Abstraction

Agriculture is considered as backbone of our country. In this modern India, farmers are facing so many problems in growing crops due to climatic change and environmental pollution. The advanced and automated machine technology which are leading the world to new heights, is been lagging when it is concerned to farming, due to either the lack of awareness of the advanced facilities or the unavailability leads to poverty in farming

One major problem farmers face while growing crops is finding the diseases at the right time . Crop specialists are required to identify the disease and recommend the best cure. It is difficult for farmers to contact crop specialists always. Leaf disease detection application which is based on machine learning will be going to solve this problem. Farmers can easily use this through any search engine into their mobile phones and just by scanning the leaf of the plant, it can identify the disease.

The Cotton Leaf Disease Detection software will help farmers easily recognize cotton crop disease. Farmers just need to take picture of the plant or can select the leaf from the gallery then the application automatically recognizes the disease. Farmers can do this process for many plants and can conclude the disease. It will also lead to a decrease the pesticide usage on the crops. Hence the farmers can decrease crop losses and can improve their profits.

Introduction:

In India, about 41.49% of the population relies on agriculture. Identification of plant diseases is important in order to prevent losses within the yield. It’s terribly troublesome to observe plant diseases manually. It needs a tremendous quantity of labor, and expertise within the plant diseases, and conjointly needs the excessive time interval.

A cotton crop field is taken for this project Cotton crop is prone to different diseases. Different seasonal diseases are extensively damaging crops. By these different types of diseases, farmers are facing severe losses. Farmers are mainly facing difficulty in identifying the disease in its early stages due to a lack of expertise. Sometimes due to a lack of expertise farmers may also use the wrong chemicals.

We can solve this problem by using technologies like machine learning and deep learning. image processing and machine learning models can be employed for the detection of plant diseases. After training the machine learning model with a suitable dataset we can deploy it in a smart device.

The main goal of this project is to overcome the difficulty in recognizing plant diseases for farmers and decreasing crop losses. I interacted with the farmers to know the different diseases of the crop they are facing. Also I have gone through the internet to get detailed information of the diseases and datasets that are required for the machine learning model training.

The main beneficiaries of this project are cotton farmers. Farmers can easily find the disease of the cotton crop. Farmers can take early precautions to prevent the losses of the crop. Hence the yield crop will increase and the income of the farmers will also increase.

Objectives & Methodology:

Methodology:

For the implementation of the community service project, we have to visit the tomato crops and interact with the farmers. We have to Survey the formers to know the various problems faced by the problems. Then we have to collect information from the formers about what are the diseases faced by the tomato crop. We have also to interact with the experts to know more about the diseases. If necessary We have to gather more information from the internet also.

Then we can identify that the problem can be solved by using machine learning. We have to plan how to implement the project. We have to find the dataset from the internet or we have to create our own dataset according to the problem statement. Then we have to select the best machine-learning model to implement the project. Then we have to train and evaluate the model. Then the model will be ready for deployment.

We have to deploy the model using the mobile application. For the deployment purpose, we have to create a suitable user interface for the mobile application. After the deployment, the application should be available to the farmers. Then the farmers can install the application into their phones which can be used for the detection of diseases. Then the farmers can use pesticides according to the diseases.

Objectives:

1. Increase the Use of the latest technologies in the forming.
2. To detect the disease in its early stages and be able to prevent it from further spreading and damaging the crop.
3. Increase the income of the farmers.
4. Improve the efficiency of farming using different technologies.
5. Using the correct pesticides and increasing the yield of the crop.
6. Reducing the labor cost in farming.
7. Increasing the awareness of the farmers in the usage of technology.

Implementation:

Activtities:

The series of activities are planned and done accordingly for best results to the farmers. The flow of activities done are :

1. Taking the necessary data and information from the farmers as a survey.
2. Analysing the data gathered and find the particular problem.
3. Finding the best possible solutions to the problem.
4. Implementing the solution to the problem.
5. Testing the solution to know how it is working.
6. Educating and delivering the solution to the farmers.

First Week:

In the first week of the project, we have made the plan and interacted with the formers for seeking cooperation from the farmers. All the permissions for the conduction of survey have been approved in this period of time. Then we have conducted the survey about the tomato crop diseases and gathered the primary information from the farmers.

We have analyzed the gathered information and have understood the main diseases that attack tomato crops. We have also interacted with experts to gather more information about the diseases. We have also gathered more information from the internet about the diseases.

Then we have understood the problem that farmers are facing difficulty in identifying the disease of the crop and because of this severe damage is occurring to the farmers. In this week we have also think about how to solve this problem.

Second week:

In the second week of the project, we created the some awareness campaigns to farmers about the tomato crop diseases. We also discussed with experts how to solve the problem by using technology. We have also gone through some examples which were solved by other persons and got some intuition in solving the problem.

Finally, we have decided that this problem can be solved by the machine learning. We have gone through the different machine learning algorithms and selected the suitable algorithm. Datasets for the training of the algorithm has collected from the Kaggle platform. We have also decided to deploy the model using the mobile application.

Third week:

In the third week of the project, we have started to build the project. For building the project we have used the jupyter notebook and python language. We have used the convolutional neural network model and build the project. And we trained the model with the tomato leaf disease dataset. After building the model we have confirmed how well the model is performing in test dataset.

After completing the model building we deployed it in the mobile application. For the deployment purpose we have used the android studio. We have created the user interface and deployed the project using the user interface in the application. We have also tested the performance of the application.

In the third week we have completed the building of the application.

Fourth week:

In the fourth week of the project, we have done awareness campaign on how to use the application for the farmers. We guided the farmers on how to use the application and find disease of the crop. We have also made some demos for clear understanding of application for the farmers.

We have also taken the feedbacks and responses from the farmers about the application. We have also noted the reviews of the farmers for the improvement of the application. Finally we have made the application available to the farmers.

Challenges:

>identifying the diseases at the correct time and using suitable medicines is a major problem for the farmers.

>farmers do not know the detailed information of the diseases so we have to interact with the experts.

>gathering the correct dataset is a major problem in building an efficient model. We can collect the dataset from the internet or we can build an efficient dataset with an expert guide.

>sometimes model cannot perform efficiently and we can overcome this problem by using better machine learning algorithm.

>farmers do not know how to use the application so we have to educate and train the farmers.

>finding the best platform for building model and handling the errors is also a big problem and we have overcome this problem by using jupyter notebook and stackoverflow.

Observations:

While interacting with the farmers we have learned about the problems in farming. We have also come across the different diseases that attacks tomato crops. While interacting with the farmers we come to know that they are not using any latest technologies in growing crops. We also come to know that farmers are facing so much damage to the crops because of diseases.

While interacting with the farmers we have know that they are not using any technologies for disease recognition. We have found that this problem can be solved by using machine learning. We have explored the different solutions and have found the best solution. Then we came to know that we have to educate the farmers about the best use of technology.

Achievements/benefits of the project:

I have contributed to the community service project by, making farmers aware of the usage of technology in agriculture. The application I contributed is also useful to the farmers. Farmers can easily find the type of disease that the crop has attacked.

I have successfully created awareness of the technology usage in the agriculture in the farmers. I have successfully built an application that can recognize tomato diseases. I have also made awareness in the farmers that what are the diseases that tomato crop can attack.

By using the application they can find the disease easily by scanning the tomato leaves. The application is very simple for the usage of the farmers. I have also made the awareness to the farmers no using the application. Now the farmers can easily find diseases in time and can apply perfect medicine to the crop.

This project has helped the farmers to decrease the crop damage and gain profits from the crops by using the latest technologies. This project helped farmers to increase their income and livelihood.

I have interacted with the farmers and collected information by surveying the farmers. I have interacted with the experts and collected information from the internet. I have gone through the different solutions and find the best solution. I have implemented the solution and delivered to the farmers. Finally I have completed the project.

Conclusions and Inferences:

**LEARNING OUTCOMES:**

1. To identify and overcome the problems encountered in day-to-day agriculture
2. To provide knowledge on technology use in agriculture.
3. To provide knowledge on diseases of the crops.
4. To improve the use of the latest technology in agriculture.
5. To make farmers familiar with using technology.
6. To serve the rural agriculture population.
7. To decrease crop losses due to different diseases.

LIMITATIONS AND CHALLENGES:

1. Most of the farmers are illiterates.
2. Farmers do not know how to use the latest technologies.
3. Farmers do not know all details about diseases.
4. Farmers do not know how to handle any damage in the use of technology.
5. Farmers must choose the correct medicine for a correct disease which is difficult.

Future scope:

This project is a simple application which can detect the diseases of the plant by just scanning of the leaf. This application will give what type of disease only. We have implemented this project by using machine learning models and android studio. This application does not provide any datails of the disease. This application will work only in English language.

We can further develop the application to suggest the pesticides for the diseases of the crops. We can also develop this application in native languages which will be very helpful for the farmers. We can further develop this application to detect all types of diseases of the crops.

## 