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DEEP LEARNING AND CNN BASED PLANT LEAF DISEASE DETECTION

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ABSTRACT:
The latest generation of convolutional neural networks (CNNs) has achieved impressive results in the field of image classification. This project is concerned with a new approach to the development of plant disease recognition model, based on leaf image classification, by the use of deep convolutional networks. Novel way of training and the methodology used facilitate a quick and easy system implementation in practice. The developed model is able to recognize 9 different types of plant diseases out of healthy leaves, with the ability to distinguish plant leaves from their surroundings. According to our knowledge, this method for plant disease recognition has beenproposed for the first time. All essential steps required for implementing this disease recognition model are fully described throughout the project, starting from gathering images in order to create a database, assessed by agricultural experts. The experimental results on the developed model achieved precision between 91% and 98%, for separate class tests, on average 96.3%.

1.INTRODCUTION
When plants and crops are affected by pests it affects the agricultural production of the country. Usually farmers or experts observe the plants with naked eye for detection and identification of disease. But this method can be time processing, expensive and inaccurate. Automatic detection using image processing techniques provide fast and accurate results. This paper is concerned with a new approach to the development of plant disease recognition model, based on leaf image classification, by the use of deep convolutional networks.

Advances in computer vision present an opportunity to expand and enhance the practice of precise plant protection and extend the market of computer vision applications in the field of precision agriculture. Novel way of training and the methodology used facilitate a quick and easy system implementation in practice. All essential steps required for implementing this disease recognition model are fully described throughout the paper, starting from gathering images in order to create a database, assessed by agricultural experts, a deep learning framework to perform the deep CNN training. This method paper is a new approach in detecting plant diseases using the deep convolutional neural network trained and fine -tuned to fit accurately to the database of a plant's leaves that was gathered independently for diverse plant diseases. The advance and novelty of the developed model lie in its simplicity; healthy leaves and background images are in line with other classes, enabling the mode l to distinguish between diseased leaves and healthy ones or from the environment by using deep CNN.

2.RELATED WORK:
Existingsystem:

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When plants and crops are affected by pests it affects the agricultural production of the country. Usually farmers or experts observe the plants with naked eye for detection and identification of disease. But this method can be time processing, expensive and inaccurate. Existing systems use expert system that contains many rules (business) which leads much time and much coding. May not give more effective results. Most of machine learning algorithms are on statistical approach. These statistical approaches are used for textual and numerical data. They may not work heavy or large no of imageinputs.

Proposedsystem :

Novel way of training and the methodology used facilitate a quick and easy system implementation in practice. All essential steps required for implementing this disease recognition model are fully described throughout the paper, starting from gathering images in order to create a database, assessed by agricultural experts, a deep learning framework to perform the deep CNN training.

This method paper is a new approach in detecting plant diseases using the deep convolutional neural network trained and fine -tuned to fit accurately to the database of a plant's leaves that was gathered independently for diverse plant diseases. The advance and novelty of the developed model lie in its simplicity; healthy leaves and background images are in line with other classes, enabling the mode l to distinguish between diseased leaves and healthy ones or from the environment by using deep CNN.

Feasibilityanalysis

Operational An important outcome of preliminary investigation is the determination that the system request is feasible. This is possible only if it is feasible within limited resource and time. The different feasibilities that have to be analyzed are

- Feasibility
- Economy Feasibility
- Technical Feasibility

OperationalFeasibility

Operational Feasibility deals with the study of prospects of the system to be developed. This system operationally eliminates all the tensions of the Admin and helps him in effectively tracking the project progress. This kind of automation will surely reduce the time and energy, which previously consumed in manual work. Based on the study, the system is proved to be operationally feasible.

Economic Feasibility

Economic Feasibility or Cost-benefit is an assessment of the economic justification for a computer based project. As hardware was installed from the beginning & for lots of purposes thus the cost on project of hardware is low. Since the system is a network based, any number of employees connected to the LAN within that organization can use this tool from at any time. The Virtual Private Network is to be developed using the existing resources of the organization. So the project is economicallyfeasible.

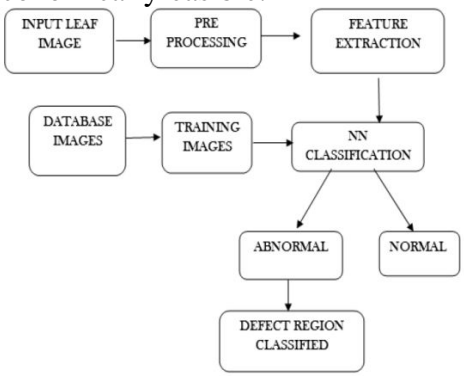

Figure1:Architecture

TechnicalFeasibility

According to Roger S. Pressman, Technical Feasibility is the assessment of the technical resources of the organization. The organization needs IBM compatible machines with a graphical web browser connected to the Internet and Intranet. The system is developed 18 for platform

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independent environment Java Server pages, JavaScript HTML SQL server and web logic server are used to develop the system .The technical feasibility has been carry out. The system is technically feasible for development and can be developed with the existing facility.

3.METHODOLOGY:

UML Diagrams:

UML stands for Unified Modeling Language. UML is a standardized general-purpose modeling language in the field of object-oriented software engineering. The standard is managed, and was created by, the Object Management Group. The goal is for UML to become a common language for creating models of object oriented computer software. In its current form UML is comprised of two major components: a Meta-model and a notation. In the future, some form of method or process may also be added to; or associated with, UML. The Unified Modeling Language is a standard language for specifying, Visualization, Constructing and documenting the artifacts of software system, as well as for business modeling and other non-software systems. The UML represents a collection of best engineering practices that have proven successful in the modeling of large and complex systems. The UML is a very important part of developing objects oriented software and the software development process. The UML uses mostly graphical notations to express the design of software projects.

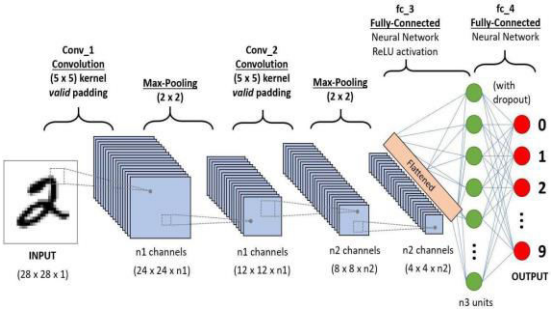

Figure 2:Block Diagram

We are first loading all the images in their respective categories from their directories. Then we are splitting the images into train and test splits in the from this we will be getting train data and test dataseparated. After separation, we will be giving train images to the image generator which flips the images, shears the images and zoom the images so that all the features of the leaf can be feed for training so that we will be able to increase the robustness of the model. Once the train set is ready we will be building the CNN layers, so in our CNN network, we have added 12 layers which include CNN layers, max pool layers, dropoutlayers.We have used different activation functions such as Relu(which allows all the positive weights), Softmax(which gives the probability of occurrence of a particular category).In our model, we have implemented 25epochs. After that, we have saved our model and loaded the model for prediction using the Tkinter UI. In the UI we have used OpenCV to load theimages.

SYSTEMTESTING

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, subassemblies, assemblies and/or a finished product It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

4.STUDY OF RESULTS:

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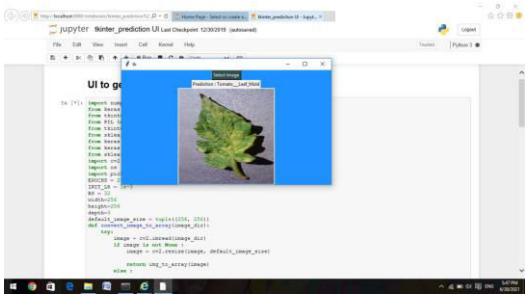

Figure3:Output Screen For Diseased Leaf

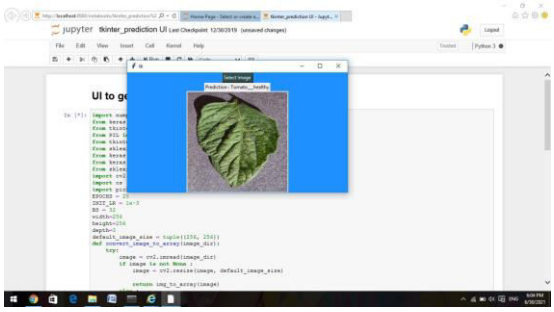

Figure4:Output Screen For Healthy Leaf

CONCLUSION:

This project has proposed a real-time detection approach that is based on improved convolutional neural networks for tomato leaf diseases. The deep-learning-based approach can automatically extract the discriminative features of the diseased tomato images and detect the ten common types of tomato leaf diseases with high accuracy in real time. In this project, to ensure satisfactory generalization performance of the proposed model and a sufficient tomato disease image dataset, a total of 2,000 images with uniform and complex backgrounds were collected in the laboratory and in a real tomatofield.

Hence, the proposed model is fully capable of real-time detection of apple leaf diseases. The results demonstrate that the proposed model can detect the ten common types of tomato leaf diseases with high accuracy in real time and provides a feasible solution for the real-time detection of apple leaf diseases.

Futurescope

The proposed system was developed taking in mind the benefits of the farmers and agricultural sector. The developed system can detect disease in plant and also provide the remedy that can be taken against the disease. By proper knowledge of the disease and the remedy can be taken for improving the health of the plant. The proposed system is based on python and gives an accuracy of around 78%. The accuracy and the speed can be increased by use of Googles GPU for processing.

REFERENCES:

1.Mrunalini R. et al., An application of K-means clustering and artificial intelligence in pattern recognition for crop diseases,2011.

2. S.Raj Kumar , S.Sowrirajan," Automatic Leaf Disease Detection and Classification using Hybrid Features and Supervised Classifier", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, vol. 5, Issue 6,2016..

3. Tatem, D. J. Rogers, and S. I. Hay, "Global transport networks and infectious disease spread," Advances in Parasitology, vol. 62, pp. 293–343, 2006. View at Publisher · View at Google Scholar · View atScopus.

4. J. R. Rohr, T. R. Raffel, J. M. Romansic, H. McCallum, and P. J. Hudson, "Evaluating the links between climate, disease spread, and amphibian declines," Proceedings of the National Academy of Sciences of the United States of America, vol. 105, no. 45, pp. 17436–17441, 2008. View at Publisher · View at Google Scholar · View at Scopus.

5. T. Van der Zwet, "Present worldwide distribution of fire blight," in Proceedings of the 9th International Workshop on Fire Blight, vol. 590, Napier, New Zealand, October 2001.

6. H. Cartwright, Ed., Artificial Neural Networks, Humana Press,2015.

7. Steinwart and A. Christmann, Support Vector Machines, Springer Science & Business Media, New York, NY, USA, 2008. View atMathSciNet.