

Internship Proposal

(To be returned by email to lqhuy@dut.udn.vn and tvlic@dut.udn.vn)

Year: 2025

Research Team or Component		
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Workplace		University of Danang – Department of Electronic and Telecommunication Engineering
Internship Category		IUT/Bachelor <input type="checkbox"/> Master1/Engineer4 <input type="checkbox"/> Master2/Engineer5 <input type="checkbox"/>
Number of students and specialties (desired pair)		3 to 4
Student's name and contact information (if known)		
Proposal title		Harmful Insect Classification and Alert System for Rice Fields Using Image Processing
Description of the proposal (2-3 pages max)		
<p>1. Introduction</p> <p>Pest management is critical in agriculture, especially for staple crops like rice, where pest infestations can lead to significant economic losses. Traditional pest control methods rely heavily on manual observation, which is time-consuming and subjective. To address these challenges, this project proposes a system that leverages image processing to identify and classify harmful insects in rice fields and provide timely alerts to farmers. By automating pest detection, the system can help farmers respond faster, reduce crop damage, and minimize the overuse of chemical pesticides.</p> <p>2. Objective</p> <p>The main objectives of this project are:</p> <ul style="list-style-type: none">• Develop a system to classify common pests affecting rice crops using image processing techniques.• Implement an alert mechanism that notifies farmers when pests are detected.• Support sustainable pest control practices by providing actionable data on pest types and prevalence.		

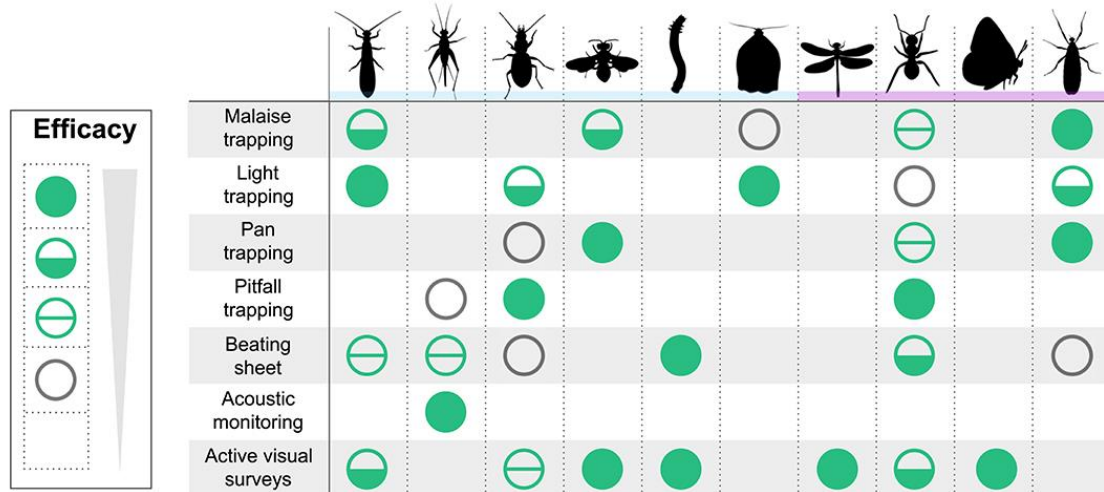


Figure 1. Standards and Best Practices for Monitoring and Benchmarking Insects

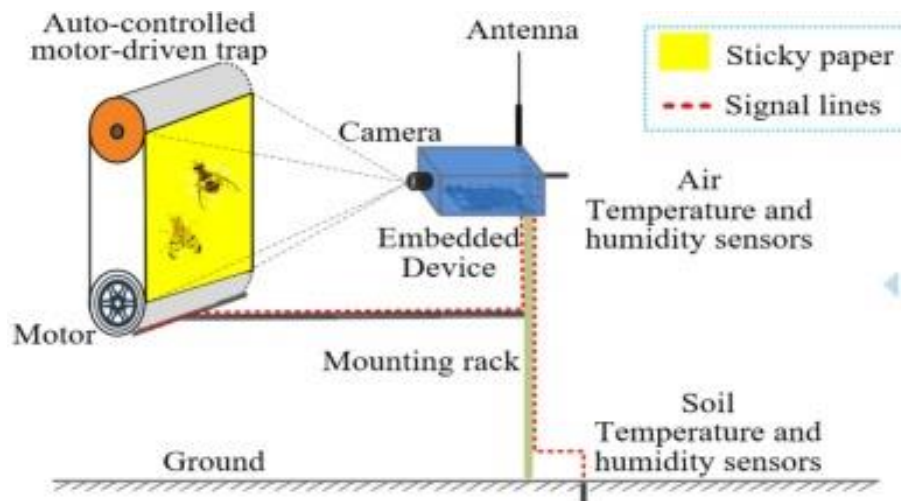


Figure 2. Example of insect monitoring system

3. Work to be developed in this internship.

The intern will work on the following key tasks during the project:

- Data Collection and Preprocessing:

Collect images of common rice pests and preprocess them to create a labeled dataset for training. Address challenges such as varying lighting, backgrounds, and insect orientations.

- Model Development:

Implement a machine learning model for pest classification using frameworks like TensorFlow or PyTorch.

Optimize for high accuracy and low latency in real-time detection.

- System Integration:

Develop a user interface for farmers to upload images for analysis and view results.

Create an alert system to notify users when harmful pests are detected.

- Testing and Validation:

Test the system in controlled and real-world field environments.

Validate the accuracy and reliability of the pest classification model.

4. Specific technic tools and working conditions.

- Technical Tools:

Python, OpenCV, TensorFlow, or PyTorch.

Dataset platforms like Kaggle for pest image datasets.

- Working Conditions:

Access to rice fields or experimental setups for real-world testing.

Supervised learning environment with periodic feedback.

5. Documentation references

Textbooks:

- Digital Image Processing by Rafael Gonzalez and Richard Woods, covering core image processing principles.
- Deep Learning by Ian Goodfellow, Yoshua Bengio, and Aaron Courville, for foundational concepts on neural networks and convolutional models.

6. Appendix (if necessary)