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Used of AI in Vegetable: A New Technology

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INTRODUCTION

Artificial Intelligence (AI) has transformed several industries including agriculture. The use of AI detectors in vegetable farming and processing has been used to enhance efficiency, quality control, and management of crops by use of computer vision and machine learning algorithms where data from images or sensors is correctly analyzed and interpreted by the detectors of such considerations to be made on vegetables.

Applications in Vegetable Farming and Processing

Quality Control and Grading: AI detectors are extensively used in grading the sizes of vegetables, shapes, colors, and ripeness. For example, tomatoes entering a processing factory may be classified as "underripe," "ripe," and "overripe," based on color and texture, by an AI system. Cameras take pictures of tomatoes passing along the conveyor belt against a standard database. This sorts and grades the tomatoes automatically to ensure uniformity of the product. The process saves on labor costs and gives a higher quality of produce to market.

Defect and Disease Detection: Produce such as vegetables should be detected early in case of defects or disease for minimal wastage and high-quality produce at harvest. AI detectors may be trained on certain specific patterns that imply defects like bruises, rot, or pest damage. For instance, in an infrared sensing system, the AI detector inside the potato processing line will show internal damage, which the human eye cannot see. In the field environment, AI-driven drones or robots can sense and scan crops for any form of diseases represented in any discoloration or unusual patterns of growth, allowing farmers to address such conditions immediately.

Automated Harvesting: Applied in automated harvesting systems are AI detectors. It identifies ripe vegetables and automatically picks them to significantly reduce the need for human labor.

For example, in a greenhouse devoted to bell peppers, an AI computer vision system could identify which peppers have reached the optimal level of ripening to be harvested. The system controls a mechanical arm that will gently remove the peppers without bruising them, so as to obtain only the finest fruit products.

Weed and Pest Control: In the open fields for crop farming of vegetables, an AI detector could differentiate crops from weeds and hence, can have highly targeted herbicide application. This implies that technology reduces chemical use and environmental degradation as well as allows healthier growth in crops. For example, an AI weeding robot will go through rows of lettuce, cameras, and sensors will be used to trace down the weeds without harming the crop. Similarly, by using image recognition, detectors by AI can be used for monitoring pest populations and their effect on the crops.

Example:

They are serval example of AI-tool App used in vegetable such as:

1. **Plantix-Your crop doctor:**

- Within a few seconds, the app will enable farmers to know about pests and diseases found in crops. The operating system the application supports is Android. It covers 45 major crops and detects more than 500 forms of plant damages.

2. **Plant disease identifier:**

- This AI used for identification of plant disease on the basis of Changes in colour, shape, and texture of leaves are usually among the clear signs to recognize that a plant has been affected by disease. The withering or yellowing of these leaves is also common. Spots, blotches, or lesions on the plant are also common indication of a disease affecting it.

3. **Leaf Doctor:**

Introducing our free Plant Disease Identifier app-the perfect tool for all of your plant care needs. This app leverages cutting-edge AI technology and an immense database to identify your plant, diagnose any possible diseases that may have hit it, and provide care tips with great detail.

It involves several methods of identification:

- **Leaves:** If leaves are good, your plant must also be good. Leaves must not droop, wrinkle or turn brown.
- **Roots:** A health plant normally possesses white roots.
- **To yield:** The unhealthy plant is more likely to suffer from diseases than a healthy one.

4. **Agrio:**

- PlantNet. In testing, we found PlantNet easy to use, accurate and fast. The free app walks you through setup, allows you to search by map or flora, and recommends that you activate geolocation (GPS) to enhance its plant recognition. PlantNet was the fastest and most accurate plant recognition app of our tests on the Android smartphone.

5. **Google Lens:**

- **Image search:** Google Lens can identify objects in images, translate text, and scan barcodes.
- **Learn about things you see:** Google Lens can identify plants and animals, tell you the name of a historical landmark, or inform you about a work of art.
- **Homework helper:** Google Lens can help you solve your homework problems.
- **Shopping:** Google Lens helps you find products and learn more about them and where to purchase.
- **Identify the gym equipment:** Google Lens can even show you how to use the gym equipment you have never seen in your life.
- **Identify the skin conditions:** The Google Lens can also help identify some of the skin conditions.
- **Add event to your calendar:** You can use the Google Lens to add an event to your calendar.
- **Save contact details:** Using Google Lens, you can save phone numbers or addresses in your contact.

- **Read reviews:** Google lens will help you read the reviews and get a quicker summary.
- **Find historical facts:** Google lens will help you find out the historical facts.
- **Find hours of operation:** Google lens will help you find out the hours of operation.

6. PlantSnap identify plants

- This is a widely known plant identification application that uses photographs to identify plants, flowers, trees, cacti, and mushrooms. Here are some ways in which you can use PlantSnap to identify species around you:
- **Identify plants**

Take a clear, well-lit photo of a plant, and PlantSnap will show you a list of species that match your photo.

- **Save your finds**

PlantSnap saves all plants you identify to your My Collection tab, along with the time and location of the photo.

- **Explore popular species**

The Explore tab also shows the most commonly flowered species identified and the currently trending species of plants.

- **Augmented Reality**

If you have iOS 12 you can use Snap! mode to tap on bubbles with background information about the plant you've identified. Such information could range from how photosynthesis works to how bees help with pollination.

7. Picture this plant identifier

- The PictureThis app uses AI to identify plants. And also, in addition to that, there are many other benefits, such as:
- **Plant identification:** App can identify more than 1,000,000 plants, including trees, flowers, and herbs at 98% accuracy.
- **Plant care tips:** The app has brought the following important tips- water, fertilize, mist, clean, and repot.
- **Light meter:** App tracks sunlight so you can search for a proper place to put your plants in.
- **Plant reminders:** You can set reminders for watering and many other things.
- **Plant collection management:** Build up your wish list for plants and document your plants. It is a method of keeping pictures and notes about each plant.
- **Plant problem diagnosis:** The app diagnoses plant problems and gives advice on treatments.
- **Toxic plant warnings:** App warns you of toxic plants and guides you in safety measures.
- **Identification of weeds:** The application will identify weeds from your garden and give you how to control or remove them. One on one expert consultancy: The application offers one-on-one talks with botanists.

8. Agroase (Sigma-Aldrich® Solutions)

Agarose has many applications such as:

- **Electrophoresis**

Agarose is used to separate bio macromolecules such as DNA and RNA by electrophoresis. Agarose gels vary from 0.7% to 2% agarose, but 0.7% gels are the best for separating large DNA fragments, while 2% gels are best for separating small DNA fragments.

- **Affinity chromatography**

Agarose is the matrix of preference for affinity chromatography. It is cheaper and possesses big pores. Affinity chromatography is an analytical technique which separates and purifies biological macromolecules.

- **Cell culture**

Agarose is used as gel plate or overlay for cells in tissue culture.

- **Microspheres**

Agarose's hydrophilicity, porosity, and non-toxicity make it suitable for preparing microspheres.

- Agarose is a natural polymer isolated from red algae, otherwise known as seaweed. Agarose is non-toxic and possesses many useful properties for application in different spheres.

AI in Tomato Ripeness Detection

Example: for instance, consider a tomato processing plant that uses an AI based detector to determine the tomato ripeness. The dataset

contains tens of thousands of images representing tomatoes at different levels of ripeness. Real time image capture of tomatoes as they go past on a conveyor belt, through the AI detector that assesses the color, texture, and shape of the tomato.

Process:

Captured images by cameras end.

- The AI model studies those images in a way that it determines ripeness using a deep color and texture.
- The system decides the ripeness by categorizing each tomato as "underride", "ripe", and "overripe" based on the study.
- The automation routes the tomatoes towards packaging if they are ripe, or other processing stages or waste.
- **Benefits:**
- It becomes more efficient with the automatic sorting
- It will have no qualitative issue since only the best tomatoes are picked.
- It reduces human error and labor costs.

CONCLUSION

Some applications of AI detectors in vegetable farming and processing offer lots of better quality control, less waste, and increased efficiency. These systems can perform the tasks that earlier required extensive manual labor, thereby making agriculture more sustainable and profitable by leveraging the power of computer vision and machine learning. All the way from sorting vegetables on the basis of ripeness to detecting defects or pests, AI detectors are becoming an important part of modern farming practices.

Identification of plant disease

Source-Jiva

Source- Intellias