PRESENTATION

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PROBLEM STATEMENT

Wheat rust is a devastating disease that affects wheat crops worldwide, causing significant yield losses and economic damage. Early detection and intervention are critical to preventing the spread of the disease. However, traditional methods of disease detection, such as manual scouting, are time-consuming, labor-intensive, and often ineffective.Wheat diseases cause significant annual losses to the global economy, ranging from $4.2 billion to $10.8 billion

PROJECT SOLUTION

1. Capture the higher resolution images of wheat fields using drones equipped with cameras.
2. Analyze the images using machine learning algorithms to detect early signs of wheat rust disease.
3. Provide real-time alerts to farmers via mobile app or web platform, enabling them to take action to prevent the spread of the disease

TOOLS USAGE
HARDWARE

DRONES : FOR CAPTURING HIGH-RESOLUTION IMAGES OF WHEAT FIELDS.
COMPUTING DEVICE : FOR DATA PROCESSING, MODEL DEVELOPMENT, AND DEPLOYMENT.

SOFTWARE TOOLS

1. PROGRAMMING LANGUAGES : PYTHON, R, OR JULIA FOR DATA PREPROCESSING, MODEL DEVELOPMENT, AND DEPLOYMENT.
2. MACHINE LEARNING FRAMEWORKS : TENSORFLOW, PYTORCH, OR SCIKIT-LEARN FOR MODEL DEVELOPMENT.
3. DATA VISUALIZATION TOOLS : MATPLOTLIB, SEABORN, OR PLOTLY FOR DATA VISUALIZATION.
4. DRONE SOFTWARE : DJI GO, PIX4D, OR SIMILAR SOFTWARE FOR DRONE IMAGE CAPTURE AND

DATA FLOW PHASE 1

Data Preprocessing

1. OpenCV : For image processing and feature extraction.
2. Python libraries [Pandas , Scipy and Matplotlib] : For data manipulation and analysis.
3. Seaborn and Infogram: For advanced data visualization.

DATA FLOW PHASE 2

Machine Learning

1. TensorFlow : An open-source machine learning framework for building and training neural networks.
2. PyTorch : Another popular open-source machine learning framework.
3. Scikit-learn : A widely-used Python library for machine learning.

STAGE 3

Deep Learning

1. Keras : A high-level neural networks API for building and training deep learning models.
2. Convolutional Neural Networks (CNNs) : For image classification and feature extraction.

Model Evaluation and Hyperparameter Tuning

1. Cross-validation : For evaluating model performance and hyperparameter tuning.
2. Grid search : For hyperparameter tuning.
3. Random search : For hyperparameter tuning.

FINAL STAGE

Model Deployment

1. Django : For building web applications and deploying models.
2.Cloud platforms (AWS) : For deploying models and scaling applications.

Drone Imaging and Data Collection

1. Drone software (DJI GO) : For capturing and processing drone images.
2. GPS and mapping software (QGIS) : For geospatial analysis and mapping.
3. Google Collab : For interactive development and testing

CONCLUSION

The development of an AI-powered predictive model for detecting wheat rust disease using drone-based imaging and machine learning algorithms has the potential to revolutionize the agriculture industry.

1. Improved Disease Management : Early detection and accurate diagnosis enable farmers to take targeted action, reducing the risk of disease spread and yield losses.
2. Increased Efficiency : Automation of disease detection reduces manual scouting, saving time and resources.
3.. Enhanced Decision-Making : Real-time data and insights enable data-driven decision-making, optimizing disease management and crop yields.

THANK YOU