Bytexl's Guided Project: Drone-based Garbage Monitoring System for Swachh Bharat

Project Overview:

The project, "Drone-based Garbage Monitoring System for Swachh Bharat," aims to support India's clean-up initiative by automating street cleanliness monitoring using drone technology and AI.

Prerequisites

- **Knowledge in Drone Mechanics:** Understanding drone operation, GPS, and camera settings.
- **Basic Machine Learning & Deep Learning Skills:** Familiarity with image processing and machine learning & Deep Learning, preferably with TensorFlow.
- **Python Programming:** Fundamental coding skills in Python, with experience in libraries like TensorFlow.

Learning Outcomes:

1. **Drone Navigation and Control:** You will learn to program drones for autonomous navigation using waypoints and GPS.
2. **Image Processing and Analysis:** Understanding how to process and analyze images using ML/ DL to differentiate between clean and unclean areas.
3. **Project Deployment:** Deploying on platforms like Docker and Google Colab for testing and scalability.

Skills Practiced:

- **Autonomous Drone Navigation**
- **Machine Learning with TensorFlow**
- **Data Collection and Cleaning**
- **Analysis and Reporting with Python**

Course Structure:

1. Introduction and Course Overview

- Learn about the purpose of the project and the technology stack involved.
- Readings on Swachh Bharat's objectives, drone application, and machine learning basics.

2. Project Structure

- **Task 1: Drone Setup and Navigation**
  - Configure drone waypoints and install navigation software.
- **Task 2: Image Data Collection**
  - Capture images using drones at specified locations.
- **Task 3: Data Processing and Analysis**
  - Process and analyze collected images to detect garbage and potholes.

- **Task 4: Notification System Setup**
  - Implement a notification system to alert the concerned authority based on analysis results.

3. Execution on Learning Platform

- Practice on your desktop or laptop for practical coding tasks.
- Use Google Colab for machine learning tasks and Docker for deployment simulations.

Educator Instructions:

1. **Use Case Creation:** Develop realistic scenarios for students to practice, such as monitoring specific urban zones.
2. **Instructions for Students:**
   - Welcome message and course objectives.
   - Guide students through drone setup, testing, and deployment.
   - Help students interpret analysis results and create reports.

Objectives Summary:

By the end of the course, students will be able to deploy drones autonomously, capture and process images for real-time analysis, and set up notifications for smart city applications.