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LEAF DISEASE DETECTION USING ANN ALGORITHM

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ABSTRACT
The yield from agricultural fields are low because lack of monitoring and treatment for infected region in cultivation fields. This tend to spreading of disease over other crops or infects whole field then the resultant will be loss and less yield. The main objective of this project is to control the spreading of disease and to provide medication for crops in initial stage of disease with the help of automatic controlled UAV with the combination of chemical sprayer. Pesticide or Chemicals is sprayed based on the particular disease of crop which can be identified input visuals of camera and then it is compared with pre-trained images in intel corei5 controller by AI based YoloV8 in video processing. The yolo V8 algorithm is used for analysing the image by extracting features such as texture pattern, color, shape of the crop. And then the sprayer initiated with a specific instructions to spray chemicals on the plants which will provide cure for the crop. The sprayer can spray based on the severity of the diseases and the sprayer will carry few small tanks of pesticides or chemicals to provide medication for crops with different diseases like leave blight and measles. There we can take over the situation under control and get more yield from agriculture. The UAV is controlled by a operator through automatic sensing technology, and then the detection of disease and treating the plant will be done through the UAV. The mixing of chemicals are done with the help of pumps in the chemical tanks, after the mixing of chemical the mixture is sprayed out through a sprinkler.

INTRODUCTION
We all know that the lack of monitoring and maintaining the crop fields may cause low yield due to disease spreading and pest. Here it is due to lack of knowledge in treating the disease with proper medicine and mixing the pesticide solution with proper ratio. They not even know the disease name, It is the main inability of farmers and which chemical to spray for the infected crop. We have lot of consulting centers for farmer to get to know disease and treatment process. And we have lot of online consultancies and apps then also they where facing problems in mixing of solution with proper ratio. For that we are here with a solution called Auto crop disease detection and medication using AI, it will identify the type of disease and treatment for the crop with required chemical with proper chemical proportion. The detection process will be done by video processing technology and that identified disease is sent processor that decides what chemicals to spray. By video processing the infected region is classified and segmented for treatment.

LITERATURE SURVEY
[1] Liu, L.; Dong, Y.; Huang, W.; Du, X.; Ren, B.; Huang, L.; Zheng, Q.; Ma, H. A disease index for efficiently detecting wheat fusarium head blight using sentinel-2 multispectral imagery. IEEE Access 2020,
A significant decrease in the quantity and quality of agricultural production. Early identification of diseases is crucial to avoid huge losses and reduce the excessive use of pesticides, which can harm human health and the environment.

[2]. Prasad, R.; Ranjan, K.R.; Sinha, A. AMRAPALIKA: An expert system for the diagnosis of pests, diseases, and disorders in Indian mango. Knowl. -Based Syst. 2019.

Moreover, if the field is attacked by a rare disease, farmers seek expert advice to obtain an accurate and efficient diagnosis, which obviously generates additional treatment costs.

[3]. Singh, V.; Misra, A. Detection of unhealthy region of plant leaves using image processing and genetic algorithm. In Proceedings of the 2019 International Conference on Advances in Computer Engineering and Applications, Ghaziabad, India, 19–20 March 2019.

The symptoms of the disease adversely affect the development and growth of crops and are easily visible. Leaf discoloration is the first symptom of disease in plants. The shape and texture of the leaves are highly useful in detecting various diseases. Different diseases, such as mildew, rust, and powdery mildew, can be detected by processing images of the leaves.

[4]. Whitmire, C.D.; Vance, J.M.; Rasheed, H.K.; Missaoui, A.; Rasheed, K.M.; Maier, F.W. Using machine learning and feature selection for alfalfa yield prediction. AI 2021.

The information and details of an image. The leaf features usually include shape, texture, and color, which are used to diagnose the crop. These chosen features form an input feature vector which is then fed into the classifier.

EXISTING METHOD

The existing system can only used for monitoring and disease detection. The UAV has brushed DC motor which can drain the battery of the device. The existing system can only identifies the disease by image processing (CNN-Alex Net) and for monitoring the crop. The Raspberry Pi controller is used for image processing.

DISADVANTAGES

- ✓ It can only used for monitoring and detection of disease of the crop based on the trained images.
- ✓ Detection accuracy is low due to the Alex Net algorithm

PROPOSED SYSTEM

We are proposing that our system can do that disease detection and also provides medication at the Initial stage. Here we also implementing that sprayer with the combination of UAV (Drone). A remote controlled UAV with a Camera which collects the image from the agricultural fields. The collected images are subjected to processor(intel corei5) which can perform the detections process with the help of trained pictures. Using CNN (VGG16) image processing algorithm, we can achieve good accuracy in image processing. Processor gives instructions to relays how much to pump out the chemical to the mixing tank based on the condition of leaves of the plant and to spray the pesticide, with a required drone. The Drone can carry few pesticide tanks which is for to spray different medicine for different disease.. The images of infected leaves of plants are detected and the classification of disease is done by the processor according to the training of algorithm. Then the set of instructions is sent to the nano board which is used to interface between the software program and the hardware(relay) unit. If the disease is detected then the signal is sent to the nano board which will take care of mixing and spraying out the chemical.

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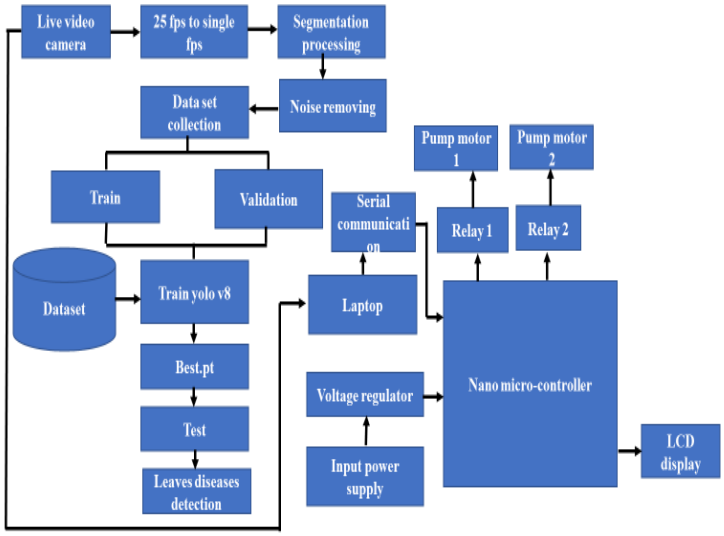
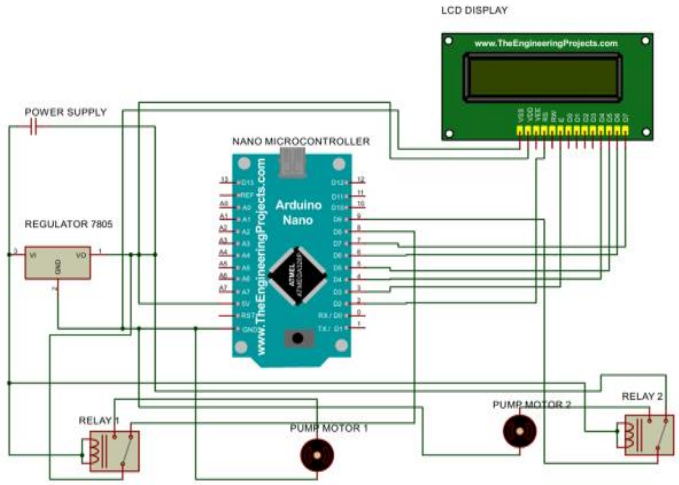
SYSTEM FUNCTION
BLOCK DIAGRAM:



Proposed for block diagram
CIRCUIT DIAGRAM



Circuit diagram
YOLO V8

YOLOv8 is the newest state-of-the-art YOLO model that can be used for object detection, image classification, and instance segmentation tasks. YOLOv8 was developed by Ultralytics, who also created the influential and industry-defining YOLOv5 model. YOLOv8 includes numerous architectural and developer experience changes and improvements over YOLOv5. YOLOv8 is under active development as of writing this post, as Ultralytics work on new features and respond to feedback from the community.

The **YOLO (YOU ONLY LOOK ONCE)** series of models has become famous in the computer vision world. YOLO's fame is attributable to its considerable accuracy while maintaining a small model size. YOLO models can be trained on a single GPU, which makes it accessible to a wide range of developers.

YOLOv8 Architecture: A Deep Dive

YOLOv8 does not yet have a published paper, so we lack direct insight into the direct research methodology and ablation studies done during its creation. We analyzed the repository and

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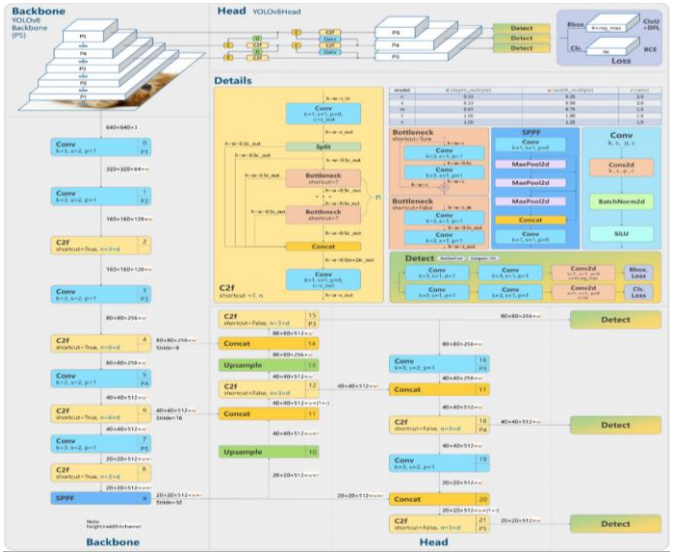
information available about the model to start documenting what's new is the **YOLO V8 Repository** and you view this code differential to see how some of the research was done.
The following image made by GitHub user Range King shows a detailed visualization of the network's architecture



YOLOv8 Architecture, visualisation made by GitHub user RangeKing

LEAVES DISEASES DETECTED

The agricultural project, the focus lies on leveraging advanced technology to address the pressing issue of disease management in crops. The system integrates cutting-edge AI algorithms with unmanned aerial vehicles (UAVs) equipped with precision chemical sprayers to detect and treat leaf diseases in crops effectively.The heart of the system lies in the sophisticated YOLO V8 algorithm, which operates on an Intel Core i5 controller, enabling real-time analysis of visual data captured by onboard cameras. This algorithm not only identifies the presence of leaf diseases but also assesses features such as texture patterns, colors, and shapes of the crop leaves. The algorithm accurately identifies diseases like leaf blight and measles.

Leaves diseases detection

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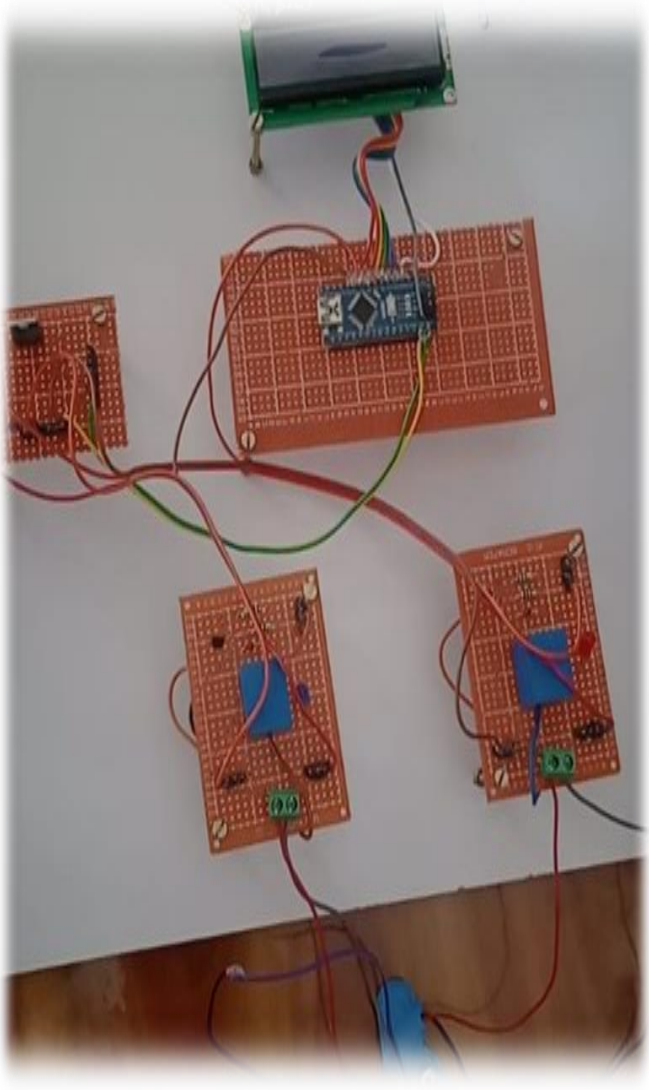
SYSTEM SOFTWARE
PYTHON PROGRAMMING LANGUAGE

RESULTS

The integration of automatic controlled UAVs with chemical sprayers equipped with disease detection capabilities significantly enhances agricultural monitoring and treatment. By leveraging AI-based algorithms like YOLO V8 for disease identification and severity assessment, the system ensures targeted and efficient application of pesticides or chemicals. The use of obstacle avoidance and autopilot features in the UAVs enables seamless operation over fields, ensuring comprehensive coverage and accurate treatment. This innovative approach not only controls the spreading of diseases but also optimizes medication dosage, ultimately leading to increased crop yield and improved agricultural productivity.



CONCLUSION

In conclusion, the integration of automatic controlled UAVs with chemical sprayers presents a promising solution to mitigate the spread of diseases in agricultural fields and enhance crop yields. By leveraging AI-based algorithms such as YOLO V8 for disease detection and analysis, coupled with precision spraying based on disease severity, the system ensures targeted and efficient treatment of infected crops. The ability to deploy UAVs equipped with obstacle avoidance and autopilot features further enhances the system's operational capabilities, enabling effective monitoring and treatment of crops across large agricultural areas. Overall, this innovative approach offers a proactive and technologically advanced means of disease control in agriculture, ultimately contributing to improved crop health and productivity.

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