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AI Based Smart Voice Assistance for Rural Places

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ABSTRACT: The improvement of the data generation and verbal exchange has been complicated in enforcing of synthetic smart machines .The systems are drawing near human activities inclusive of decision support system, robotics, natural language processing, expert systems, and so forth. These structures can learn by themselves and renew their know-how by way of reading all electronics articles that are currently on the internet. Humans as a user can ask inquiries to the structures like normally do to different humans. These structures are regularly known as net answering-engines. In rural areas there is a dire need for a smart system which could help the rural people with their everyday troubles and offer solutions that may ease their existence. As a result, we have proposed a smart system which targets to make conversations between the humans and the machines. The device has been embedded with knowledge to perceive the sentences and make decisions itself as a reaction to answer the query. This system enables to simplify the lives of rural people by solving their queries regarding various government schemes, imparting knowledge about medicinal tablets, and educating them with remedies for leaf diseases .

KEYWORDS: Smart voice assistant, CNN, voice recognition, leaf disease detection ,general queries.

I. INTRODUCTION

In India there are around 6,00,000 villages out of which 1,25,000 villages are backward in terms of education, so there is a need for designing and building efficient tools and models that will ease the life of rural people. Village is a critical area for the development of a nation, so we need to develop it in such a way which makes it self-dependent in providing the services and well connected to the rest of the world i.e., smart village.

The development of the information technology and communication has been complex in the implementation of artificial intelligent systems. The systems are approaching of human activities such as decision support systems, robotics, natural language processing, expert systems, etc. Even in the artificial intelligent fields, there are some hybrid methods and adaptive methods which make it possible to develop even more complex systems.

Not only that, but nowadays there is also a hybrid of natural language and intelligent systems those could understand human natural language. These systems can learn themselves and renew their knowledge by reading all electronics articles that are existing
on the internet.

Human beings as a user can ask questions to these systems like they do to other human beings. These systems are often known as internet answering-engines. These systems work is very simple fashion where in the knowledge required to perform the certain action is already programmed in advance. One of methods used in this application is to match the pattern (pattern-matching). The Smart model would match the input sentence from the speaker or user with pattern that has existed on the knowledge. It would then find the solution associated the matched pattern and return the solution of the query to the user.

II. RELATED WORK

In this section presents the existing methods and relevant approaches which are surveyed as follows.A literature survey is a piece of discursive prose, not a list describing or summarizing one piece of literature after another. It is an iterative process, assessing and distilling information. One of the key purposes of the literature survey is to investigate a problem that no one else has addressed. In [1], they have developed an intelligent personal robot named BoBi secretary, which perform the works of a secretary, such as scheduling works, scheduling reminders, sending emails, calling phones, booking, making reservations, searching information etc. The main drawback of this system is that the model gives less accuracy and there is a high chance of theft. In [2], the authors developed a system that

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makes use of the Random Forest in identifying between the healthy and diseased leaf from the datasets created. The drawback here is It takes more time for image processing. Grape is widely grown crop in India and it may be affected by different types of diseases on leaf, stem and fruit. In [3], the authors have developed an automatic system for detecting the diseases in the grape vines using image processing and machine learning techniques. The drawback here is that The model cannot recognize the all type of diseases.

In [4], they have developed a personal assistant robot which helps to reduce the manual efforts of human in their day-to-day task. Here the person assistant robot is controlled by voice command to pick long/short distance objects. The drawback here is that it may require person to be educated to operate the robot. In [5], the authors have proposed a virtual learning environment integrated with adaptive testing functionalities using Raspberry pi. The system has the potential to increase the learning effectiveness for learners in remote villages as learners can browse learning content and do assessments offline. The learners will have access to course material through a mobile application. Each course topic that students engage in, will include topic notes, videos, activities, assessments, which can be accessed even when offline. At the end of each topic, students will take an adaptive test. Learning content is made available in the learning management system, hosted on a Raspberry pi and accessed on a mobile application. The drawback here is that Educational qualities is must to operate the system. In [6], the authors have proposed a model to extract the name of the medicine with the help of OCR and Text Summarization and display information like name, usage, dosage, etc. on the application. The drawback is that the model needs persons to be educated to operate for user interaction. In [7], the authors have proposed a personal assistant presented in the form of a humanoid robot equipped with an embedded interactivity platform as well as an integrated vision system. It has been designed then developed in order to conduct discussions, communicate with individuals and smart devices through voice commands, recognize, locate and count people's faces. The drawback is that the people need to be educated on the system to operate. In [8], the authors have proposed the intelligent assistant which is capable of understanding the commands given by the user. The assistant can easily understand the commands given by the user through vocal media and responds as required. It can perform the most frequently asked requests from the user and makes their task easier. The drawback is that the system was complex to implement which is not usually feasible in villages. In [9], they have made an experimental evaluation of a reliable, low power indoor bed tracking and drug identification system for hospital ward environment. The aim of this work is to deliver correct drugs to patients on a timely basis. The drawback is that it requires to be supplied with power continuously. In [10], the authors developed a mobile application, in order to give suggestion to farmers about crop to be cultivate and fertilizer which could be used for good yield. It requires a good quality mobile device which is not affordable by all farmers.

III. PROPOSED ALGORITHM

Algorithm design refers to a method or a mathematical process for problem-solving and engineering algorithms. The design of algorithms is part of many solution theories of operation research, such as dynamic programming and divide-and-conquer. The algorithm design of our project is CNN.

STEP 1: Acquire the dataset images.

STEP 2: Perform pre-processing(image),

Do Re-size(dataset_images) to 50 x 50

STEP 3: Feed the images into a CNN model consisting of convolutional layers, pooling layers and fully connected layers.

STEP 4: Alter the fully-connected layer of the model to fit the number of classes to classify, in this case it is 6.

STEP 5: Define the loss function and train the model according to the decided epoch value to increase the accuracy of the model.

STEP 6: Save the model to deploy in the application.

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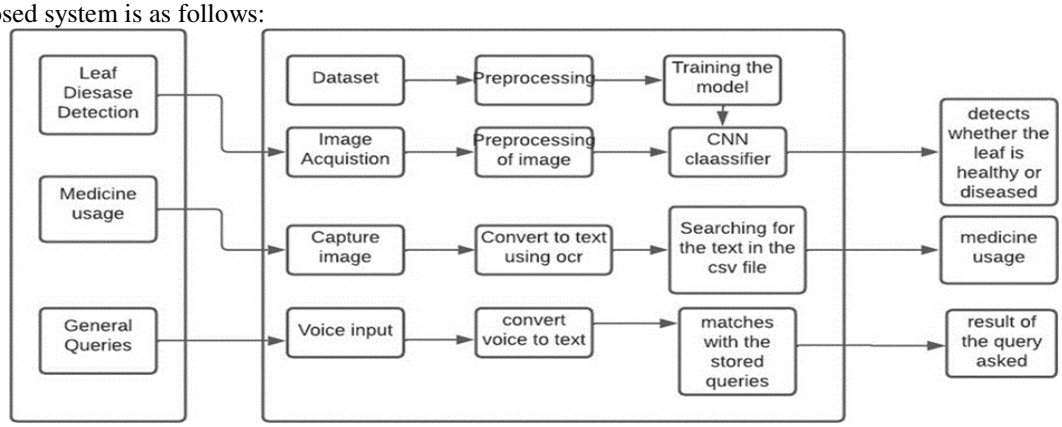
The proposed system is as follows:



The proposed system consists of the following components.

1. Leaf disease detection

- Dataset Collection:
  - In this module, we collect the images from kaggle website.
- Image Preprocessing:
  - In this module, we preprocess the image by converting them into standard sizes, converting them to tensors so that they are ready for CNN'S.
  - This makes sure that the model is robust towards varied data.
- Building a CNN:
  - In this module, we build custom CNN which consists of 5 layers to extract features from the images. The convolutional layers learn 32,64,1024 filters one by one with filters of size 3.
  - Maxpool layer has a filter size of 3, finally followed by fully connected layer with activation function as softmax and optimizer as adam.

2. Medicine detection module

- In this module we take image as the input.
- Using OCR the characters in the image are recognized and converted to text.
- Here the csv file is used to store the medicine names and their uses.
- The text is compared with the medicine names in the csv file and then the matched results are displayed.

3. Queries module

- The user can ask the queries through voice which after converting to text will be matched with the stored queries.
- The matched responses will be given.

IV. PSEUDO CODE

Leaf Disease detection:

Step 1:Import the necessary libraries.
Step 2: The pre-processing module was implemented.
Step 3:Train the dataset using CNN model.
Step 4:Save and deploy the model.
Step 5:Input the leaf image and send it to CNN Classifier which classifies leaf as diseased or not.
Step 6:Output the remedies.

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Medicine detection:

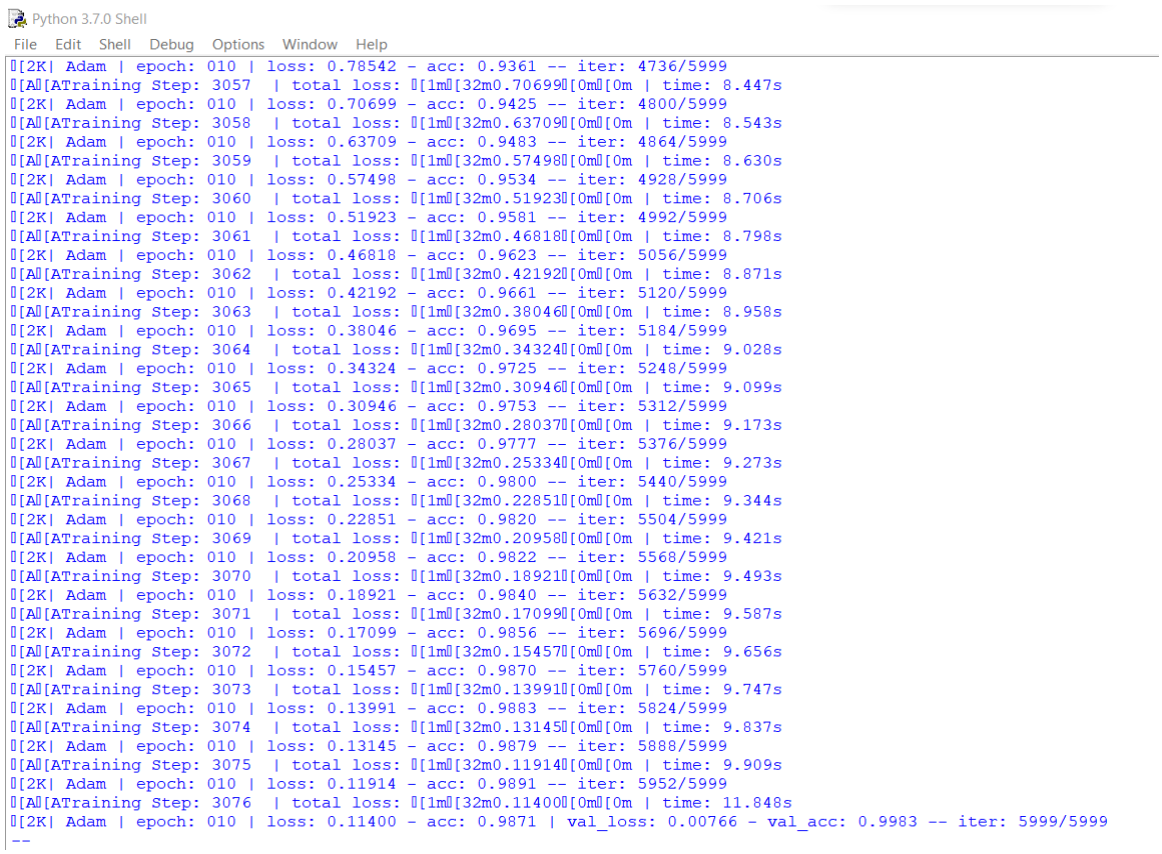
Step 1:Import the necessary libraries.
Step 2:Create the datafile in csv format which consists of medicine name and its uses.
Step 3:Capture the medicine image using camera.
Step 4:Next the text on the image is recognized and identified using python inbuilt module pytessaract.
Step 5:The text is searched for the medicine name in the csv file.
Step 6:Output the uses if the match is found.

General Queries:

Step 1:Import the necessary libraries.
Step 2:Create the datafile in csv format which consists of general queries and its benefits.
Step 3:Take the voice as input using microphone.
Step 4:Recognize the voice and convert it into text using gTTs module.
Step 5:The text is matched with the queries stored in csv file.
Step 6:Output the benefits if match is found.

VI. SIMULATION RESULTS

Once the images are trained, a certain number of epochs and iteration is decided and the model is executed. Below is the snapshot of epochs running and execution.



The accuracy of the leaf disease detection model is 98.71%.

VI. CONCLUSION AND FUTURE WORK

This project proposes a smart model which aims to fulfil the objectives of helping in educating rural people and providing them guidance in various domains such as agriculture, medicine. It provides an efficient mechanism for solving queries of rural people by communicating the solutions/remedies of their queries in local(kannada) language.

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This model can be deployed at the village panchayat office and used as an efficient tool to educate and impart knowledge among rural people.

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