

# **DurTect: An Image-Based Detection using Roboflow Framework and YOLOv5 Model for Disease Identification in Patch Canker on Durian**

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Fusarium

Phytoplasma

Phytophthora

## Background

- **Issue:** Disease misdiagnosis in fruit crops, particularly in durian production, can result in treatment delays, hampering crop development and quality, leading to yield losses.
- **Traditional Approach:** Manual inspections and expert microscopic observations are costly, time-consuming, and prone to errors.
- **Davao City's Durian Production:** Hindered by climate change, with extended rainy seasons causing susceptibility to Phytophthora Patch Canker disease, leading to fruit and bark rot.
- **Economic Impact:** Disease outbreaks can lead to reduced crop yields and economic losses, particularly in the ASEAN region where agriculture is a vital sector.



## Technology Solution

- **Deep Learning** : Utilizing AI and deep learning for disease detection.
- **CNN (Convolutional Neural Network)** : A highly effective tool for image classification systems.
- **Efficiency and Accuracy** : Modern technology promises quicker, standardized, and accurate disease detection, reducing economic losses.
- **Study Example** : Researchers in the region are employing CNN to classify and detect durian diseases, aiming to improve recognition accuracy.

## Significance for ASEAN Region

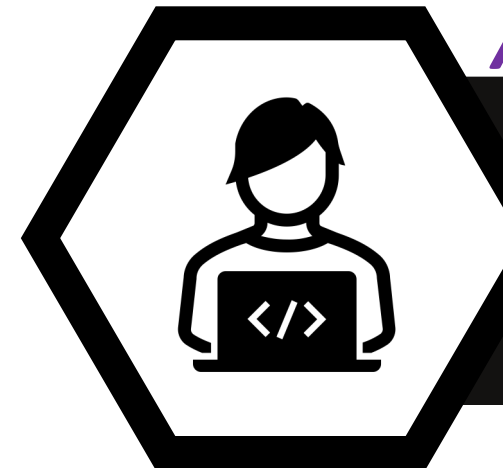
### *Economic Impact*

Crop diseases significantly affect the agricultural sector, resulting in substantial economic losses.



### *Automated Systems*

Automation is crucial in detecting diseases early, preventing substantial losses.



### *Adoption of Technology*

ASEAN countries should consider the adoption of deep learning and CNN for agricultural disease control.



# Proposed Method : AI Solution

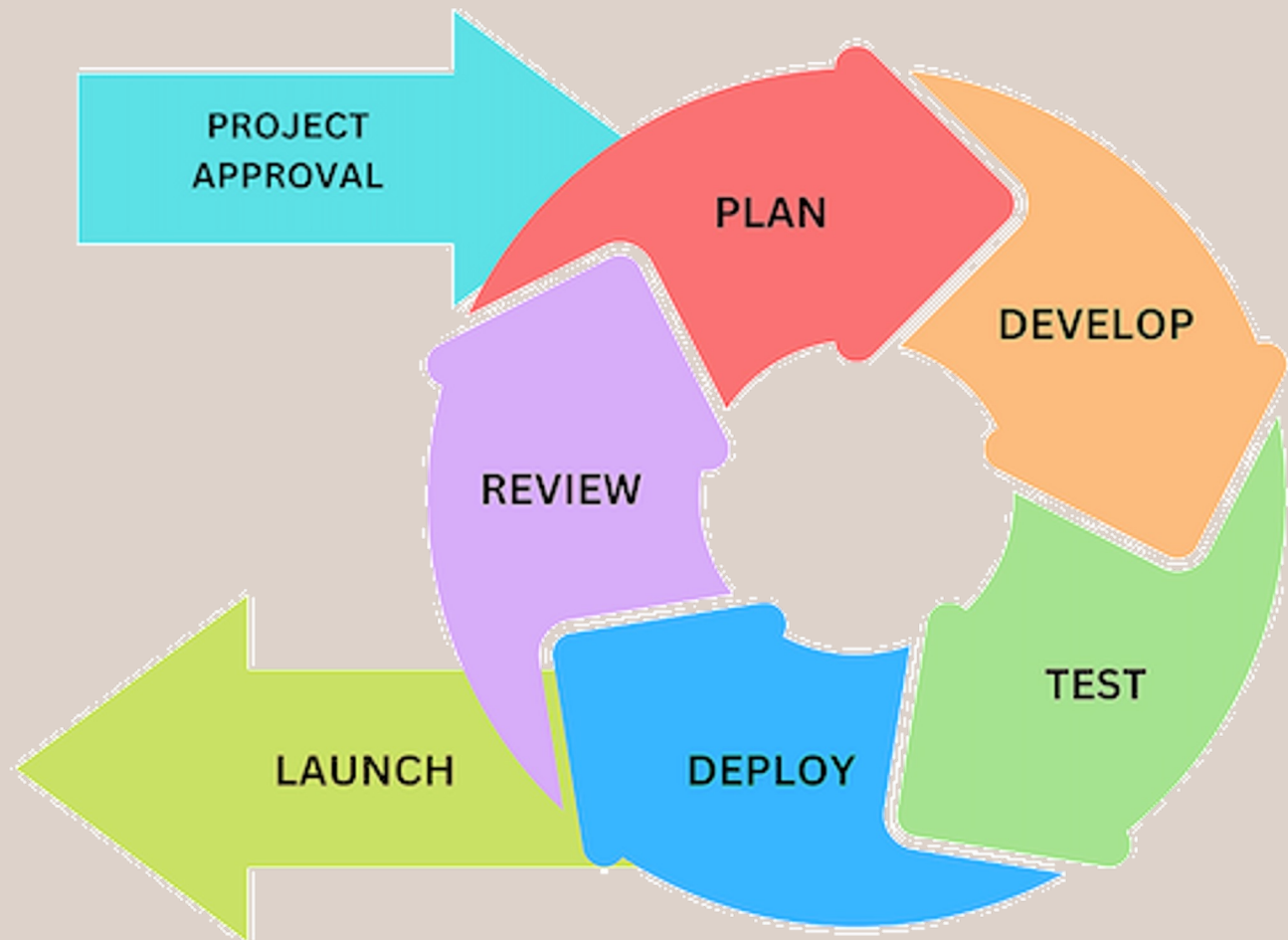
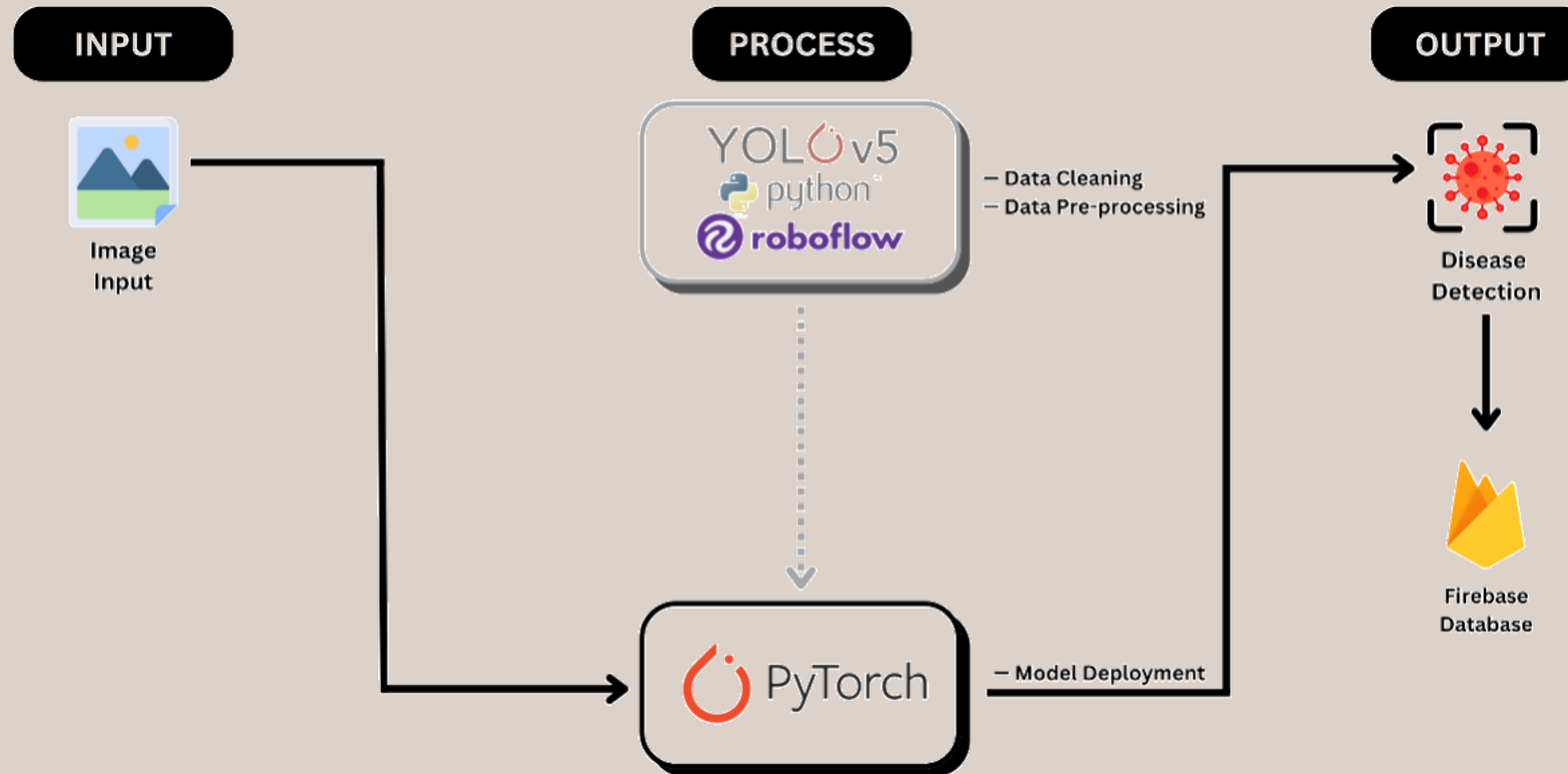


Figure 1. Agile Development

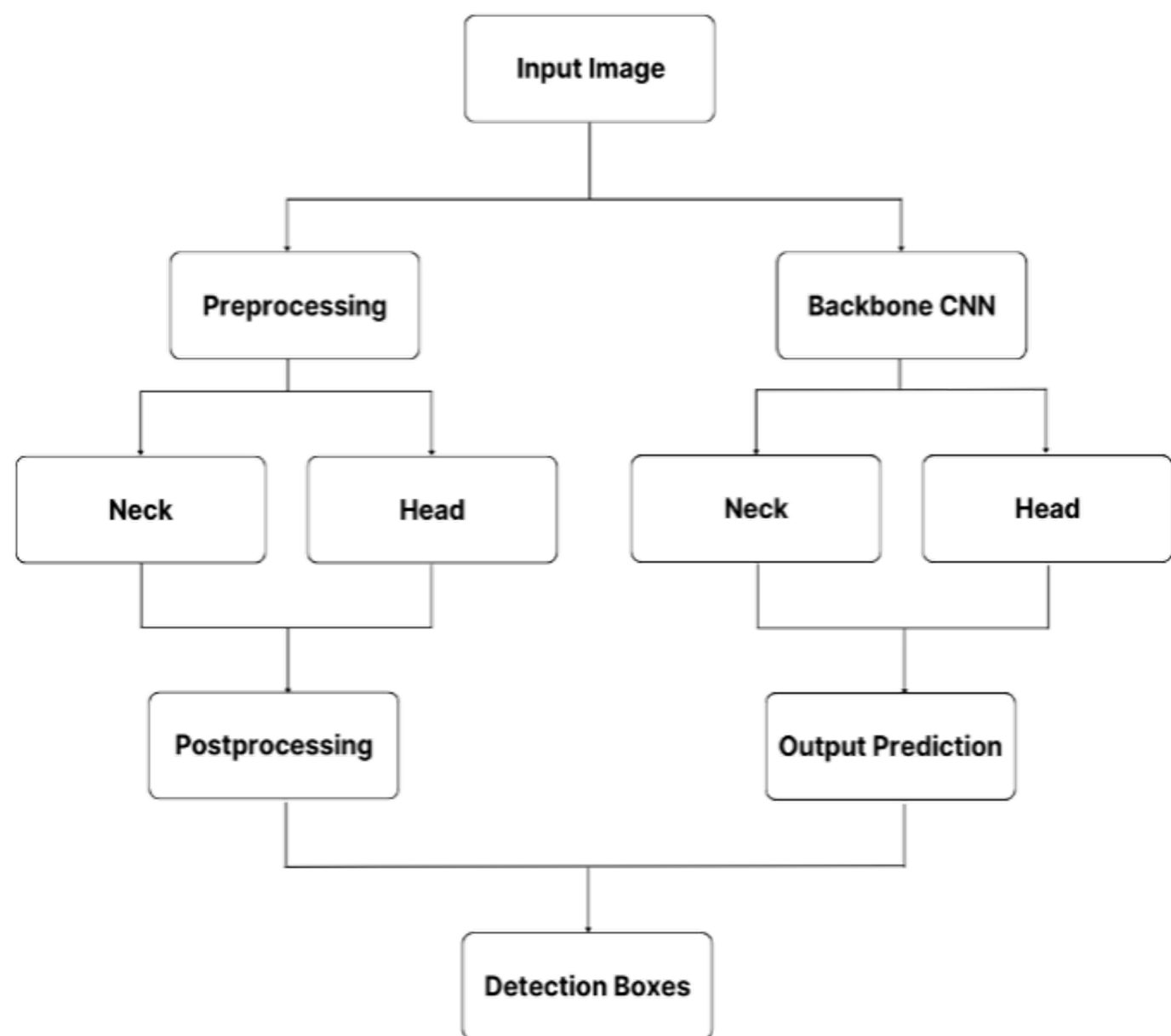


- **Partner:** Bureau of Plant and Industry (BPI)
- **Datasets:** 89 images were gathered which was then augmented to 739 images
- **ML Model :** OpenCV and Roboflow
- These experiments demonstrated its robustness and potential for widespread use in the agricultural sector

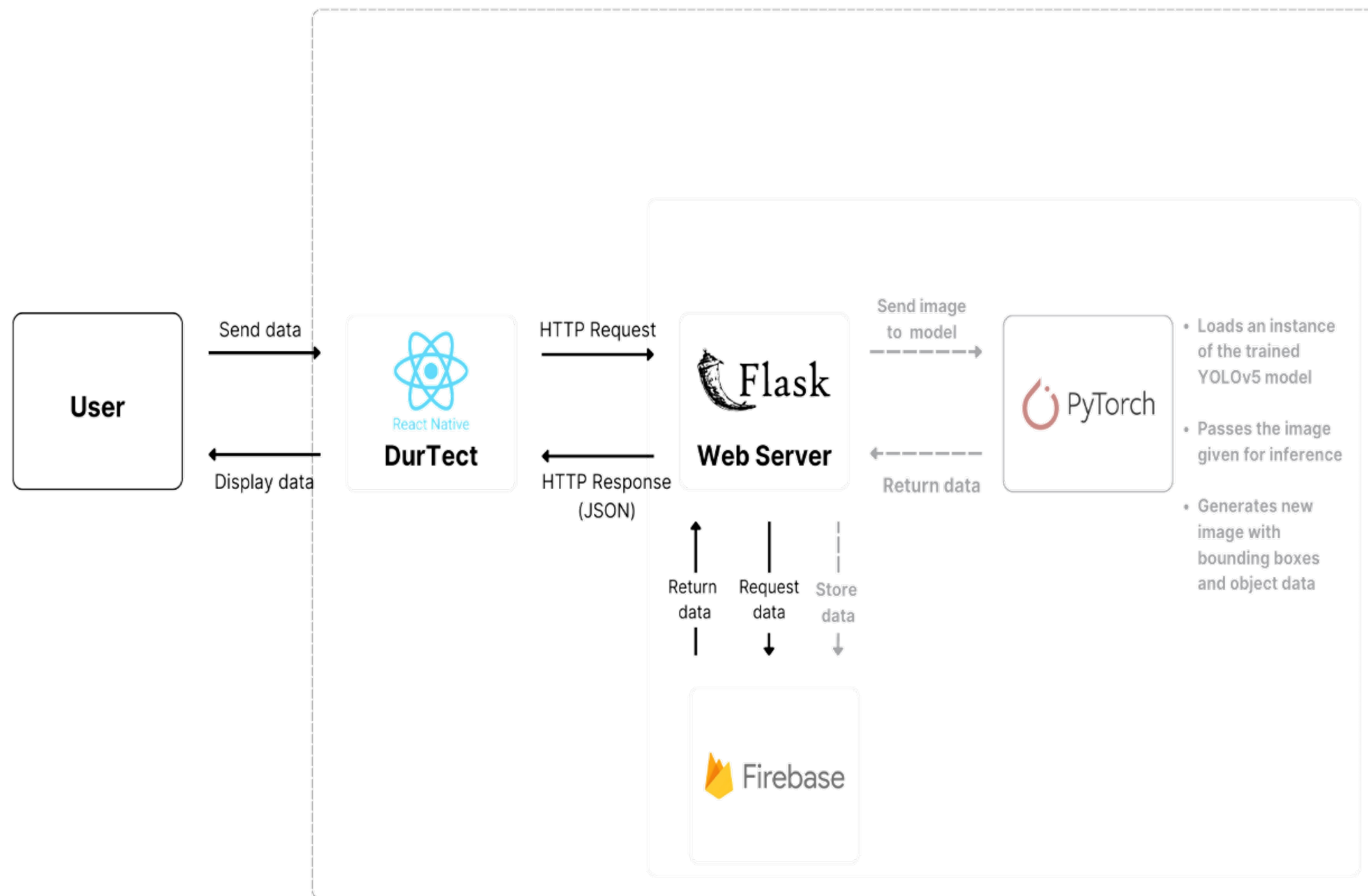


# Proposed Method : AI Solution

## YOLOv5



YOLOv5 is a cutting-edge object detection model, employing a deep Convolutional Neural Network (CNN) for precise object identification in images



The Flask server receives an image via HTTP POST request from the mobile app, then processes it with PyTorch and the YOLOv5 model to generate a new image with bounding boxes for the objects classified. Results are returned to the app and stored in a Firebase database.



**Table 1**  
**Test Cases Summary**

Image	Resolution	Size	Expected Result	Device 1	Device 2	Device 3
<b>1</b>	<b>600 x 900</b>	186 KB	<b>Blackbark</b>	<b>1 Blackbark detection, 83.76% avg. confidence</b>	<b>1 Blackbark detection 82.60% avg. confidence</b>	<b>1 Blackbark detection, 82.60% avg. confidence</b>
<b>2</b>	<b>3,024 x 4,032</b>	8 MB	<b>Blackbark</b>	<b>1 Blackbark detection, 53.13% avg. confidence</b>	<b>1 Blackbark detection, 52.35% avg. confidence</b>	<b>1 Blackbark detection, 52.35% avg. confidence</b>
<b>3</b>	<b>3,024 x 4,032</b>	9 MB	<b>Blackbark</b>	<b>4 Blackbark detections, 50.06% avg. confidence</b>	<b>4 Blackbark detections, 49.99% avg. confidence</b>	<b>4 Blackbark detections, 49.99% avg. confidence</b>
<b>4</b>	<b>5,184 x 3,456</b>	8 MB	<b>No Disease</b>	<b>1 No Disease detection, 54.70% avg. confidence</b>	<b>1 No Disease detection, 54.15% avg. confidence</b>	<b>1 No Disease detection, 54.15% avg. confidence</b>
<b>5</b>	<b>2050 x 2048</b>	3 MB	<b>Null</b>	<b>No detections</b>	<b>No detections</b>	<b>No detections</b>





# Impact: Impact of the Proposed Method (DurTect) on Various Aspects



## Scientific & Technological Impact

Advancing Disease  
Detection Technology  
Efficient Use of AI



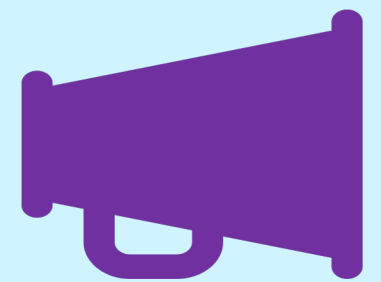
## Societal Impact

Economic Benefits  
Accessibility



## Collaborative Impact

Collaboration with Agricultural  
Experts  
Open-Source Contribution



## Environmental Impact

Disease Prevention  
Knowledge Dissemination  
Paving the Way for Future  
Innovations



# OUTPUT/OUTCOME

The outcome of DurTect encompasses scientific advancements in technology application, societal contributions in terms of open datasets and potential technology transfer, and collaborative efforts through partnerships and community engagement. This comprehensive approach reflects the multifaceted impact of the proposed method



## Scientific Outcome

### ***New Technology Application***

- deep learning
- adaptability of cutting-edge technology
- AI in agriculture.



## Societal Outcome

### ***Open-Source Dataset***

- researchers, developers, and stakeholders
- promotes knowledge sharing and collaborative efforts to improve disease detection in agriculture
- Potential Technology Transfer - attract the interest of companies or organizations involved in agriculture or AI



## Collaborative Outcome

New Collaborative Partnerships  
Community Engagement





 **Target**  
Disease Identification in Durian Trees

 **Method (Idea)**  
DurTect Application

 **Scientific and Societal Impact**  
Scientific Advancement  
Open Dataset  
Potential Societal Benefits  
Collaborative Partnerships

 **Outcome**  
Agricultural Efficiency  
Community Engagement

# Conclusion

Addressing disease control in durian production is vital for agricultural sustainability and economic stability in Davao City and the broader ASEAN region. Adopting advanced technology is key to mitigating economic losses and ensuring food security