, offering interactive responses and performing commands such as navigation, waving, and object manipulation. As a personal assistant, Spidey can not only perform tasks but also "talk back" to users, providing a conversational interface to enhance engagement. This makes it ideal for applications in home automation, or as an entertainment companion.

**Robot Capabilities:**

Spidey can autonomously navigate rooms using an ultrasonic sensor to detect obstacles, adjusting its path accordingly. It can also execute specific commands such as waving or other customized movements. Through the integration of a language model, users can interact with Spidey naturally, issuing commands via spoken or text-based input.

**Interactive Display:**

The LCD screen on Spidey’s back provides an additional layer of interaction, displaying emojis, task updates like "Yay! I completed the task!" or "Oops! I couldn't pick up the object," engage the user.

**Hardware and Components:**

* **Servo motors:** Control movement and gestures such as waving.
* **Camera:** Enables vision-based tasks and user interaction.
* **Ultrasonic proximity sensors:** Detect obstacles and facilitate autonomous navigation.
* **Raspberry Pi or ESP:** Acts as the central processing unit.
* **LCD screen:** Displays feedback, emojis, and interactive elements.
* **Batteries:** Provide power for mobile operations.
* **3D-printed legs:** Enable versatile mobility and flexibility.

**Conclusion:**

Spidey offers an interactive robotic platform that can function as a personal assistant with autonomous navigation and conversational abilities. With its ability to execute tasks, communicate feedback, and engage users in interactive experiences, Spidey represents an innovative tool in the field of robotics for personal assistance and entertainment.