**Abstract:**

The project "Smart City Waste Management Using Text Data and Images" aims to improve urban waste management by using advanced techniques in machine learning and computer vision. It focuses on classifying waste using textual data and images to automate and optimize waste collection and sorting processes. This system will reduce human errors in waste management, increase recycling rates, and promote environmental sustainability in smart cities.

**Business Need:**

1. **Improved Efficiency**: Current waste management systems are often slow and prone to errors, which can lead to delays and increased operational costs.
2. **Enhanced Accuracy**: Automating the sorting process with image and text data classification will reduce contamination and improve recycling, making waste management more efficient.
3. **Sustainable Practices**: By better managing waste, this project supports environmental goals such as reducing landfill use and promoting recycling, contributing to a cleaner and greener urban environment.

**Problem Statement:**

1. **Inefficient Waste Sorting**: Manual sorting processes are slow and error-prone, leading to contamination and reduced recycling efficiency.
2. **Lack of Automation**: There is a need for an automated system to handle waste classification, which would improve accuracy and efficiency in waste management processes.

**8-Week Gantt Chart Breakdown (Week 1 to Week 8):**

**Week 1: Project Setup and Planning**

* **Task 1**: Finalize project goals and objectives.
* **Task 2**: Set up development environment.
* **Task 3**: Prepare project documentation.

**Week 2: Data Collection and Initial Preprocessing**

* **Task 1**: Collect and organize text data from sensors and databases.
* **Task 2**: Set up data storage systems.
* **Task 3**: Begin data augmentation and preprocessing for images.

**Week 3: Model Development - Text Classification**

* **Task 1**: Research and select NLP models (LSTM, BERT).
* **Task 2**: Implement the text classification model architecture.
* **Task 3**: Train and validate the model on a subset of the data.

**Week 4: Model Development - Image Classification**

* **Task 1**: Research and select image classification models (e.g., YOLO, CNNs).
* **Task 2**: Set up the image classifier architecture.
* **Task 3**: Train and validate the model on sample images.

**Week 5: Integration of Text and Image Models**

* **Task 1**: Combine outputs from text and image models.
* **Task 2**: Develop integration strategies for unified predictions.
* **Task 3**: Optimize integration for real-time processing.

**Week 6: Deployment and Testing**

* **Task 1**: Set up cloud-based deployment (e.g., AWS SageMaker).
* **Task 2**: Deploy models and integrate with the dashboard.
* **Task 3**: Conduct end-to-end integration tests.

**Week 7: System Optimization and Fine-tuning**

* **Task 1**: Optimize models for efficiency and accuracy.
* **Task 2**: Implement feedback loop based on initial user interactions.
* **Task 3**: Test the system with real-world data.

**Week 8: Full-Stack Product Completion**

* **Task 1**: Complete all development tasks.
* **Task 2**: Conduct final testing (unit, integration, usability).
* **Task 3**: Complete documentation and prepare for product launch.