**Chapter 6**

**SUMMARY AND CONCLUSIONS**

**6.1 Summary**

The proposed system is a software application designed to identify, classify, and treat plant diseases using advanced computer vision and machine learning algorithms. With a dataset of over 24 disease classifications, the system can identify and classify a wide range of plant diseases, including apple scab, black rot, cedar apple rust, grape leaf blight, and many others. The system has also been trained to detect specific diseases such as powdery mildew and bacterial spot in crops like cherry, pepper, and peach.

The software application can be downloaded from Kaggle and offers several functionalities for users. Firstly, users can input an image of a diseased plant, and the system will detect and classify the disease, providing a diagnosis and recommending treatment options. Additionally, users can ask specific questions to the system, and the system will provide personalized answers to guide and support them in treating the disease. Users can also choose to seek assistance from a network of experts who can provide additional guidance on treating specific diseases.

While the system offers many benefits, there are also challenges and limitations that need to be addressed. For instance, the system's accuracy and processing times depend on the quality and quantity of input data, which can limit its applicability in certain cases. There are also limitations to current machine learning algorithms and technology that can impact the system's effectiveness. Furthermore, the system's scalability may be limited for larger-scale commercial agricultural operations.

Overall, the proposed system has the potential to improve accuracy, processing times, and efficiency in plant pathology and enhance the user experience for growers, farmers, and researchers. It can help users quickly diagnose and treat plant diseases, saving time and resources, and has the added advantage of providing personalized answers to user queries through a network of experts. With further development and improvements, the system could become a valuable tool for the agricultural industry.

**Future Works:**

In future works, there are several areas for improvement and expansion of this plant disease detection, classification, and treatment system. Firstly, the data can be trained on a larger dataset to improve the accuracy of the predictions. Additionally, the system can be expanded to include disease detection beyond just leaves photos, such as stem and root diseases.

Furthermore, an admin section can be added to the system to allow experts to easily resolve user queries. The admin section can include buttons such as "mark as resolved" or "wait for more time" to help streamline the query resolution process. Currently, queries are manually retrieved from the database and sent to the expert for resolution, but in the future, users can receive their solutions directly on the portal. This will help to reduce the response time for queries and enhance the user experience.

In future, captcha is also added in the time of signup and login

Overall, the system offers several advantages, such as accurate disease detection, classification, and treatment recommendations, as well as the ability to resolve user queries by experts. With further development and expansion, this system has the potential to become a valuable tool for farmers and plant enthusiasts.

**Conclusion**

In conclusion, the plant disease detection, classification, and treatment system is a valuable tool for farmers and plant enthusiasts. It offers accurate predictions and recommendations for disease detection, classification, and treatment, based on image analysis and machine learning algorithms. The system has been trained on a dataset of 24 classes and can detect 5 classes for disease detection and 24 classes for disease classification. The user-friendly interface allows users to easily upload images of plant leaves and receive prompt results.

The system's performance has been evaluated on several metrics, including accuracy, precision, recall, and F1-score. The results show that the system is capable of accurately detecting and classifying plant diseases. The system's accuracy is affected by the quality of the input images and the training data. However, with further training and expansion of the dataset, the system's accuracy can be improved.

In the future, the system can be expanded to include disease detection beyond just leaves photos, and an admin section can be added to allow experts to resolve user queries efficiently. With continued development and improvement, this system has the potential to become an invaluable tool for farmers and plant enthusiasts, helping to promote healthy plant growth and increase crop yields.

**REFERENCES**

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