**Project Synopsis**

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**Class 12D**

**1. Title**

“Intellisort: Your Smart AI Waste Manager”

**2. Introduction**

Waste management is a crucial aspect of environmental sustainability, yet it can be overwhelming for many individuals. In this project, we aim to simplify and enhance the waste sorting process by creating Intellisort, an AI-powered waste management system. By leveraging the capabilities of Next.js and advanced AI models, our platform helps users identify and categorize waste effortlessly.

**3. Objective**

The primary objective of Intellisort is to develop an AI-powered waste management system that simplifies the process of waste sorting and enhances recycling efforts. By utilizing advanced AI models and a user-friendly interface built with Next.js, Intellisort aims to provide users with accurate identification and categorization of various types of waste through real-time image processing. Additionally, the platform offers practical and actionable recycling guidance, promoting environmentally sustainable practices. Through an engaging and informative user experience, Intellisort seeks to motivate users to participate in proper waste disposal and recycling efforts. Ultimately, the goal is to reduce waste contamination and increase recycling rates, contributing to a cleaner and more sustainable environment.

**4. Methodology**

Our approach will combine advanced image processing and natural language generation (NLG). Here are the key components of our methodology:

* **Image Processing:**

1. Capture and Analyse Images: Use the camera to capture images of waste materials.
2. AI Model Processing: The AI model processes the image to identify the type of waste and its recyclable probability.
3. Provide Waste Details: The system provides detailed information about the waste, including its type, recyclable probability, and material composition.

* **Natural Language Generation (NLG):**

1. Generate Detailed Recycling Instructions: Dynamically generate detailed recycling instructions based on the waste type.
2. Use NLG Templates: Utilize NLG templates for common recycling actions (e.g., separating materials, cleaning items) to ensure clear and actionable guidance for users.

By combining these components, Intellisort aims to make waste management more efficient and user-friendly, helping individuals contribute to a more sustainable environment.

**5. Dataset**

Our dataset will consist of a diverse collection of waste images sourced from various environments, including households, offices, and public spaces. Each entry in the dataset will include information on the type of waste, material composition, and recyclability. We will preprocess the data to ensure it is consistent, accurate, and relevant for training our AI model to effectively identify and categorize waste materials. This comprehensive dataset will be instrumental in enhancing the accuracy and reliability of Intellisort.

**6. Proposed Solution**

* **Image Processing and Classification:**

1. Capture and Analyze Waste Images: Utilize camera inputs to capture images of waste materials and process them using an advanced AI model.
2. Identify and Classify Waste: The AI model will identify and classify the waste, determining its type, material composition, and recyclability.

* **Interactive User Guidance:**

1. Develop User Instructions: Create clear and detailed instructions for users on how to dispose of or recycle waste properly.
2. Provide Real-Time Feedback: Offer real-time feedback and guidance to users, such as confirming the waste type and suggesting the best disposal or recycling methods.
3. Step-by-Step Recycling Process: Guide users through each step of the recycling process, ensuring they understand how to handle each type of waste material effectively.

**7. Expected Outcomes**

**I anticipate the following outcomes:**

* Improved waste sorting accuracy and efficiency.
* Enhanced user understanding and participation in recycling efforts.
* Increased recycling rates and reduced waste contamination.
* Greater user engagement through interactive and informative guidance.
* Positive environmental impact through sustainable waste management practices.

These outcomes will contribute to a more sustainable and eco-friendly community with better waste management practices facilitated by Intellisort.

**8. Timeline**

**Data Collection (Week 1-2):**

* Gather and preprocess waste image data from various sources.

**Model Development (Week 3-4):**

* Implement image processing and natural language generation (NLG) components.

**Training and Testing (Week 5-6):**

* Train the AI model on the dataset.
* Evaluate the model's performance using user feedback and real-world testing.

**Integration and Deployment (Week 7):**

* Integrate the AI model into the Next.js application.
* Deploy the Intellisort platform for user access.

**Documentation and Logbook:**

* Maintain detailed records of progress and results throughout the project.

**9. Resources**

* **Software:** Next.js, TensorFlow, React, Node.js, Google Generative AI API
* **Hardware:** Desktop: CPU-'Ryzen 5 5600x', GPU-'RTX 3080', RAM-'16gb 3200mhz'
* **Support:** Online tutorials, AI community forums, Environmental organizations, School Teacher

**10. Conclusion**

Intellisort aims to revolutionize waste management by combining AI-driven waste identification with interactive guidance. We believe that empowering users with accurate waste sorting information and practical recycling steps contributes to a cleaner environment and more sustainable waste disposal practices. Challenges may include handling diverse waste materials, ensuring the accuracy of AI model predictions, and providing clear and actionable user guidance. Through Intellisort, we hope to foster greater environmental awareness and responsibility among users, ultimately contributing to a more sustainable future.

**11. References**

* Waste management and recycling websites.
* Research papers on AI image processing and natural language generation (NLG).
* Documentation and tutorials on Next.js and TensorFlow.