

**COLLAGE CODE : 3126**   
**COLLAGE NAME : Thangavelu engineering collage**   
**DEPARTMENT : Bech.IT**   
STUDENT NM-ID **ecb4ddba7ad63a494e8455107698c6d9**

**ROLL NO : 312623205018**   
**DATE : 17/05/2025**   
**TECHNOLOGY PROJECT NAME : AUTONOMOUS VEHICLES AND ROBOTICS**   
**SUBMITTED BY : K.MARIYAPPAN**

**Abstract**   
**This project explores the integration of autonomous vehicle technologies with robotic systems to develop a smart, self-navigating robotic vehicle. The aim is to build a prototype that can autonomously navigate an environment using sensors, computer vision, and path-planning algorithms. It is designed to demonstrate real-time decision-making, obstacle avoidance, and environmental interaction**

**2. Project Demonstration (Initial)**   
• **Goal:**

 **To present a working prototype showcasing core functionalities.**

**Components Shown:**

 **Autonomous navigation using ultrasonic and IR sensors.**

 **Real-time object detection with a camera and AI processing.** ❖**Basic route planning and obstacle avoidance.**

**3. Overview**   
**The system combines robotics (mobility, sensors) with autonomous driving algorithms**   
**(path planning, decision-making, control). The vehicle uses microcontrollers (e.g., Raspberry Pi/Arduino), computer vision, and machine learning models to navigate autonomously.**

**4. Demonstration Details**   
**Hardware:**   
  **Chassis, wheels, motors, Raspberry Pi, Arduino, Li-ion batteries,**  **ultrasonic sensors, camera module.**

**Software:**

 **Python, Opens, Tensor Flow Lute for object detection, ROS (optional).**

**Tasks Demonstrated:**   
  **Line following, object detection, obstacle avoidance, path**  **recalculation.**

**5. Outcon**   
 **Successfully created a prototype that can detect and avoid obstacles.**

**Demonstrated autonomous pathfinding in a controlled environment.** **Integrated basic AI for object recognition (e.g., pedestrians, stop signs). 6.**

**Feedback and Final Adjustment**   
**Feedback:**   
 **Received from mentors and peers highlighting:**   
 **Improvement needed in edge detection and low-light performance.**

**Enhancing real-time data processing speed.**

**Adjustments Made:**   
 **Upgraded camera and lighting support.**

**Optimized the AI model and control algorithm for better response time.**

**7. Final Overview**   
**A compact, self-driving robotic vehicle capable of navigating autonomously in a mapped area, equipped with real-time obstacle detection, simple AI decision-making, and basic voice command recognition**   
**8. Project Steps**

**1.**  **Research and planning**

**2.**  **Hardware acquisition and setup.**

**3.**  **Sensor integration and calibration.**

**4.**  **Navigation and path planning algorithm development.**

**5.**  **AI integration for object recognition.**

**6.**  **Testing and debugging.**

**7.**  **Final demonstration and documentation.**

**9. Final Project Report Submission**

 **Full technical documentation submitted including:**

❖

 **Design schematics**   
 **Codebase and algorithm explanations**

 **Testing**

**10. Project Handover and Future Works**

**Handover Includes:**

 **Source code and documentation**

 **Hardware assembly guide**

 **Usage instructions Future Scope:**

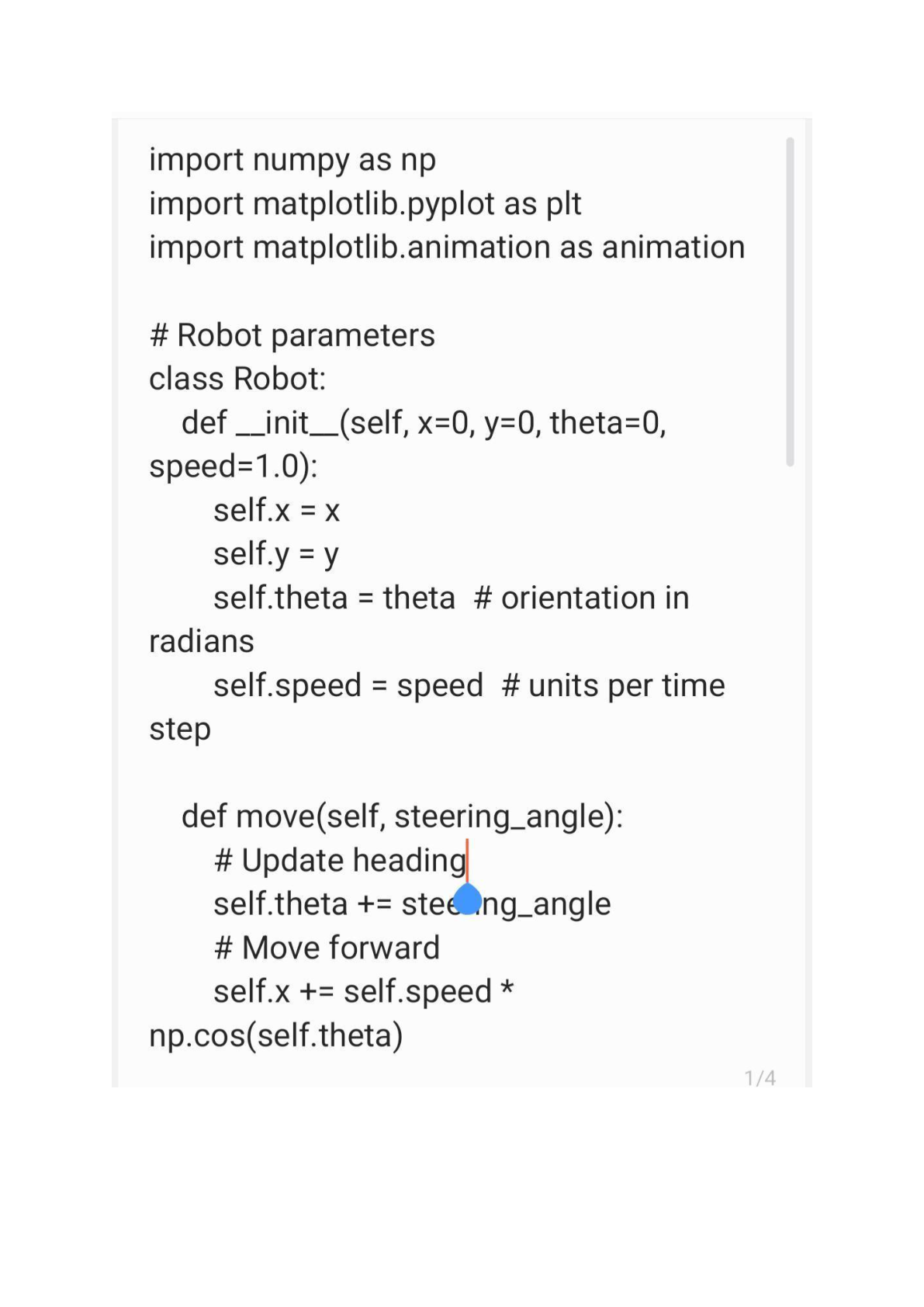
 **Integration with GPS for outdoor navigation.**

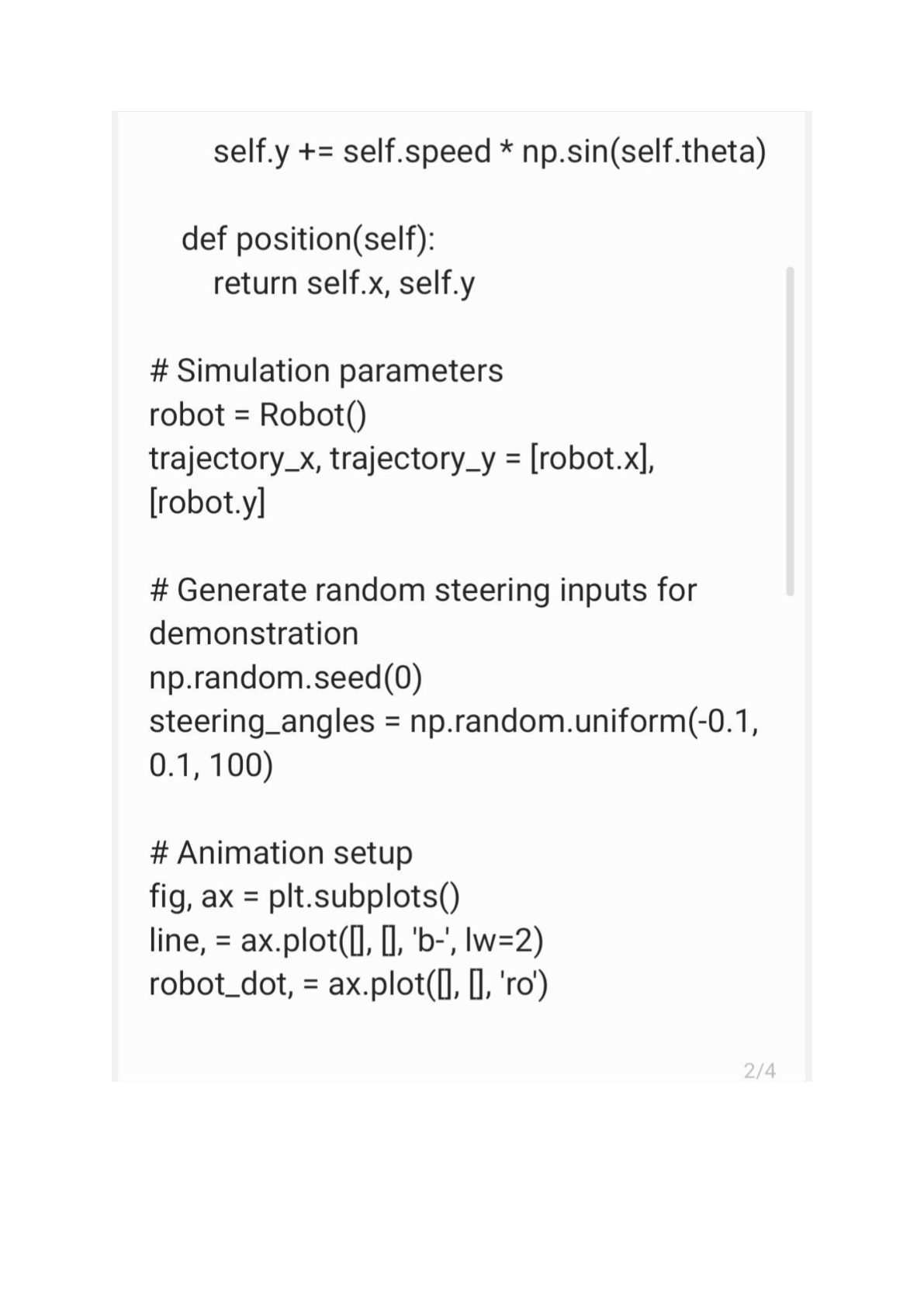
 **Use of LIDAR for advanced mapping.**

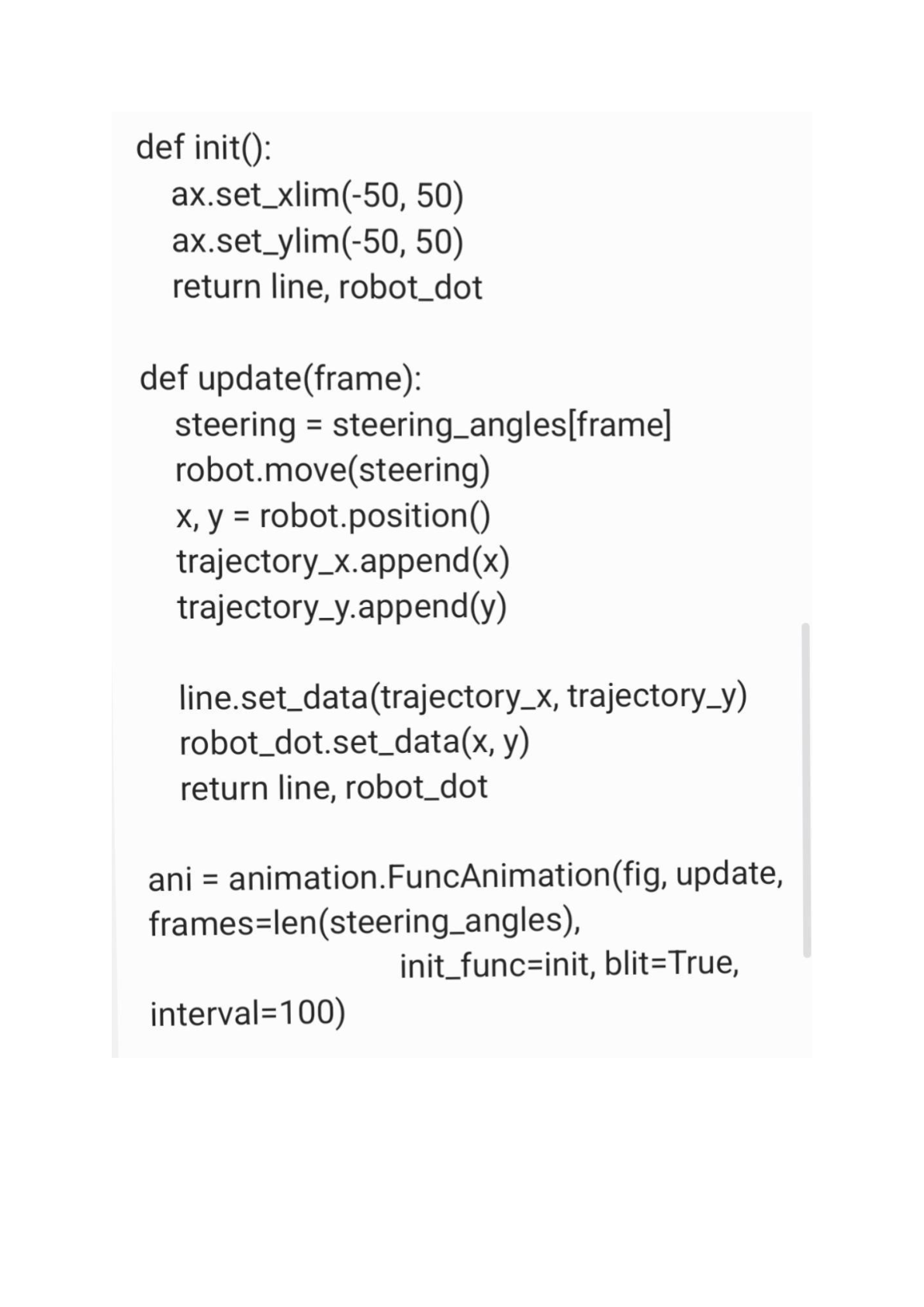
 **Deep learning for improved object classification.** ❖**Cloud**

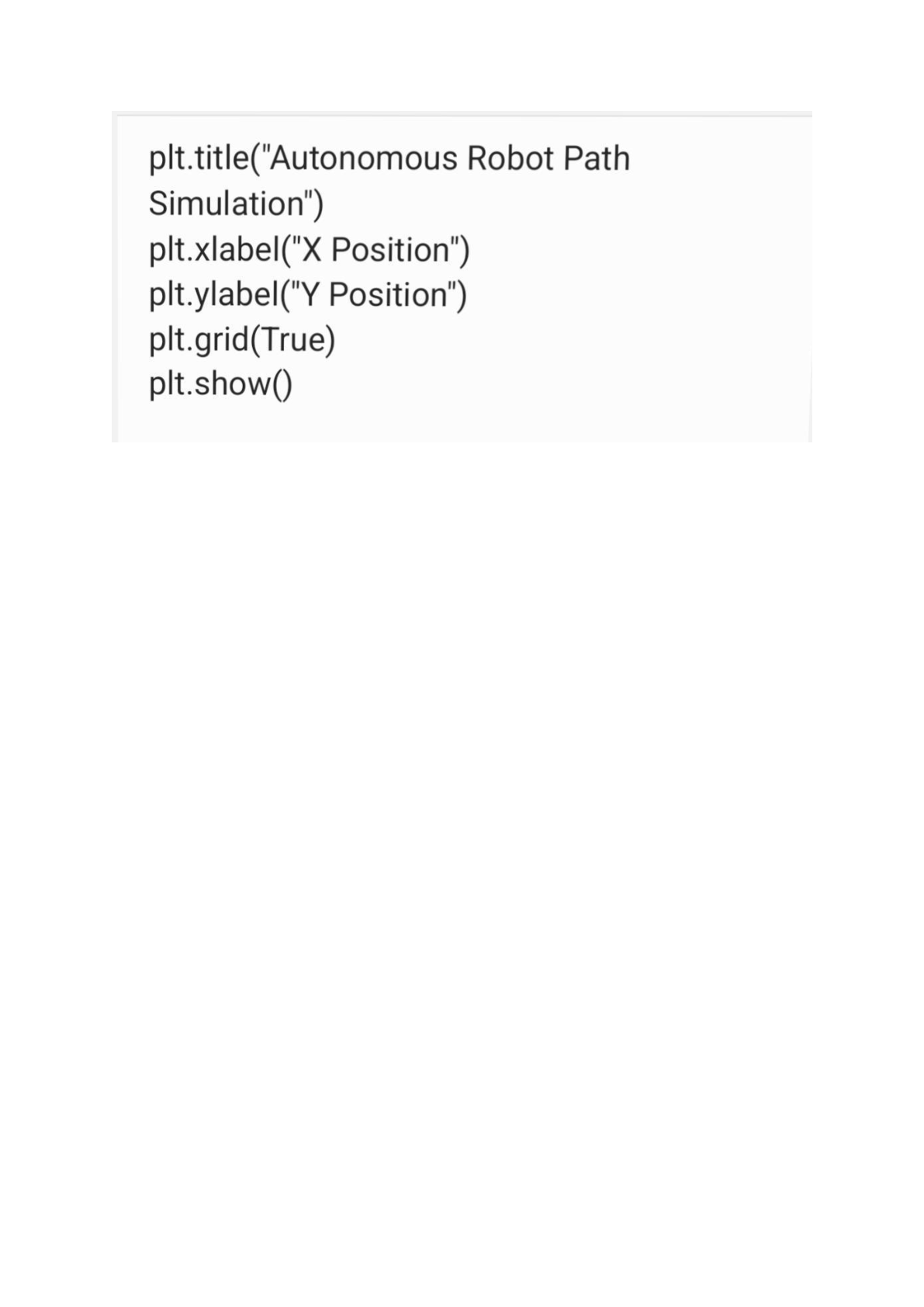
**connectivity for real-time monitoring.**

**Program :**









**Output :**

