QUALITY ANALYSIS OF FRUITS USING MACHINE LEARN

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ABSTRACT

The proposed system helps in identification of fruit quality and provides classification that can be used as a defence mechanism against the disease. In Today's time Agriculture productivity has vast role in the economy of any country, this is one of the reasons that fruit quality detection in the fruits plays an important role in the agriculture field. Detection of fruit quality through some advanced computer vision technology is called OpenCV and TensorFlow it is very beneficial to reduce the large work of monitoring in big farm of any plants and at very early stage camera can detects the quality of fruit that is when they appear on fruit surface or from internal sides. The newest generation of convolutional neural networks (CNN) has impactful results in the field of image classification. All essential steps required for implementing this quality recognition model like variety of neural-wise and layer-wise visualization methods were applied using CNN and trained with publicly available Fruit quality dataset and after generate the attention maps for identify several layers that were not contributing to inference and remove such layers from the network and decreasing the number of parameters by 75 percent without affecting the classification accuracy.

KEYWORDS: Image processing, Keras library, OpenCV ,TensorFlow, classification, Test-Dataset, CNN.

1. INTRODUCTION

Fruits and veggies include a critical part of the human food plan as they may primarily deliver nutrients. In latest years, the rising call for fruits quality assessment and sensory traits have captured big demanding conditions within side the agriculture sector. Although, manual grading and sorting can be completed for the first-class tests and freshness of result detection, even though this technique is significantly fickle, inconsistent, and tedious. In this situation, the identification of any microbiologically contaminated result is quite difficult and can motive immoderate threats to human health via causing numerous diseases. Object popularity is a judgemental field of the computer era for finding patterns like seen or sound patterns. To achieve we used techniques from areas like data science and machine learning. In modern-day years, various sorts of image assessment techniques have been applied to come across objects, like the result or veggies. Most of these techniques for fruit detection are based mostly on four easy features that describe an object: colour, form, texture, and intensity.

2. OBJECTIVES

1. To develop an effective Quality Analysis system.
2. To give the user at most perfect prediction about the quality of product, it may be good, average or worst.
3. To use a video as input & do Quality Analysis on that video.

3. BACKGROUND REVIEW AND SYSTEM ARCHITECTURE

1. **BACKGROUND REVIEW:**

   1. **Tensorflow**
   TensorFlow is a free and open-source software library for machine learning. It can be used across a range of tasks but has a particular focus on training and inference of deep neural networks. Tensorflow is a symbolic math library based on dataflow and differentiable programming.

   2. **Keras**
   Keras is an open-source software library that provides a Python interface for artificial neural networks. Keras acts as an interface for the TensorFlow library. Up until version 2.3, Keras supported multiple backends, including TensorFlow, Microsoft Cognitive Toolkit, Theano, and PlaidML.

3.   **OpenCV**

OpenCV is a library of programming functions mainly aimed at real-time computer vision. Originally developed by Intel, it was later supported by Willow Garage then Itseez. The library is cross-platform and free for use under the open-source Apache 2 License.

4.   **PyCharm**

PyCharm is an integrated development environment used in computer programming, specifically for the Python language. It is developed by the Czech company JetBrains.

2.   **SYSTEM ARCHITECTURE:**
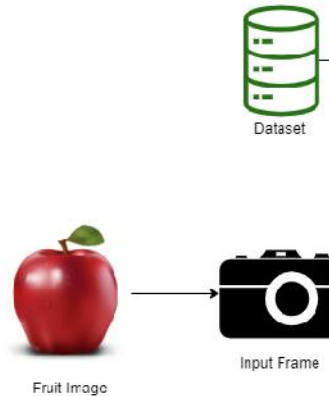
Figure: System Architecture

It takes fruit image as input and gives its quality. So, there's a data-set which has the fruit specifications and by using that various groups work. If a new image is given to the component then it's characteristics get compared with the features that are already trained in the dataset. It then provides the result.
There are two phases - training phase and testing phase.
Planning stage - The case of data set defilement during the planning stage is adaptable and physical.

Make the information base versatile - Contaminated examples can be found by applying different cycles, for example, picture reprocessing and picture refreshing of versatile methodologies.

Make information base physically - The illness models and sickness levels in these models are gathered utilizing manual strategies.

Test stage - Sullied tests can be recognized from the informational collection, and the illness name and infection level of the example can be found at the test stage.

Versatile Database Creation - Test Phase Take photos to assist with following sullied models at this stage.

Testing period of manual information base creation - Plans are stacked from vault.

Testing period of automatic information base creation - At that point now select illness levels and models from the outline. Discover illnesses for those examples and apply the elastic rule to find the infections with the most noteworthy repeat pace of debased examples during the testing stage. In case you are not happy with the soft closures, kindly do differential..

Convolution Neural networks (CNN)

CNN is a type of neural network model which allows us to extract higherrepresentations for the image content. Unlike the classical image recognitionwhere you define the image features yourself, CNN takes the image's rawpixel data, trains the model, then extracts the features automatically forbetter classification.

4.   DATASET

A Dataset is a collection of related information sets made of different materials but which can be used as a computer unit. Here we collected lots of images of leaves in which some are healthy and some are diseased or infected, that collated data we are going to use as raw dataset for image processing.

Figure: Dataset

5.   RESULT
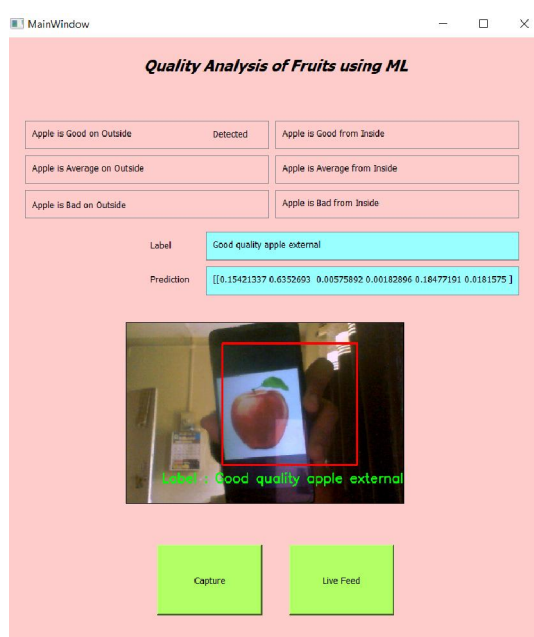
Some of results that we get through implementation

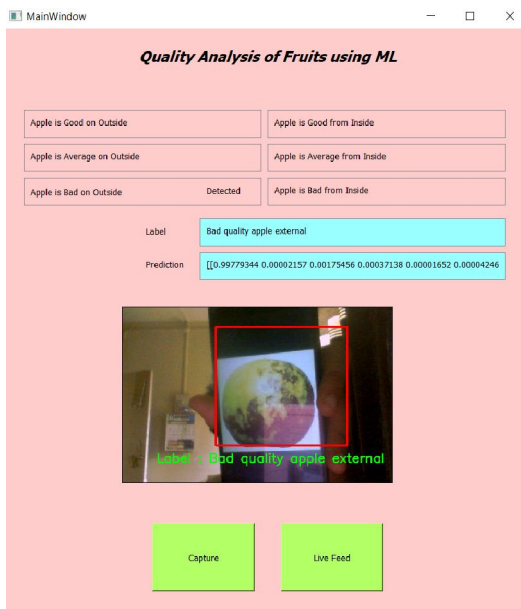*Figure: Result*

Figure: Result

Figure: Result

Figure: Result

6. CONCLUSION

It focused how image from given dataset (trained dataset) in field and pastdata set used predict the pattern of fruit quality using OpenCV, Tensorow,keras library. Here, fruit quality will be covered under this system.

7. FUTURE SCOPE

Agricultural department wants to automate the detecting the quality ofproduct quickly (real time).To automate this process by showing the prediction result in web application or desktop application. To optimize the work to implement in Artificial Intelligence environment.

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