

# **MINI PROJECT REPORT**

*On*

### **FRUIT DISEASE DETECTION**

*Submitted in partial fulfilment for the award of degree*

*Of*

#### **Master of Computer Applications**

By

**ASWINI ANIL(MLM24MCA-2021)**

Under the Guidance of

### **Ms.Greeshmamol P Kurian**

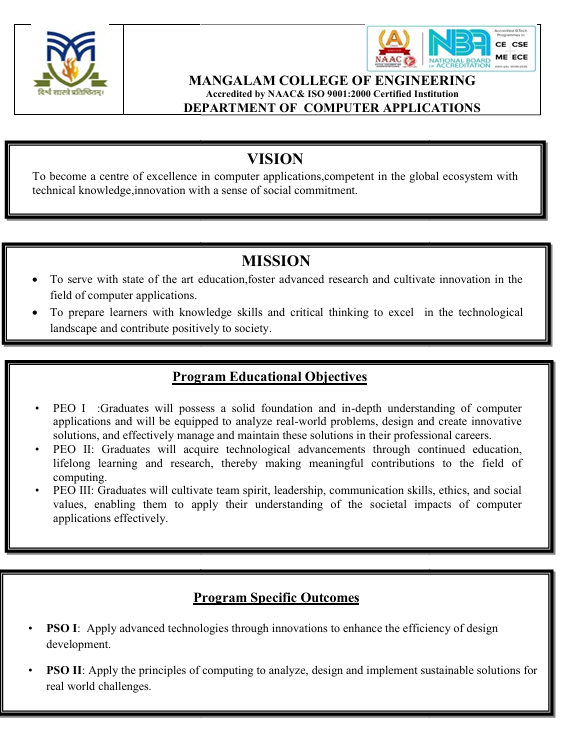
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# **DEPARTMENT OF COMPUTER APPLICATIONS**

# **MANGALAM COLLEGE OF ENGINEERING, ETTUMANOOR**

***(Affiliated to APJ Abdul Kalam Technological University)***

# **OCTOBER 2025**



**MAPPING OF PO-PSO-SDG**

1. **MAPPING WITH PROGRAM OUTCOMES (POs):-**

|  |  |  |
| --- | --- | --- |
| **SL.NO** | **POs ADDRESSED** | **RELEVANCE TO PROJECT** |
| 1. | **PO1 – Engineering Knowledge** | The project applies knowledge of computer science, deep learning, and image processing to design and develop a CNN-based system for detecting fruit diseases. It integrates theoretical and practical AI concepts to solve real agricultural challenges effectively. |
| 2. | **PO2 – Problem Analysis** | The project identifies and analyses the problem of detecting fruit diseases by studying datasets and applying machine learning techniques to classify diseases accurately based on image features. |
| 3. | **PO3 – Design/Development of Solutions** | The system is designed to provide a solution for farmers and researchers by automatically identifying fruit diseases, reducing manual inspection, and ensuring better agricultural output while supporting sustainable practices. |
| 4. | **PO4 – Conduct Investigations of Complex Problems** | The project involves conducting experiments using CNN architectures, dataset preprocessing, and performance evaluation to achieve accurate and valid results for fruit disease detection. |
| 5. | **PO5– Modern Tool Usage** | The project uses modern tools and technologies such as Python, TensorFlow, Keras, and OpenCV for building, training, and testing the CNN model to classify fruit diseases efficiently. |
| 6. | **PO6 – The Engineer and Society** | The project benefits society by helping farmers and agricultural experts detect fruit diseases early, thus improving productivity, food quality, and supporting food security initiatives. |
| 7. | **PO7 – Environment and Sustainability** | The system promotes sustainable farming practices by reducing excessive pesticide usage through early and accurate disease identification, supporting environmental conservation. |
| 8. | **PO10 – Communication**. | The project includes well-documented reports, technical papers, and presentations that clearly communicate the system design, methodology, and experimental findings. |
| 9. | **PO12 – Lifelong Learning**. | The project encourages continuous learning of emerging technologies such as deep learning, artificial intelligence, and computer vision to enhance the system’s efficiency and adaptability. |

**LIST OF PROGRAM OUTCOMES (POs):**

**PO1 – Engineering Knowledge** :Apply knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to solve complex engineering problems.

**PO2 – Problem Analysis**: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3 – Design/Development of Solutions**: Design solutions for complex engineering problems and design systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

**PO4 – Conduct Investigations of Complex Problems**: Use research-based knowledge and research methods including design of experiments, analysis, and interpretation of data, and synthesis of information to provide valid conclusions.

**PO5– Modern Tool Usage** : Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex engineering activities with an understanding of the limitations.

**PO6 – The Engineer and Society**: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to professional engineering practice.

**PO7 – Environment and Sustainability**: Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of, and need for sustainable development.

**PO8 – Ethics** : Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

**PO9 – Individual and Team Work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10 – Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11– Project Management and Finance**: Demonstrate knowledge and understanding of engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12 – Lifelong Learning**: Recognize the need for, and have the ability to engage in independent and life-long learning in the broadest context of technological change.

1. **MAPPING WITH PROGRAM SPECIFIC OUTCOMES (PSOs):**

|  |  |  |
| --- | --- | --- |
| **SL.NO** | **PSOs ADDRESSED** | **RELEVANCE TO PROJECT** |
| **1** | **PSO 1** | The project “Fruit Disease Detection using CNN” reflects PSO 1 by applying advanced deep learning and computer vision technologies to develop an efficient model for fruit disease classification. The use of Convolutional Neural Networks (CNN), TensorFlow, and image preprocessing techniques demonstrates innovation in automating agricultural disease detection and improving accuracy in system design. |
| **2** | **PSO 2** | The project “Fruit Disease Detection using CNN” demonstrates PSO 2 by applying core computing and AI principles to analyze agricultural problems and design a sustainable, technology-driven solution. By detecting fruit diseases early, it helps farmers minimize crop loss, reduce pesticide use, and promote sustainable agricultural practices that address real-world challenges in food production. |

**LIST OF PROGRAM SPECIFIC OUTCOMES (PSOs):**

**PSO 1**: Apply advanced technologies through innovations to enhance the efficiency of design development.

**PSO 2**: Apply the principles of computing to analyze, design and implement sustainable solutions for real world challenges.

1. **MAPPING WITH SUSTAINABLE DEVELOPMENT GOALS (SDGs):**

|  |  |  |
| --- | --- | --- |
| **SDG NO** | **SDGs ADDRESSED** | **RELEVANCE TO PROJECT** |
| **SDG 2** | **Zero Hunger** | The project “Fruit Disease Detection using CNN” contributes to sustainable agriculture by helping farmers detect fruit diseases early, thereby reducing crop loss and improving yield quality. This supports food security and helps ensure a consistent supply of healthy fruits for consumption. |
| **SDG 9** | **Industry, Innovation, and Infrastructure** | The project promotes technological innovation in agriculture through the application of deep learning and artificial intelligence. It demonstrates how advanced computing methods can be used to develop intelligent systems that support modern, smart farming infrastructure. |
| **SDG 12** | **Responsible Consumption and Production** | By detecting fruit diseases at an early stage, the project helps minimize fruit wastage and reduces the overuse of harmful pesticides. This leads to efficient resource utilization and promotes environmentally responsible farming practices. |
| **SDG 13** | **Climate Action** | The project indirectly supports climate action by reducing chemical pollution through minimized pesticide usage. Early disease detection allows for targeted treatment, contributing to a cleaner environment and sustainable farming ecosystems. |

**SUSTAINABLE DEVLOPMENT GOALS (SDGs):**

**SDG 1 – No Poverty**-End poverty in all its forms everywhere.

**SDG 2 – Zero Hunger**-End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.

**SDG 3 – Good Health and Well-Being**-Ensure healthy lives and promote well-being for all at all ages.

**SDG 4 – Quality Education**-Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

**SDG 5 – Gender Equality**-Achieve gender equality and empower all women and girls.

**SDG 6 – Clean Water and Sanitation**-Ensure availability and sustainable management of water and sanitation for all.

**SDG 7 – Affordable and Clean Energy**-Ensure access to affordable, reliable, sustainable, and modern energy for all.

**SDG 8 – Decent Work and Economic Growth**-Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all.

**SDG 9 – Industry, Innovation, and Infrastructure**-Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation.

**SDG 10 – Reduced Inequality**-Reduce inequality within and among countries.

**SDG 11 – Sustainable Cities and Communities**-Make cities and human settlements inclusive, safe, resilient, and sustainable.

**SDG 12 – Responsible Consumption and Production**-Ensure sustainable consumption and production patterns.

**SDG 13 – Climate Action**-Take urgent action to combat climate change and its impacts.

**SDG 14 – Life Below Water**-Conserve and sustainably use the oceans, seas, and marine resources.

**SDG 15 – Life on Land** -Protect, restore, and promote sustainable use of terrestrial ecosystems, manage forests sustainably, combat desertification, halt and reverse land degradation, and halt biodiversity loss.

**SDG 16 – Peace, Justice, and Strong Institutions**- Promote peaceful and inclusive societies, provide access to justice for all, and build effective, accountable, and inclusive institutions.

**SDG 17 – Partnerships for the Goals** -Strengthen the means of implementation and revitalize the global partnership for sustainable development.

**MANGALAM COLLEGE OF ENGINEERING, ETTUMANOOR**

**DEPARTMENT OF COMPUTER APPLICATIONS**

**OCTOBER 2025**



***DECLARATION***

*I hereby certify that the work which is being presented in the project entitled* ***“FRUIT DISEASE DETECTION”*** *submitted in the* ***DEPARTMENT OF COMPUTER APPLICATIONS*** *is an authentic record of my own work carried under the supervision of* ***GREESHMAMOL P KURIAN, ASSISTANT PROFESSOR, DEPARTMENT OF COMPUTER APPLICATIONS.*** *This study has not been submitted to any other institution or university for the award of any other degree. This report has been checked for plagiarism by the college and the similarity index is within permissible limits set by the college.*

*Name & Signature of Student*

*Date:*

*Place:*

**MANGALAM COLLEGE OF ENGINEERING, ETTUMANOOR**

**DEPARTMENT OF COMPUTER APPLICATIONS**

**OCTOBER 2025**

***CERTIFICATE***

*This is to certify that the Project titled* ***“Fruit Disease Detection”*** *is the bonafide record of the work done by* ***ASWINI ANIL (MLM24MCA-2021)*** *of Masters of Computer Applications towards the partial fulfilment of the requirement for the award of* ***MASTER OF COMPUTER APPLICATIONS by APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY****, during the academic year 2025-26.*

|  |  |
| --- | --- |
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| **Project Guide**  **Ms.Greeshmamol P Kurian**  **Assistant Professor**  **Department Of Computer Applications** | **Head of the Department**  **Ms. Divya S B**  **Associate Professor**  **Department of Computer Applications** |

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**ASWINI ANIL (MLM24MCA-2021)**

**ABSTRACT**

Fruit disease detection plays a crucial role in modern agriculture by ensuring crop quality, reducing economic losses, and promoting sustainable farming. Traditional methods of identifying fruit diseases rely heavily on manual inspection, which is time-consuming, subjective, and often inaccurate. To overcome these challenges, this project **"Fruit Disease Detection "** proposes an automated, intelligent system capable of identifying fruit diseases accurately through image analysis.

The system uses deep learning, specifically CNNs, to process fruit images and detect disease symptoms such as spots, discoloration, or texture changes. The workflow includes key stages like image acquisition, preprocessing (resizing, normalization, and noise reduction), feature extraction through CNN layers, and classification of diseases. The trained model classifies input images as healthy or diseased and displays the disease name with accuracy.

This project leverages a web-based interface where users can easily upload fruit images, view results, and access detection history. The CNN model ensures high precision and efficiency by learning intricate patterns from a large dataset of healthy and infected fruits. The proposed system significantly improves accuracy compared to traditional methods and can be applied across different fruit types such as guava, pomegranate, and watermelon.

By integrating artificial intelligence with agricultural practices, this project contributes to early disease detection, reducing pesticide misuse, and enhancing crop productivity — paving the way for **smart and sustainable farming solutions.**

***Keywords: Fruit Disease Detection, CNN, Deep Learning, Image Processing, Classification, Agriculture, Smart Farming.***

|  |  |
| --- | --- |
| **Mapping with**  **Sustainable Development Goals**  **(Mention the Goal)** | SDG 2 - Zero Hunger  SDG 9 - Industry, Innovation, and Infrastructure  SDG 12 - Responsible Consumption and Production  SDG 13 - Climate Action |

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**I**

# **LIST OF ABBREVIATIONS**

|  |  |  |
| --- | --- | --- |
| **ABBREVIATION** |  | **FULL FORM** |
| CNN | **-** | Convolutional neural network |
| ML | **-** | Machine Learning |
| NIR | **-** | Near Infrared |
| AI | **-** | Artificial Intelligence |
| SVM | **-** | Support Vector Machine |
| DL | **-** | Deep Learning |

**II**