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VegCheck: A Vegetable Detection Website

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Abstract: ***Food safety and reduction of food wastage are major concerns in today's society. Vegetables, being highly perishable, often deteriorate rapidly, leading to health risks and economic loss. This paper presents VegCheck, an intelligent system designed to detect vegetable freshness and determine whether the vegetable is fit for consumption or has become rotten. The proposed system utilizes image processing and machine learning techniques to analyze visual features such as color, texture, and surface characteristics of vegetables. Based on the freshness classification, the system provides appropriate outputs including nutritional information and healthy recipe suggestions for fresh vegetables, while recommending safe disposal methods for rotten produce. The system aims to assist consumers in making informed food safety decisions, reduce food wastage, and promote sustainable consumption practices. Experimental results demonstrate the effectiveness of VegCheck in accurately classifying vegetable freshness and enhancing user awareness regarding nutrition and waste management.***

Keywords: Vegetable Freshness Detection, Image Processing, Machine Learning, Food Safety, Recipe Recommendation, Nutritional Analysis, Waste Management, Smart Food System.

I. INTRODUCTION

Vegetables are an important part of the human diet as they provide essential nutrients required for good health. However, vegetables are highly perishable and tend to spoil quickly due to improper storage, microbial growth, and environmental conditions. Consumption of spoiled or rotten vegetables can cause serious health issues, while lack of proper freshness detection leads to increased food wastage. To address this problem, this paper proposes VegCheck, an intelligent vegetable freshness detection system using image processing and machine learning techniques. The system identifies whether a vegetable is fresh or rotten and provides appropriate outputs such as nutritional information and recipe suggestions for fresh vegetables, and safe disposal methods for rotten vegetables. The proposed system aims to improve food safety, reduce food wastage, and support sustainable food management.

II. SYSTEM SPECIFICATIONS OF VEGCHECK

1) Input Type – Digital images of vegetables captured using camera or uploaded by user
2) Image Format – JPG / PNG
3) Processing Technique – Image Processing and Machine Learning
4) Classification Output – Fresh or Rotten
5) Supported Vegetables – Tomato, Potato, Onion, Brinjal ,Carrot (can be extended)
6) Platform Used – Web-based system

III. FUNCTIONAL MODULES OF VEGCHECK

Table I. Functional modules of VegCheck system

Module	input	Condition	Output Description
Freshness Detection	Vegetable Image	Image Analysis	Classifies vegetable as fresh or rotten
Nutritional Information	Fresh Vegetable	Fresh detected	Displays nutritional values of the vegetable
Recipe Suggestion	Fresh Vegetable	Fresh Detected	Suggests suitable recipes for consumption
Disposal Guidance	Rotten Vegetable	Rotton Detected	Displays Safe Disposal Methods
User interface	Classification	After Processing	Shows Final decision and guidance

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IV. METHODOLOGY

1) Image Collection: Vegetable images are captured using a camera or uploaded by the user through the web interface.
2) Pre-processing: The collected images are resized, normalized, and noise is removed to improve image quality for analysis.
3) Feature Extraction: Important visual features such as color, texture, and surface patterns are extracted from the processed images.
4) Classification: A machine learning model analyzes the extracted features and classifies the vegetable as Fresh or Rotten.
5) Result Generation: Based on the classification result, the system displays nutritional information and recipe suggestions for fresh vegetables, or disposal methods for rotten vegetables.

V. LITERATURE SURVEY

1) ResearchGate – Proposed a food waste management system focusing on reducing food wastage through technological solutions.
2) IRJMETS (2023) – Presented a smart food waste management system to improve food utilization using digital platforms.
3) IJARCCE (2023) – Developed an intelligent system for food waste detection and management.
4) arXiv (2023) – Proposed a machine learning-based approach for food waste detection and classification.
5) Elsevier (ScienceDirect) – Discussed intelligent food waste management using machine learning techniques.
6) IJRPR – Designed a smart system for automated food waste management.
7) JETNR (2025) – Proposed an automated food waste identification and management system.

VI. PROPOSED SYSTEM

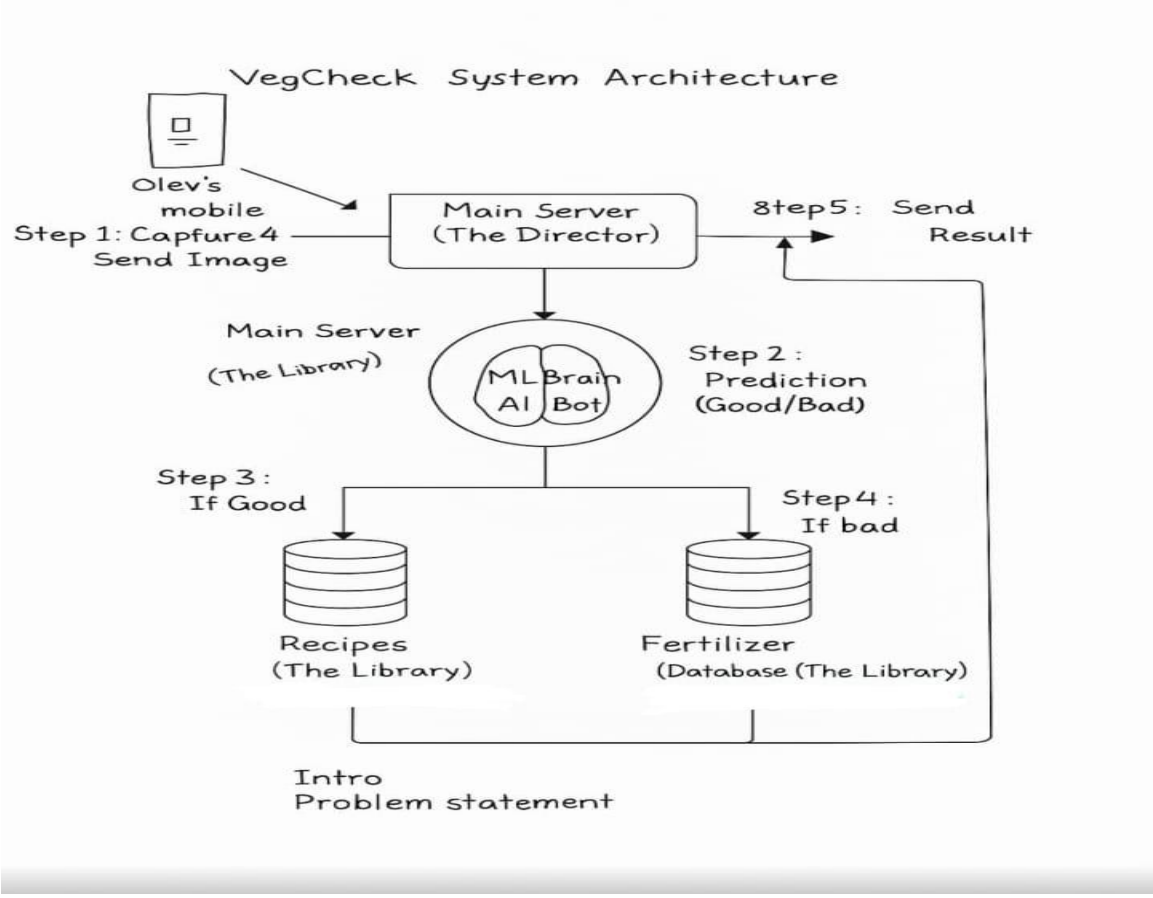


Fig. 1 Block Diagram

The Vegcheck System Works On The Principle Of Image-Based Analysis, Intelligent Classification, And User Guidance Using Machine Learning Techniques.

1) *Input Stage:* The system accepts vegetable images captured through a camera or uploaded by the user. These images act as the primary input for analysis.
2) *Data Processing and Classification:* The input image is preprocessed and analyzed using image processing techniques. Extracted features are passed to a machine learning model which classifies the vegetable as **Fresh** or **Rotten**. If the vegetable is classified as fresh, the system proceeds to nutritional analysis and recipe recommendation. If the vegetable is classified as rotten, the system generates safe disposal guidance.
3) *Output and User Interface :* The final result along with freshness status, nutritional information, recipe suggestions, or disposal methods is displayed to the user through a web-based interface.

VII. FUTURE SCOPE

1) Expansion of Dataset: The system can be trained with a larger dataset including more varieties of vegetables to improve accuracy
2) Mobile Application Integration : The system can be trained with a larger dataset including more varieties of vegetables to improve accuracy

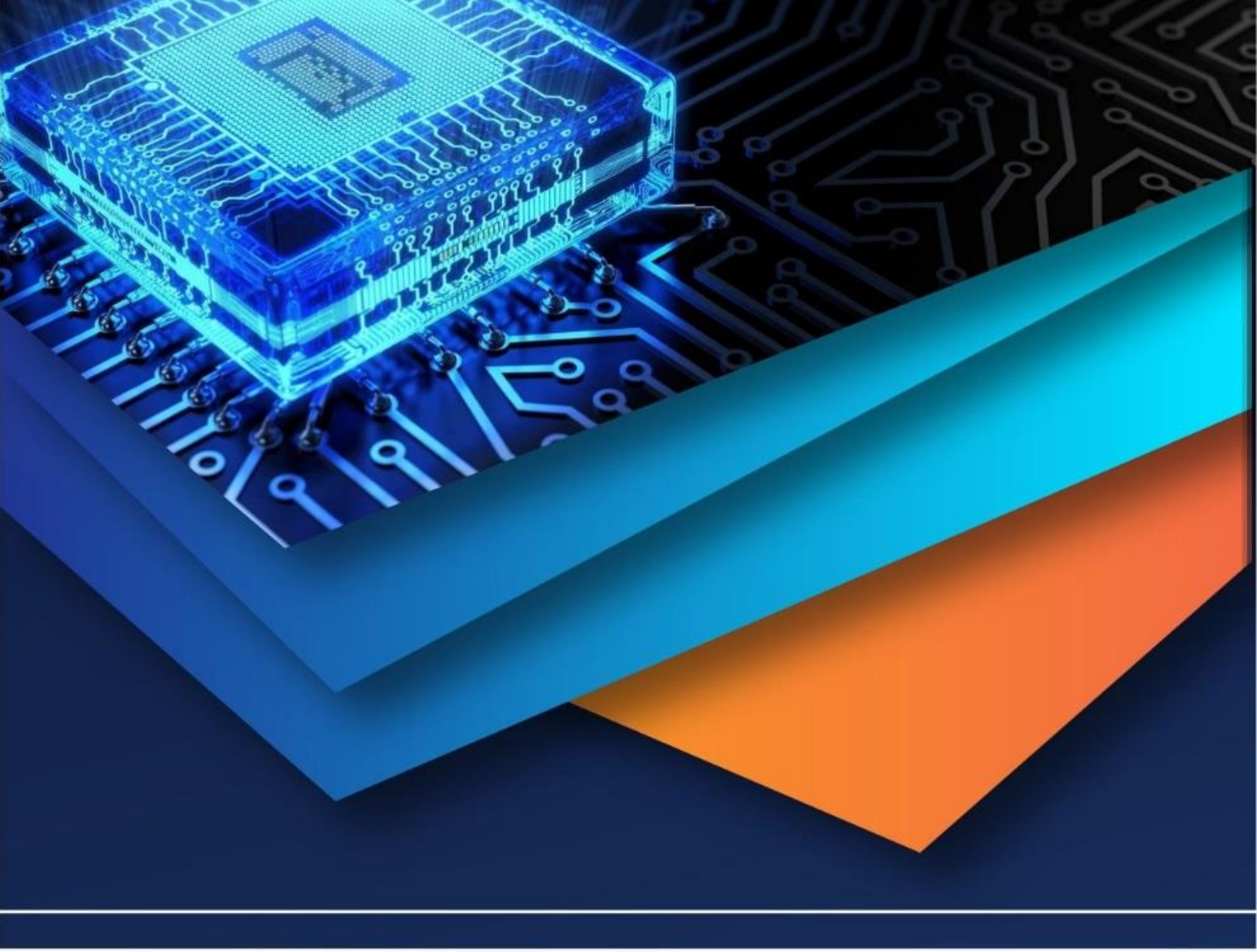
VIII. CONCLUSION

The proposed VegCheck system provides an effective solution for detecting vegetable freshness using image processing and machine learning techniques. The system accurately classifies vegetables as fresh or rotten and provides appropriate guidance such as nutritional information, recipe suggestions, and safe disposal methods. VegCheck is simple, cost-effective, and user-friendly, making it suitable for improving food safety, reducing food wastage, and supporting sustainable consumption practices.

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