**Chapter 2**

**Literature / Market Survey**

**2.1 Introduction**

Tomato Care is a complete agricultural solution which is designed to solve the problems of farmers. This advanced platform, which is available for both web and Android, leverages cutting-edge technology to revolutionize the way farmers detect and manage diseases in their tomato crops. With current methods falling short in addressing the complexities of tomato crop health, Tomato Care aims to provide an efficient and innovative solution to empower farmers. By seamlessly integrating image-based disease detection, treatment recommendations, and real-time updates, Tomato Care ensures a holistic approach to crop health management. This user-friendly platform not only enhances the accuracy of disease identification but also encourages a collaborative environment where farmers can make informed decisions for optimal yields.

The Tomato Disease Detection market survey involves a thorough analysis of technology trends, and customer needs in the agricultural technology sector. By assessing market size, growth potential, and competitive dynamics, businesses can gain valuable insights for informed decision-making.

**2.2 Literature Review/Technologies Overview**

The literature review and technologies overview for Tomato Disease Detection look at what researchers and experts have already studied and developed in this area. They've been using technologies like machine learning and computer vision to identify diseases in tomatoes. One good thing they use is image recognition, especially with something called CNNs. These technologies help to quickly spot and classify diseases just by looking at pictures of tomato leaves. Also, there are smart sensors and data analytics that help farmers monitor their crops in real-time, catching diseases early. All of this technology together helps in managing diseases in tomatoes better, reducing losses, and making farming more sustainable. As scientists keep studying and improving these technologies, the way we detect and handle tomato diseases keeps getting better.

**The Table below shows some researched papers reviews**

**Table 1: Literature Review**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Paper ID** | **Domain** | **Document** | **Algorithm** | **Accuracy** | **Reference** |
| **1** | Machine Learning | **Tomato Leaf Disease Detection Using Convolutional Neural Networks** | Convolutional Neural Networks (CNNs) | 91.52% | https://ieeexplore.ieee.org/document/9988540/ |
| **2** | Deep Learning | **Early Detection and Classification of Tomato Leaf Disease Using High-Performance Deep Neural Network** | Inception V3, Rainbow concatenation | 92.52% | https://www.mdpi.com/1424-8220/21/23/7987 |
| **3** | Deep Learning | **Tomato Leaf Disease Detection using Convolution Neural Network** | Convolutional Neural Networks (CNNs), Transfer learning with Inception V3 | 91.2% | https://www.sciencedirect.com/science/article/pii/S1877050920306906 |
| **4** | Deep  Learning | **Disease detection on the leaves of the tomato plants by using deep learning** | Convolutional Neural Networks (CNNs) | 91% | https://ieeexplore.ieee.org/document/9397001 |
| **5** | Machine Learning | **Tomato leaf disease detection and classification using image processing and machine learning** | Vector Machines (SVMs), K-Nearest Neighbors (KNN), Random Forests, Convolutional Neural Networks (CNNs) | 91.5% | https://pubmed.ncbi.nlm.nih.gov/27172010/ |

**2.2.1 Market Survey**

**Table 1.1: Market Survey**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Ref** | **Applications** | **Tomato- Disease Detection** | **Treatment**  **Suggestions** | **Voice and Text** | **Localized Alerts** |
| 1 | Toma App | ✔ | ✖ | ✖ | ✖ |
| 2 | Tomato Disease | ✖ | ✔ | ✖ | ✖ |
| 3 | Diagno Plant Tomato | ✖ | ✔ | ✖ | ✖ |

**2.3 Summary**

The research on Tomato Disease Detection shows that scientists are using smart technologies like machine learning and computer vision to find and manage diseases in tomato plants. They look at pictures of tomato leaves to figure out what kind of disease might be there. The market survey tells us that some of the applications are using these technologies, especially in precision farming. They also use smart sensors and data analytics to keep an eye on the plants in real-time, finding diseases early. This helps farmers take care of their crops better, reducing losses, and making tomato farming more sustainable. It's a growing and changing area with lots of opportunities for making tomato plants healthier.