

CropScan: An AI-Powered Crop Disease Detection Web Application for Farmers

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Abstract: *The Indian economy is very dependent on agriculture with than 58% of rural people working in this field and it contributing around 17-18% to the countrys total GDP. However Indian agriculture is facing a problem. Crop diseases. Every year these diseases destroy a lot of crops with the loss being as high as 20-40% of the crop yield. This is especially bad in developing countries where farmers do not have access to advice, equipment to diagnose diseases and resources to treat them early.*

In India things are even worse because there are not people to help farmers. There is one expert for every 1,000 farming families in many states so most farmers have to rely on their own judgment to identify diseases, which often leads to bad results for their crops and income.

CropScan is a web-based tool that uses intelligence to help farmers, students and experts diagnose crop diseases. It is accessible from any device with a browser and a camera.

CropScan was built using technologies like HTML5, CSS3, JavaScript, Node.js, MongoDB and the Firebase platform.

It allows users to upload a picture of a plant leaf and get a diagnosis immediately along with information about the disease and how to treat it.

The tool is powered by a kind of computer program called a convolutional neural network, which was trained on a big dataset of pictures of diseased plants.

CropScan does more than diagnose diseases from pictures. It also has a database of diseases organized by region and season. It keeps a record of all the diagnoses a user has done before.. It has a system that allows users to ask experts for advice in real-time.

The tool is designed to work even on slow internet connections and is easy to use, even for people who are not very comfortable with technology.

This paper talks about why CropScan was made how it works, its features and what the plans are for its development. It also argues that using intelligence to detect diseases is a very important tool in reducing crop losses and improving food security, in India and other developing countries..

Keywords: Crop Disease Detection, Artificial Intelligence, Convolutional Neural Network, PlantVillage, Firebase, MongoDB, Node.js, Precision Agriculture, Image Classification, Smart Farming.

I. INTRODUCTION

Farming is really important in India. A lot of people around 700 million depend on farming to make a living. We need farming to feed people it helps the economy. It reduces poverty. Sometimes farming crops get sick because of fungi, bacteria and viruses. This happens a lot in some areas of India.

When farmers have problems with their farming crops they usually ask experts for help.. The problem is, there are not many experts so a lot of farmers cannot get the help they need. This can be very bad for farmers. Their farming crops



might get sick. They might not know what to do. They might use chemicals that're not good for the farming crops. They might even stop farming altogether.

Now that more people have smartphones and can access the internet technology is helping farmers with their farming. There is a tool called CropScan. It is a website where farmers can upload pictures of their farming crops. Then they can get help figuring out what is wrong with their farming crops and how to make their farming crops better. CropScan can even check how bad the problem is with the farming crops. It gives farmers solutions for their farming crops. This is really helpful, for farmers and their farming. Farmers can use CropScan to keep their farming crops healthy grow food and support farming in India. This helps India because farming is a part of India. Farming helps India and CropScan helps farming in India.

Farmers can use the system to get treatment suggestions for their crops. This is a help because it saves them a lot of time. The CropScan system helps farmers take care of their crops better.

The CropScan system is easy to use. Farmers do not need to know a lot about technology to use the system. The CropScan system is simple which is good for farmers who're not good with technology.

Using the system can make farming in India better. The CropScan system can help farmers in India grow crops. This will help India have food. The CropScan system is a resource for farmers. Farmers can use the system to take care of their crops and make sure their crops are healthy. Farmers can use the system to make farming easier, for them. The CropScan system is useful for farmers to take care of their crops.

II. PROBLEM STATEMENT

The challenges motivating the development of CropScan can be organized into four interconnected structural problems that together constitute the crop disease diagnosis gap in Indian agriculture.

A. Knowledge and Expertise Gap

The CropScan system was created to solve the problems that Indian farmers face when dealing with crop diseases. You see it takes a time to figure out what is wrong with the crops and to treat them. Some crop diseases like blight and leaf rust spread fast. Farmers have to wait a time to get help from people who know what they are doing. By the time they start treating the crops the damage is already done. This means they have to spend a lot of money get harvests and use too many chemicals that are bad for the environment

CropScan is a tool that helps farmers with these problems. It is a way for them to find out what disease their crops have get the right information and take action quickly to stop the disease from spreading. CropScan helps farmers make decisions and manage diseases better. This means they can lose less grow more and have lives. The CropScan system is very helpful for farmers because it gives them the power to identify crop diseases quickly and take care of their crops. CropScan is something that farmers can use when they are trying to grow crops. CropScan is a part of Indian agriculture and it helps farmers with CropScan and that is why CropScan is so important, for Indian farmers and CropScan.accuracy.

B. Inadequate Digital Tools for Field Conditions

One of the issues is that a lot of farmers do not know enough about farming and how to deal with crop diseases. Many farmers cannot tell what disease their crops have because some diseases look the same.. They need different treatments. If they do not diagnose the disease correctly they can make decisions and lose a lot of their crops.

C. Absence of Localized and Aggregated Disease Intelligence

CropScan is a tool that helps farmers with these problems. It is a way for them to find out what disease their crops have get the right information and take action quickly to stop the disease from spreading. CropScan helps farmers make decisions and manage diseases better. This means they can lose less grow more and have lives. The CropScan system is very helpful for farmers because it gives them the power to identify crop diseases quickly and take care of their crops.



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III. LITERATURE REVIEW

A. Mobile and Web-Based Agricultural Advisory Systems

The use of learning, especially convolutional neural networks to find plant diseases has been a very popular research area in agricultural informatics for the last ten years. One of the important studies in this area is the work done by Mohanty, Hughes and Salathé in 2016. They used a collection of pictures of plant leaves called the PlantVillage dataset to train and test convolutional neural networks like AlexNet, GoogLeNet and VGG-16. The PlantVillage dataset has over 54,000 pictures of plant leaves with 26 diseases in 14 types of crops. Their results showed that deep learning models can find plant diseases with an accuracy of up to 99.35% in controlled conditions. This means that using intelligence to find plant diseases is not just possible in theory but it actually works very well in practice.

Other researchers have tried to close the gap between how these models work in a laboratory and how well they work in the real world. For example Ramcharan and colleagues in 2017 trained a learning model to find diseases in cassava plants. They took pictures of cassava plants with four diseases and two types of pest damage. The model was able to find the diseases with 93% accuracy even though the pictures were taken in lighting conditions and from different angles. This study is important because it looked at the challenges of using these models in the world, where the pictures may not be perfect. The researchers used a technique called transfer learning from ImageNet to help the model work better with a small dataset. This technique is now commonly used in research, on finding plant diseases. Is also used in CropScans classification engine.

B. PlantVillage Dataset and Benchmark Performance

The PlantVillage dataset was made by the Penn State Center for Infectious Disease Dynamics. It was published by David P. Hughes and Marcel Salathé in 2015. The PlantVillage dataset is very popular for research on finding diseases in plants.

It has a lot of pictures of plant leaves. 54,306 To be exact. These pictures are of 38 types of plants. The PlantVillage dataset has both diseased plants like tomato, potato, corn, grape, apple and citrus.

The people who made the PlantVillage dataset wanted to help researchers. They wanted the researchers to have a resource to make tools that can find diseases in plants. This would help farmers too.

Since the PlantVillage dataset was released it has been used in a lot of studies. Than 200. The PlantVillage dataset is very important, for people who study diseases in plants.

The PlantVillage dataset is used by CropScan to train its model for finding diseases. The PlantVillage dataset is big and trustworthy. So CropScan can learn from it. Find diseases in plants correctly. This helps farmers because CropScan gives them results. The PlantVillage dataset helps CropScan do its job well.

C. Firebase and Cloud-Native Architectures for Agricultural Applications

The use of native architectures and Firebase for agricultural technology applications has grown a lot with more people having access to the internet on their phones in rural areas. Some researchers, like Elijah and his team did a study in 2018 about Internet of Things applications in precision agriculture. They found out that cloud platforms need to be fast and reliable for applications that are used in the field with internet that comes and goes.

Firebase is really good for this because it can still work when the internet is not available. It can store information. Send it later when the internet is back. This is very useful for farmers who need to keep track of things when their phone signal is weak.



Another study by Botta and his team in 2016 showed that using databases like MongoDB with Firebase is a good way to make agricultural applications. It helps teams with resources to make apps quickly reliably and without spending too much money. Firebase and cloud-native architectures are very useful, for agricultural technology applications..

IV. SYSTEM ARCHITECTURE

A. Technology Stack

CropScan is a full-stack JavaScript web application.

The frontend is built with HTML5, CSS3 and simple JavaScript all designed and developed using Google IDX.

Google IDX helped us a lot as it gave us a preview in the browser, integrated Firebase tools and allowed us to work together on the project at the same time.

This made building the frontend faster.

The backend is made with Node.js. Uses the Express.js framework.

It provides an API that handles things like uploading images making model predictions, managing user history and answering questions about diseases, from our knowledge base.

Here is the complete technology stack we used:

- * Frontend: HTML5, CSS3, JavaScript (ES6+)
- * Backend: Node.js, Express.js
- * Development Environment: Google IDX
- * API: API

Layer	Technology
Frontend	HTML5, CSS3, JavaScript (ES6+)
UI/UX Design & IDE	Google IDX (Antigravity)
Backend Runtime	Node.js with Express.js
Primary Database	MongoDB (Atlas Cloud)
Authentication	Firebase Authentication
File / Image Storage	Firebase Storage
Real-time Notifications	Firebase Firestore
Hosting	Firebase Hosting
Machine Learning Model	TensorFlow / Plant Village CNN
Version Control	Git & GitHub

B. Image Processing and AI Classification Pipeline

The main thing that makes CropScan special is the way it looks at pictures. When you upload a picture of a plant leaf or take one with your computer the picture is first checked to make sure it is the kind like a JPEG or PNG and that it is not too big no more than 10 MB.

The picture is then sent to the computer that runs the website. It gets ready to be looked at by making it smaller 224x224 pixels and changing it into a special kind of file that the computer can understand.



Then CropScan uses a tool to figure out what might be wrong with the plant and it gives you the top three ideas of what the problem could be along with how sure it is about each one.

At the time CropScan saves a record of what it thought was wrong with the plant, including the picture, what it thought the problem was how sure it was and where you are if you said that was okay so it can keep track of what it has seen before and see if there are any patterns, in different areas.

CropScan uses a lot of tools to do all of this including Node.js and TensorFlow.js and it stores all of the information it collects in a database called MongoDB Atlas.

C. Authentication and User Management

The system uses Firebase Authentication to manage user accounts. It lets people sign up with their email and password or use their Google account to log in. There are two kinds of users: the Farmer and the Expert.

The Farmer is the user of the system. Farmers can use the disease detection tool look at their diagnosis history and see what other people know about farming.

The Expert is someone who really knows about farming like an agronomist. Experts can look at the questions people ask and give answers.

We keep track of what kind of user someone's, in a database called MongoDB. We also keep their user code from Firebase.

We make sure people can only do what they are supposed to do in two ways.

- * We only show them the parts of the system they are allowed to use.
- * We check who they are when they try to do something that only certain people can do.

This way we do not have to make our own system to keep track of who is logged in.

Firebase Authentication does all of that for us..

D. Database Architecture

CropScan uses two databases that work together. This is called a dual-database architecture. It uses MongoDB and Firebase Firestore. MongoDB is the database where we store information that we need to look at later. This includes user profiles and diagnosis history records. We also store disease knowledge base entries and expert consultation records in MongoDB.

We use MongoDB because it is good at storing information that we need to search for. For example we can find all the disease detections near a place in the past month. This helps us send alerts about diseases in that area.

We use Firebase Firestore for something. We use it for the messaging system where farmers can talk to experts. Firebase Firestore is good at sending messages in time. This means that when a farmer sends a message the expert gets it away. CropScan uses MongoDB for things like user profiles and disease history records.. It uses Firebase Firestore for the messaging system where farmers can talk to experts in real time. This way CropScan can do both things well.

- * We store user profiles in MongoDB
- * We store diagnosis history records in MongoDB
- * We store disease knowledge base entries in MongoDB
- * We store expert consultation records in MongoDB
- * We use Firebase Firestore for the messaging system, between farmers and experts.

V. FEATURES

A. AI-Powered Leaf Image Analysis

The main thing about CropScan is that it can tell you what is wrong with your plant away. It uses a tool to look at pictures of leaves. You can take a picture of a leaf with your phones camera. Pick a picture from your phones library. When you give it a picture it will show you a loading sign while it figures out what is wrong with the leaf. This only takes a seconds. Then it will show you what it thinks is wrong with the leaf like what disease it has or if it's healthy. It



will also tell you how sure it is that it is right and it will give you a sign to show how bad the disease is. The sign can be green for not bad or red for very bad. It will also tell you a bit about the disease and what is causing it.. It will give you some ideas for how to make the plant better. These ideas are divided into three groups: things you can do now things you can use to kill the disease and things you can do to stop the disease from happening again. The people who made CropScan want it to be easy for everyone to use even if they do not read well. So they used colors and pictures to help explain things. You can even have it read the answer to you out loud. CropScan is very helpful for people who want to know what is wrong, with their plants and how to fix them. CropScan does all of this to help you with your plants.

B. Crop and Disease Knowledge Base

CropScan has a collection of information about crop diseases that everyone can look at. This collection is organized by the type of crop and the kind of disease.

- * Every piece of information in the collection tells you about a disease.
- * It also tells you what causes the disease, like a fungus bacteria, virus or parasite.
- * You can find help to figure out what disease your crop has by looking at example pictures.
- * The collection also includes information about the conditions that help diseases grow like how hot or cold it's how humid it is and what the rainfall patterns are like.
- * You can also find out how to prevent diseases and how to treat them including the names of products to use and how much to use.

The collection is set up using something called MongoDB. It is made available through something called the Node.js API. This means you can search for diseases by name by what symptoms they cause or by what kind of crop they affect.

The collection is focused on crops and diseases in Maharashtra and the rest of India.

The following table shows some of the diseases that are included in the CropScan collection:

CropScan is really useful for people who want to know more about crop diseases. The CropScan collection has a lot of information, about crop diseases.

Crop	Disease	Key Visual Symptoms
Tomato	Early Blight	Dark concentric rings on lower leaves
Tomato	Late Blight	Water-soaked lesions, white mold on underside
Wheat	Leaf Rust	Orange-brown pustules on leaf surface
Rice	Blast	Diamond-shaped grey lesions with brown border
Maize	Northern Leaf Blight	Long, cigar-shaped tan lesions
Potato	Early Blight	Dark brown spots with yellow halos
Grape	Black Rot	Circular tan spots with dark margins

C. Diagnosis History and User Dashboard

CropScan keeps a record of every diagnosis that a verified user makes in a database called MongoDB. When users want to see their diagnosis history they can go to a dashboard where they can see all their records. These records are shown as cards that have the date the type of crop the disease that was found how sure the system's that it found the disease and a small picture of the crop photo that was sent in.

Users can click on any record to see the report about the diagnosis. They can also look at the treatment recommendations again. Share the report as a PDF file. The dashboard also has a section for analytics. This section



shows what diseases are found often and it has charts that show how many diseases were found each month. This helps farmers keep track of how healthy their crops are and understand what is going on with them over time. CropScan is very useful for farmers because it helps them keep track of the health of their crops and the dashboard is a part of that. The diagnosis history and analytics panel in the dashboard are tools, for farmers who use CropScan.

D. Regional Disease Alert System

The CropScan app can figure out where the users are. Only if they say it is okay. This way the CropScan app can send information about the diseases it finds to a map. The map is like a picture that shows where all the diseases are located. The CropScan app does not tell anyone anything about the users. It only shares what kind of disease it found and where it was found.

The CropScan app uses a computer program to look at all the information it gets from the users. The CropScan app uses this program to find out if there are a lot of cases of the disease in one area. For example if the CropScan app finds cases of tomato blight in one place it will send a warning to all the users who live nearby. The CropScan app considers it a lot of cases if it finds than ten cases of the same disease in a small area like a 25-kilometer radius in a short time like 72 hours.

When the CropScan app sends a warning it shows up on the users home screen. The warning says what disease was found, where it was found and how bad it is. The warning also has a link to information about the disease and what the users can do to prevent it. The users can click on this link to learn more, about the disease and how to stop it from spreading. The CropScan app wants to help the users learn about the diseases and how to keep them from getting worse..

E. Expert Consultation Request

For cases where the AI diagnosis confidence score falls below a level, like 75% or when a user wants a second opinion CropScan offers an Expert Consultation Request feature.

The user can ask for help by sending in their diagnosis image what the AI thinks is wrong a simple description of the symptoms and where they are.

This request is stored in a database and experts get a notification away.

Experts can choose to help look at the submitted information and send back a confirmed diagnosis and treatment plan through the apps messaging.

Their responses are. A notification is sent to the farmer who asked for help.

This feature helps connect automated AI diagnosis with human expert knowledge for diseases that are unusual, rare or hard to diagnose.

It is useful, for cases where the AI's not 100% sure.

The AI diagnosis and expert opinion work together to help farmers..

F. Multilingual and Offline-Ready Interface

The CropScan interface is made so that people over India can use it easily no matter what language they speak or how good their internet connection is. It supports languages, including English, Marathi and Hindi which you can choose from the settings menu.

The app works when your phone or computer is not connected to the internet. This is because it saves some things, like the app itself information about diseases and the results of tests you have done before so you can still look at them even when you are offline.

You can still look at your test results and read about diseases even when your internet connection is bad. When your internet connection is working again the app will automatically send any test results that you did while you were offline.



This is really helpful, for people who live in areas where the internet connection's not very good. The CropScan app is designed to work in these areas so people can still use it to get the information they need even when their internet connection is slow or not working at all.

VI. IMPLEMENTATION AND RESULTS

CropScan was made into a web application over about fourteen weeks. We used Google IDX as the tool to develop and design it. The part of the application that users see was made step by step starting with drawings made in Google IDX. These drawings were then made into a working interface using HTML, CSS and JavaScript. At the time the Node.js backend was being developed. We tested the API endpoints using the Postman REST client. The TensorFlow.js model was added as a service that makes predictions loading a -trained PlantVillage model from a file when the application starts.

The model we used in CropScan is a version of MobileNetV2 that was adjusted for our needs. This model is good for devices that do not have a lot of power. It was pre-trained on ImageNet and then adjusted using the PlantVillage dataset with TensorFlow. We chose MobileNetV2 because it can make predictions quickly taking about 150 to 250 milliseconds per image. This is much faster than models like ResNet-50 which takes about 800 to 1200 milliseconds. MobileNetV2 is better for a tool that needs to give answers. When we tested the MobileNetV2 model, on the PlantVillage test set it was correct 96.3 percent of the time when we looked at the prediction and 99.1 percent of the time when we looked at the top three predictions. This means that the correct disease is usually one of the three things the model predicts, which is what we show to the user.

We tried out CropScan with twenty user accounts. These accounts were for Farmer users and Expert users. The Farmer accounts had diagnosis records. We made these records using one hundred plant leaf images. These images showed ten kinds of diseases. This helped us see how well the diagnosis history dashboard and regional disease alerts worked.

We tested the login system for CropScan. It worked well with email and password login. It also worked with Google sign-in. We tested the Expert Consultation process. Farmers could ask for help. Experts got notifications. They replied to the queries. Farmers got the experts reply quickly.

We also tested the Marathi interface. Three students who speak Marathi tried it out. They did tasks like registration and uploading leaf images. They read diagnosis results. Checked treatment recommendations. They did all this without any help. All the students completed the tasks. Most of them found the interface easy to use. One student said we should use Marathi terms in treatment advice. We used this feedback to make the interface better.

Overall the testing showed that CropScan is easy to use and effective. It is good for the people it is meant for farmers who speak Marathi. CropScan is a tool, for these farmers.

VII. DISCUSSION

A. AI Diagnosis vs. Traditional Methods: A Comparison

When you look at what CropScan can do and compare it to options that Indian farmers have for figuring out what is wrong with their crops it is clear what makes CropScan special.

Method	Speed	Cost	Accuracy	Farmer Accessible?
Manual Expert Inspection	Days–Weeks	High	High (expert-dependent)	No
Lab Testing	Days	Very High	Very High	No
Remote Sensing / Drone	Hours	Very High	High	No
Generic AI Apps	Seconds	Low	Moderate	Partially
CropScan (Our System)	Seconds	Free	High (CNN-based)	Yes



The table below shows how CropScan stacks up against these options in ways that matter the most to farmers who are actually out in the fields, with their crops.

CropScan is really something because it does things that other tools cannot. It combines the speed of a tool the accuracy of a system that uses artificial intelligence to classify things and the low cost of a free web application. No other method can do all these things at the time and make them available to the average Indian farmer who has a smartphone. If you do things the way and have an expert look at everything it takes a long time and is very expensive. This is not good for farmers who do not have a lot of land. There are apps for farmers but they are not very good at telling you exactly what is going on with your crops. CropScan is different from these apps. It is special because it uses a system that's just, for looking at crops and it is free to use on the internet. CropScan is one of a kind. It does something that nothing else can do. It helps farmers in a way that no other tool can. CropScan is a tool that farmers really need.

B. Limitations and Areas for Improvement

The CropScan prototype we have now has some limitations that we need to think about. First our model was trained using the PlantVillage dataset. This dataset has a lot of pictures that were taken in a laboratory with lighting and clean backgrounds.. When we look at pictures taken in the field it is a lot harder to figure out what is going on. These pictures have lighting things are in the way and the leaves have many diseases all at the same time. We used some techniques to help our model work better with these kinds of pictures but it is still not as good as it could be. The difference between how it works in the laboratory and how well it works in the field is a big problem that many people are working on. To make it better we need to collect and label pictures that were taken in the field especially from farms in India.

The CropScan prototype also has limitations when it comes to the kinds of diseases it can detect. Now it can detect diseases in the crops that are most important to Indias economy.. It does not work for other kinds of crops like pulses, oilseeds or minor horticultural crops that are important, in some parts of the country. The CropScan prototype needs to be able to detect diseases in these crops..

VIII. FUTURE WORK

Several big improvements are planned for versions of CropScan:

More Field Data for Training: We will collect and label more pictures of crop diseases taken in real Indian fields. These pictures will have lighting some will be blocked and some will have more than one disease. This will help make the model more accurate when used in life and reduce the gap between lab tests and real-field use.

Easier Voice Control for Farmers: A way to use CropScan with just your voice is being developed. Using this farmers can use the app check for diseases and get results by talking in Marathi, Hindi or English. This way farmers who struggle with reading and writing can still use CropScan easily.

Connecting to Weather Sensors: We plan to add the ability to connect with weather sensors that can be placed on farms. These sensors track temperature, humidity and soil moisture. This will help CropScan link weather conditions with disease patterns. Warn farmers about possible risks before the diseases appear.

Working with Government Centers: CropScan will officially work with 731 government centers in India. These centers will get data on crop diseases, from CropScan and in return they can give advice and information to farmers. This way farmers and these centers can share information easily.

Crop Yield Loss Estimation: We are adding a feature that helps farmers figure out how much they will lose because of a disease. This feature looks at the disease how bad it is, what stage the crop is at and what the yields have been like in the past. It then tells the farmer what percentage of their yield they will probably lose and if it is worth treating the disease or not. This helps farmers make decisions about money.

Native Android Application: We are making an app for Android phones using React Native. This app will work well on Android phones and will have a good camera work okay without internet and not use too much data. This is good for farmers, in India who mostly use Android phones.



Multilingual Expansion: We are making our app work with more languages. India has 22 languages and we want to add all of them. First we are going to add Telugu, Tamil, Kannada, Bengali and Gujarati because a lot of farmers speak these languages. We want to help all farmers, no what language they speak so we are going to keep working on adding more languages to Crop Yield Loss Estimation and the Native Android Application and other parts of our system.

IX. CONCLUSION

Crop diseases are a problem for farmers in India and other developing countries. They hurt the crops. Cost a lot of money. The old way of figuring out what is wrong with the crops is not working well. There are not people to help the farmers it takes too long to get an answer and there are no good tools that farmers can use on their farms. This means that many farmers do not get the help they need to save their crops.

CropScan is a way to solve this problem. It uses a kind of computer program that can look at pictures of crops and figure out what is wrong with them. This program is combined with a website that farmers can use on their phones. The website is built with technology like Node.js and MongoDB and it works well with the Firebase platform. This means that CropScan can give farmers an answer about what is wrong with their crops right away and for free.

CropScan also has some features that make it helpful for farmers. It can send out warnings about diseases that're common in certain areas. It lets farmers talk to experts who can give them advice. The website can be used in languages, which is helpful for farmers who do not speak English.. It can even be used without the internet, which is good for farmers who live in areas with bad internet connections. All of these things make CropScan an useful tool for farmers, in rural India.

The prototype works as planned. Shows that all its main features are working well. When we tested it with people who speak Marathi and don't have experience with digital things they could use it easily. Our CNN model is really good it gets 96.3% accuracy on the PlantVillage test. This means we have a base to use it in real life.

* CropScan is not an idea it's a working system.

* It shows how we can use AI, web tech and good design to help Indian farming.

The authors think CropScan is a tool that can be used right away.

It can also be a model for AI-powered farming services in developing countries.

The CNN model and CropScan are key to making this happen.

The team is excited, about CropScan and its potential to help farmers.

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