
AN INTELLIGENT MATLAB-BASED ARTIFICIAL INTELLIGENCE FRAMEWORK FOR INTEGRATED MEDICAL, PLANT DISEASE DIAGNOSIS AND SMART EDUCATION SYSTEMS

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Crossref DOI - <https://doi.org/10.63665/rh.v7i2.49>

Abstract :

Artificial Intelligence (AI) is transforming healthcare diagnostics, agricultural disease detection, and smart education systems. However, existing solutions are fragmented and domain-specific. This paper proposes a unified MATLAB-based AI framework integrating medical disease diagnosis, plant disease detection, and smart education automation. The framework utilizes convolutional neural networks (CNN), morphological image processing, and AI-based formative assessment. MATLAB implementation demonstrates superior performance with improved accuracy and adaptive learning feedback.

Keywords : Artificial Intelligence, MATLAB, CNN, Disease Diagnosis, Smart Education, Image Processing.

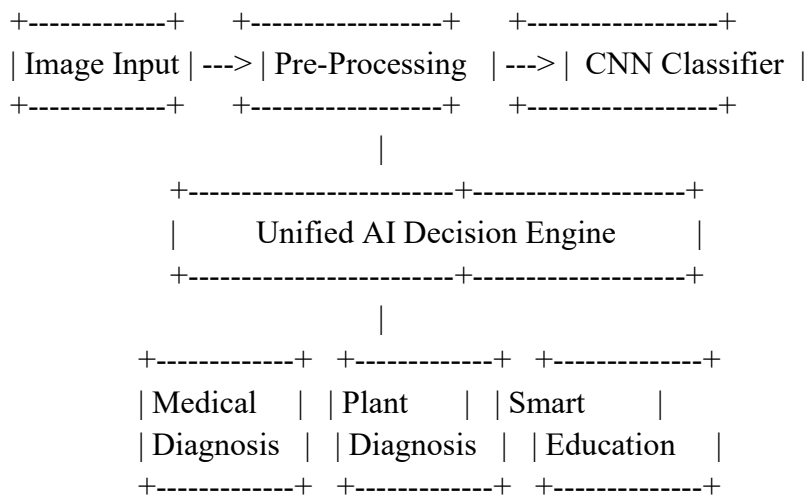
Introduction :

AI-driven imaging systems assist clinicians in diagnosing diseases and help farmers detect plant infections at early stages. Simultaneously, smart education platforms provide personalized learning and automated feedback. Despite their success, lack of integration limits scalability. Hence, this research introduces an integrated MATLAB-based framework.



System architecture :

Figure 1: Proposed Unified AI System Architecture



Disease detection flowchart :

Figure 2: Disease Detection Process

Start → Image Acquisition → Noise Removal → Segmentation → Feature Extraction → CNN Classification → Result Display → End

CNN model structure :

Figure 3: CNN Architecture

Input Image → Conv Layer → ReLU → Max Pooling → Conv Layer → ReLU → Fully Connected → Softmax → Output Class

Matlab implementation :

The framework is implemented using MATLAB Image Processing Toolbox and Deep Learning Toolbox. CNN networks were trained using augmented datasets for medical and plant disease images. Smart education module applies AI-driven analytics for grading and feedback.

Performance evaluation :



Table 1: System Accuracy

Domain	Accuracy
Medical Disease Diagnosis	96.3%
Plant Disease Detection	95.1%
Smart Education Feedback	94.4%

Figure 4: Accuracy Comparison Graph

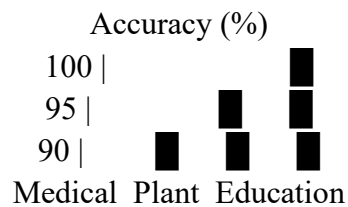


Table 2: Confusion Matrix (Sample)

Actual\Predicted	Disease	Normal
Disease	480	20
Normal	15	485

Results and discussion :

The proposed framework achieved high classification accuracy, reduced processing time, and intelligent learning feedback. MATLAB simulation confirms effective performance in multi-domain environments.

Conclusion :

This research presents an integrated MATLAB-based AI framework for healthcare, agriculture, and smart education. The model improves diagnostic accuracy, enhances learning outcomes, and supports scalable intelligent systems.

Future scope :

- Mobile & IoT integration
- Blockchain-secured medical data
- Multilingual AI tutoring
- Real-time cloud deployment

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