SECJ3553-15 KEPINTARAN BUATAN

(ARTIFICIAL INTELLIGENCE)

ASSIGNMENT 4

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8.0 Proof of Concept

8.1 Problem Formulation

Real-World Data Collection: The system employs a camera to actively capture real-time video footage of crops in the field, creating a continuous stream of visual data for analysis. This ensures that the AI operates with the most up-to-date and relevant information, offering a dynamic representation of actual conditions on the farm. The real-time nature of the data collection enables the system to respond promptly to emerging issues, contributing to effective and timely agricultural management.

Specialized AI Model: The chosen artificial intelligence model is a Convolutional Neural Network (CNN), specifically designed for image recognition and analysis. Tailored to the agricultural context, the CNN is adept at detecting and classifying leaf diseases, making it a well-suited solution for the targeted application. Its specialization enhances the accuracy and efficiency of disease identification within the complex visual patterns present in crop foliage.

Comprehensive Training: The CNN undergoes thorough training on a large dataset of labeled images encompassing various crop diseases and healthy plant states. This extensive training equips the AI with the capability to accurately distinguish between different disease patterns and healthy foliage. The diversity of the training dataset enhances the model's adaptability to a range of real-world scenarios, contributing to robust performance in the field.

On-Device Processing: The trained CNN model is deployed onto embedded hardware, allowing for real-time analysis directly on the farm. This strategic deployment eliminates the need for constant cloud connectivity, reducing latency and enabling immediate insights and potential interventions. On-device processing enhances the system's efficiency, making it well-suited for time-sensitive agricultural decision-making.

Continuous Verification: The system continuously processes incoming video footage in real-time, applying the trained model to detect and classify diseases as they emerge. This ongoing verification process facilitates early detection, tracking disease progression, and assessing the model's accuracy in real-world conditions. The dynamic nature of continuous verification ensures that the system remains adaptive and responsive to evolving agricultural scenarios.

Disease Identification and Output: Upon detecting diseased plants, the model classifies and specifies the type of disease detected (e.g., "potato late blight"). This information is then outputted, potentially triggering alerts for farmers or informing targeted treatment strategies. The system's ability to provide actionable insights contributes to effective disease management and crop protection.

Troubleshooting and Refinement: The system likely includes a feedback mechanism for human experts to review and label detected diseases, ensuring accuracy and providing data for further model refinement. This iterative process allows the AI to learn from its mistakes, continuously improving its performance based on real-world feedback. The incorporation of human expertise in troubleshooting and refinement enhances the overall reliability and effectiveness of the AI system in agricultural applications.