Solving for India - Shri Ramdeobaba College of Engineering & Management
Powered By Google Cloud & AMD

Team Name : BinaryBrains

Members:

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Theme: AgroTech

Project Title: Kisan-seva

GitHub Link: https://github.com/Lokesh-malviya/Kisan

Problem Statement

Farming is the main occupation in rural areas of India. There are many difficulties faced by the farmers while growing the crop and selling it. Sometimes, the farmer uses inappropriate fertilizers or medicine and this results in significant loss of agricultural production. It may also happen that the crop might get infected by some disease and the farmer is unable to recognize the exact type of infection and is not able to find appropriate medicine.When it comes to selling crops in the market, buyers manipulate and pressurize the farmers to sell their agricultural production at a lower rate. So, this leads to financial loss of the farmer. Most of the farmers in India are not aware of the schemes organized by the Government of India. If awareness of these schemes are increased among the farmers, it would be very beneficial for farmers in terms of finance and in terms of tools and equipment used in farming.

Objective:

The objective of this project is to develop a Web Application for farmers so that the respective farmer can overcome the problems mentioned in the above problem statement.
In that web application the farmer can:

- view the schemes released by the government of India.
- view the current selling price of the crop so that the farmer will have some knowledge about the rate of crop.
- upload the image of the crop and get the name of the disease as well as the remedy to cure it.
- store his/her information related to farming such as crops grown.

Technologies Used:

HTML, CSS, JS, MERN, Python, Tensorflow, Streamlit, Flask, Google Cloud

Methodology:

We have developed this application using MERN stack. The frontend is implemented on ReactJS and backend on Node JS. We have used MongoDB for creating and storing the data in the database.

The first step is to login to the website. We can login by providing a phone number or password. If we do not have an account on the website, then we will have to register first. Now, after successful registration , provide the mobile number and password and click on login. So in the backend, the credentials will be checked by first converting the password into hash and generating the jwt tokens and then matching the credentials. The data is sent in the form of JSON to the backend and the jwt tokens and user ID of a particular person.

After successful login, we can see the dashboard. The dashboard contains 5 fields.

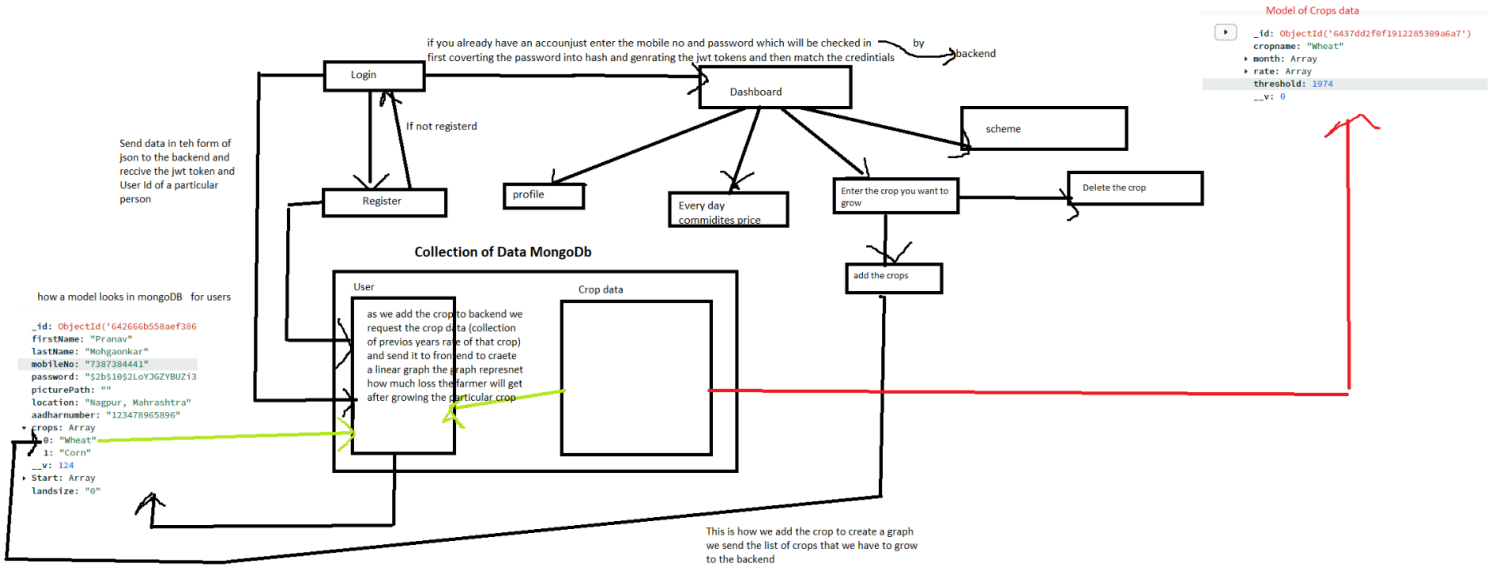
1) Profile: We can view and edit the profile in this section
2) Everyday Commodity Price: Below the profile section we have the Commodity Price section which displays the current price of commodities in the market. It is a table showing the name of the commodity, its max price, its min price, and its average price.
3) Crop to Grow: In this section we have provided the facility to add the crops. If a crop is added then its graph is displayed. As the crop is added to the backend, we request the crop data (collection of previous year rate of that crop) and send it to the frontend to create a linear graph. From that graph, the farmer can get an idea about his loss and profit after growing the particular crop. We have also provided the facility to delete the crop.
4) Schemes: In this section we have displayed the various agricultural schemes launched by the Government of India.
5) Predict:This section predicts the disease of the crop from the uploaded image. In the predict section , we have given an option to select a crop. The farmer can select a crop, then he can upload its image, and check whether the crop has any disease or not. If any disease is detected, then the name of a particular disease is displayed and the methods to prevent and cure that disease are also displayed along with it. We have used Deep Learning concepts for training the datasets of crops. The datasets of crops have images and they are classified into various folders and these folder names are the name of the disease .We developed a deep learning model and passed our dataset on our model. As a result, we are able to predict and classify the disease of the uploaded image.

   Description of Deep learning model:

   Over the time AI has proved itself, with accuracy, reliability and its application in various domains. Deep learning starts with preprocessing of images, for preprocessing we have used specific image height and width so that the model can predict accurate results. The model is a sequential model, comprising of different layers as follows:

Convolutional layer: This layer performs convolutional operations on the input image using a set of learnable filters (also called kernels). The output of this layer is a set of feature maps, each of which corresponds to a particular filter. Here we can decide the activation function, strides, padding to an image and also the kernel.
Pooling layer: This layer downsamples the feature maps by performing a pooling operation (such as max pooling or average pooling) over small regions of the maps. This helps to reduce the spatial size of the maps and make the model more computationally efficient.
Dropout layer: This layer randomly drops out a fraction of the neurons in the previous layer during training. This helps to prevent overfitting and improve the generalization ability of the model.
Fully connected layer: This layer connects all the neurons in the previous layer to every neuron in the next layer, just like a traditional neural network. This layer is typically used at the end of the network to map the learned features to the output classes. We use them as dense layers after flattening our layers.
The Flatten layer in a CNN is a layer that is used to convert the output of the previous layer (usually a convolutional layer) into a 1-dimensional feature vector that can be inputted into a fully connected layer.
To train the model we have used 80-20 split, that is 80 percent for training and 20 percent for testing and validation and we also closely monitored the loss and the overfitting of the model. To ensure robustness of the model we used vivid images of all crops.

Here is the pictorial view of the working of our application.



Function Specification

The detailed description of the functionality of the project is mentioned below:

- First step is to log into the website. The farmer can login by providing the phone number and password. In case if a farmer does not have an account on the website, there is an option for signing up.
- After successful login, the farmer can view his selected schemes in the left panel. The schemes displayed are authentic and are released by the government.
- At the center, the farmer can view a graph that gives a pictorial representation of the crop prices. By seeing that graph the farmer can easily interpret the selling price of the crop.Below the graph we have provided a button named “ADD”. After clicking the add button the farmer is supposed to till which crop he/she is currently growing.The graph then changes according to the crop selected. For example, if the farmer is growing wheat, then the graph containing the details of wheat will be displayed. The X axis of the graph is the months and the Y axis has the price Multiple crops can be added and we have also added an option to delete the crop i.e. if the farmer decides to grow different crop after a season, he/she can delete the crop and add a new one
- In the right panel, the farmer can view his profile, and below the profile we have provided a table which displays the current per quintal price details of crops.
- We have also provided the widget for viewing the current weather in the farmer's respective location.
- In the above navigation bar, we have provided the predict button and profile button.
- By clicking the predict button, we have provided a drop down list which contains 5 crops viz potato, corn, cotton, rice, wheat. So, the farmer can select an option from the drop down, and after that an upload window appears where the farmer can upload the image of the crop he/she has grown. After uploading and submitting the image, the disease name and the remedy to cure the disease is displayed.
- The farmer can view his personal details and change them in the profile section.

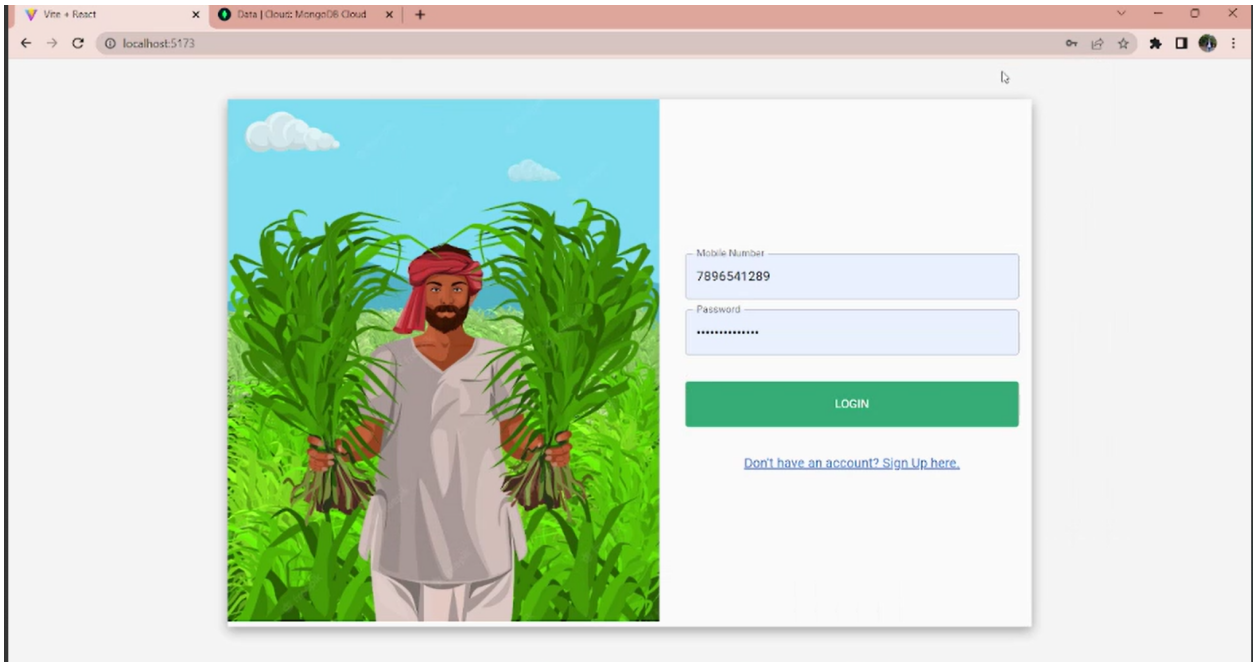
Project Outcome

We, as a group, have identified the problems which farmers are dealing with in their daily lives. Most of the farmers are unaware of the different schemes for which they are eligible. Many of them don’t know the market prices of the crops which they are harvesting, and a lot of them don’t know how to deal with different diseases if their crops have any. We have tried to address this issue via our website, where farmers can find solutions to all of their problems in one place. Now, farmers can check different schemes launched by the government, as well as the market price of their crops and the minimum price they could get after harvesting. They can also check the health of their crops and get suggestions from authorities if any of the crops are found to be diseased. Not only will the farmers benefit from this, but the government body will also benefit. They can now have data about the farmers and their harvesting patterns, which will help them in

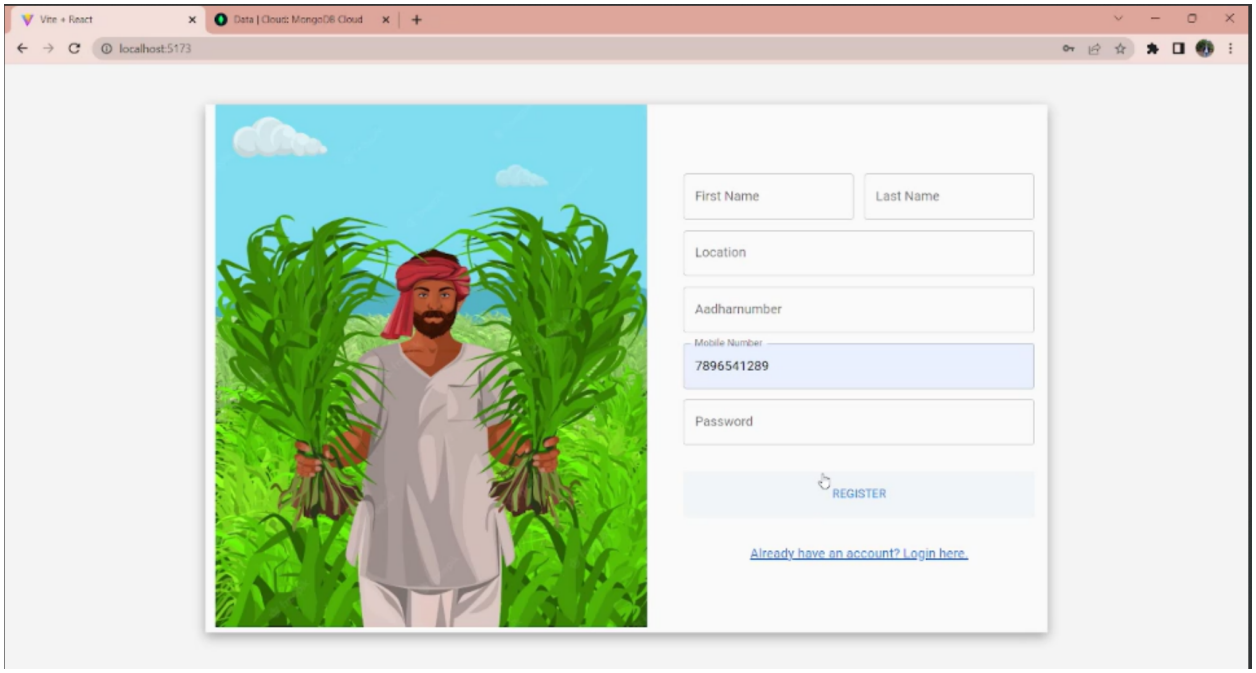
inventory management. They will have data regarding the amount of crops which a particular area will harvest at the end of the harvesting season. They can also know how many farmers have enrolled in a particular scheme, and how many farmers need help with fertilizers and pesticides (by knowing which farmers have diseased crops). In this way, our group has tried to solve a major issue that will benefit both farmers and the government of India.

Screenshots of Output:

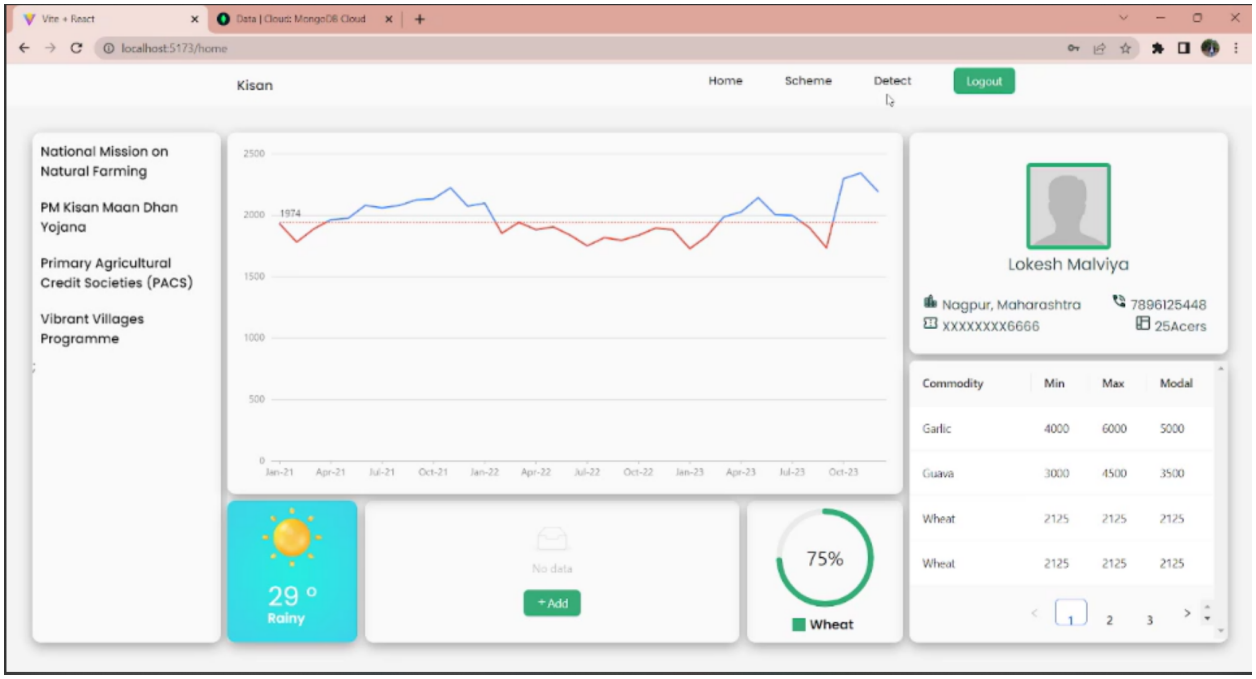
Login Page:

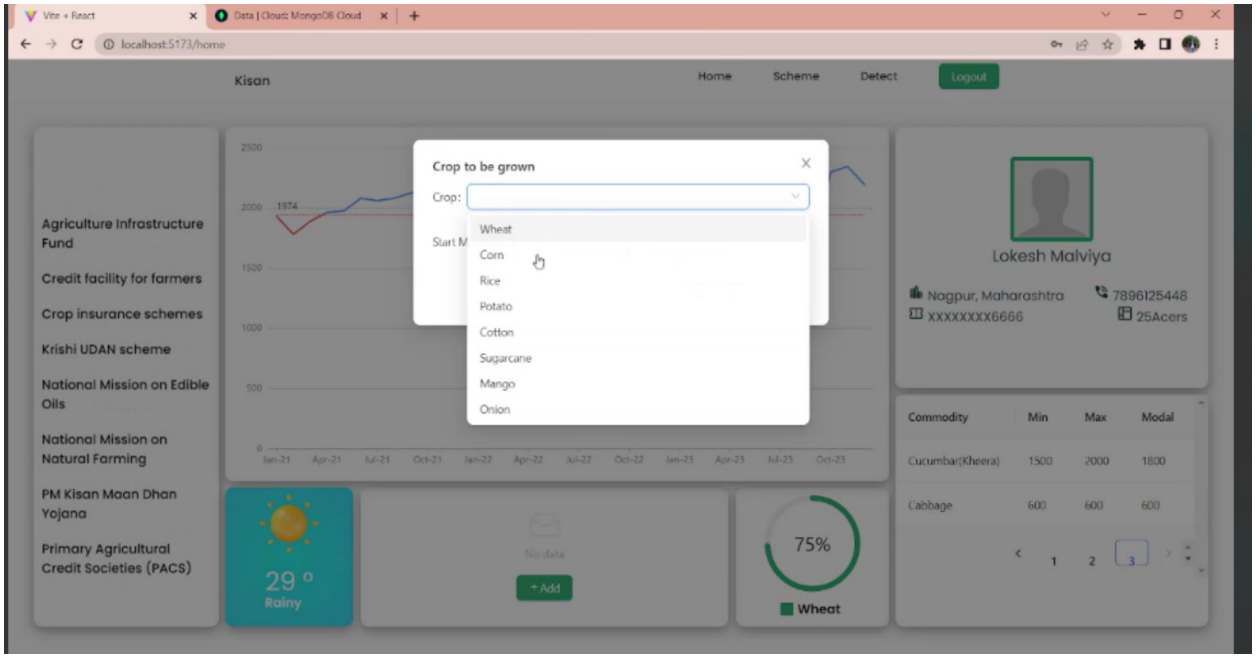


Sign Up Page:

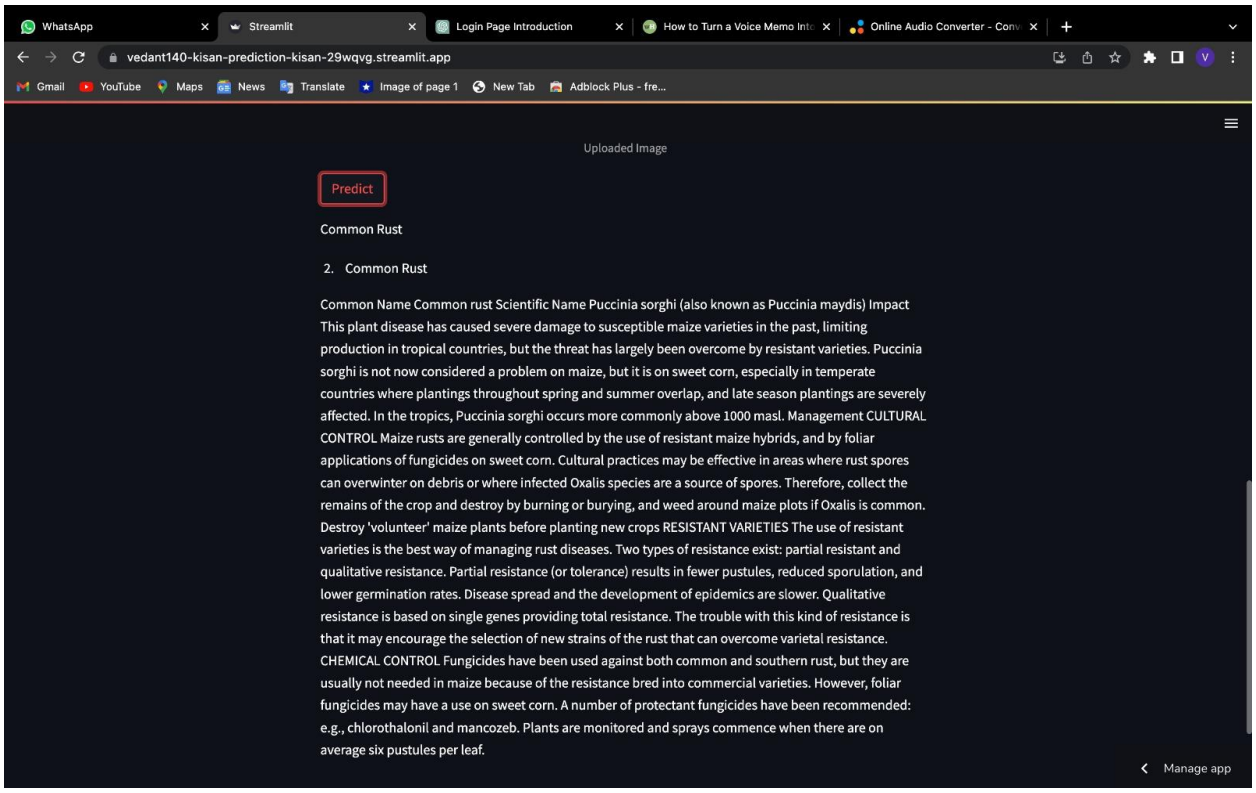


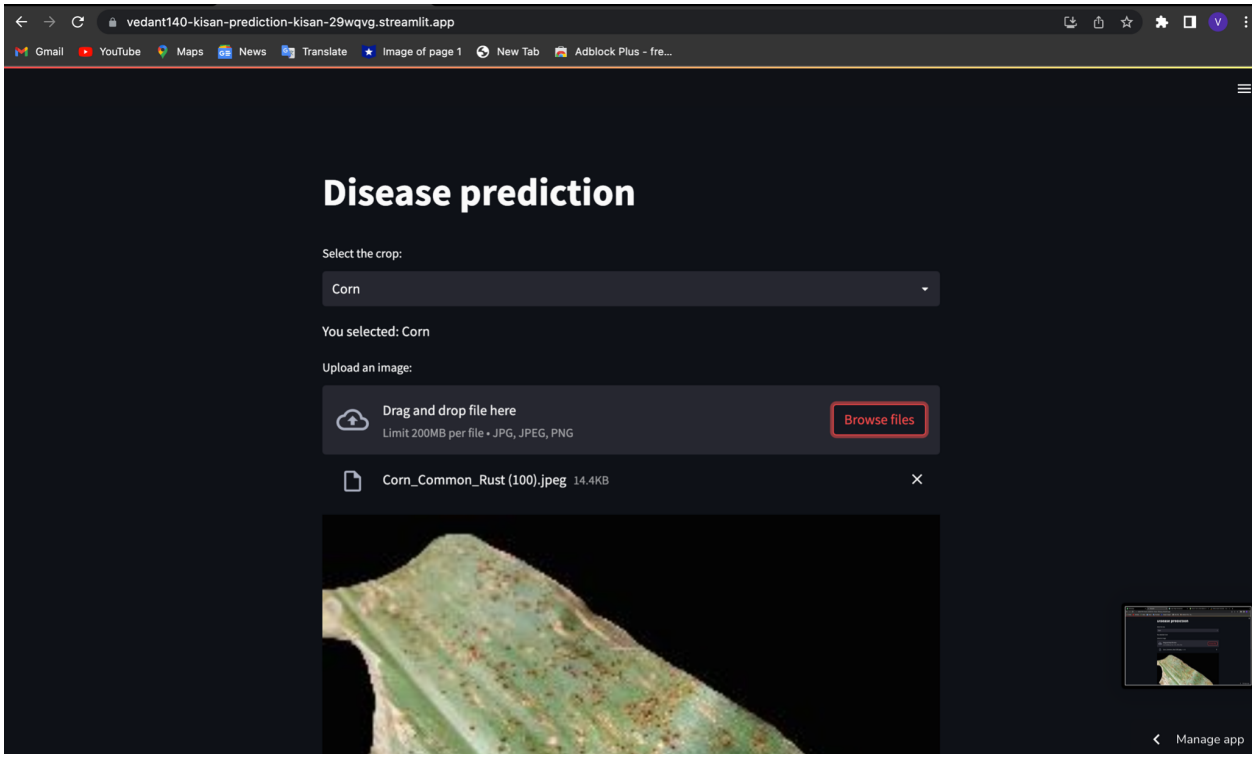
Dashboard:





After Clicking Predict button:

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Manage app