

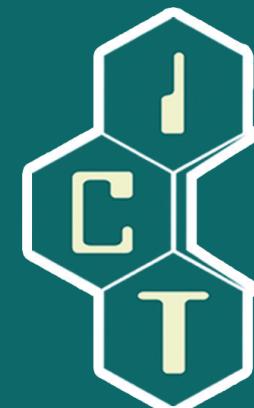


Mahidol University

Faculty of Information and Communication Technology

ChickenME: Classification of Chicken Diseases From Fecal Images

Waris Damkham, Pattanan Korkiatrakool, Kanokpitch Songdechakaivut



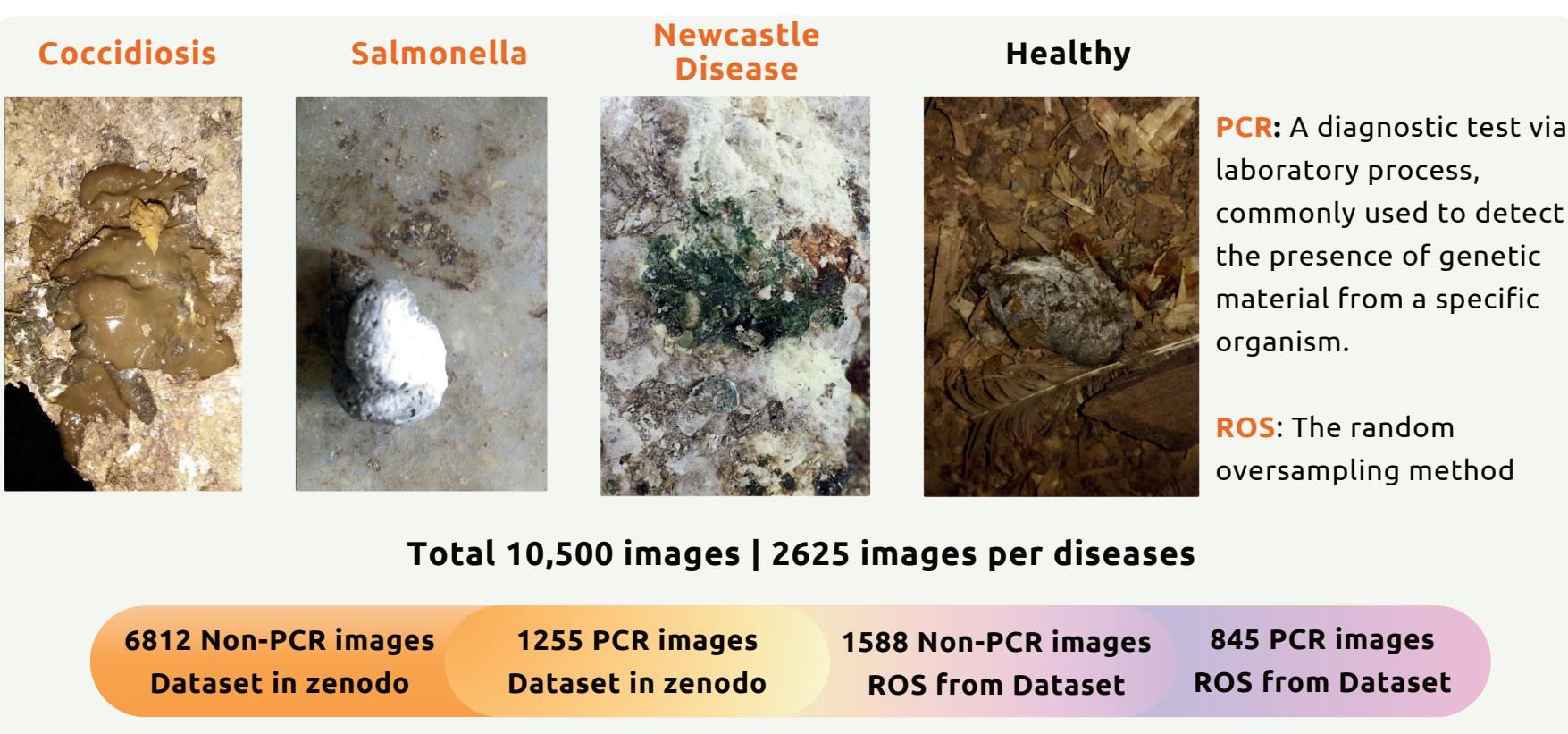
Advisor: Asst. Prof. Dr. Piyanuch Silapachote and Co-Advisor: Asst. Prof. Dr. Ananta Srisuphab

E-mail: {waris.dam, pattanan.kor, kanokpitch.son}@student.mahidol.ac.th

ABSTRACT

According to the growing global poultry demand, increases a challenge for the agricultural sector, with infectious diseases causing high mortality and economic losses. Manual observation and experience, the traditional methods for detecting poultry diseases, labor-intensive, and high risk of human errors, necessitating the need for more efficient, reliable, and timely detection techniques. **ChickenME** provides an advanced diagnostic tool that integrates deep learning technology to enhance disease detection and management in poultry farming. The project utilizes YOLOv5 for **object detection** to segment regions of interest (ROI) from fecal images, with achieved a mean average precision of 87.10 percent, and ResNet50 for **image classification** with an accuracy of 84 percent. The ChickenME classifies health conditions into four categories, two sectors: Healthy (Chickens in healthy condition) and the three most common diseases found in chicken epidemics with varying symptoms and severity levels, as follows: **Coccidiosis**, **Salmonella**, and **Newcastle Disease**. ChickenME trained on a dataset of 10,500 chicken fecal images from the Zenodo open database, for the use in classifying diseases that occur in chickens. The technology integrated within the **LINE** platform ensures user-friendly access, promoting widespread adoption among poultry farmers and animal husbandmen. The project aims to automate disease detection in chicken fecal images, decrease self-observation among farmers, and promote a time-efficient experience through deployment within the Line Official Account.

SCOPE & DATASETS



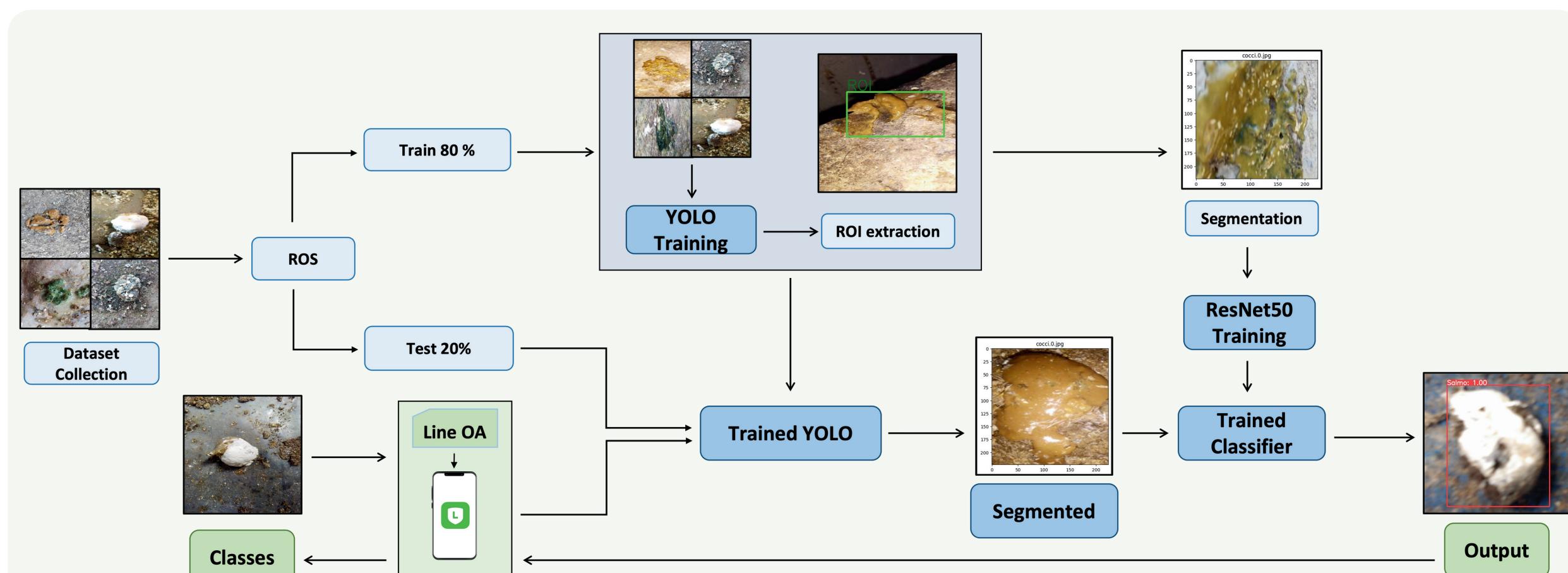
PROBLEM STATEMENTS

- Approximately **34.4 billion chickens worldwide** in 2023.
- The increase in the risk of **infectious diseases, poultry mortality rates, and economic losses**.
- Some diseases require high epidemic control; **High severity of the disease**.
- Disease confirmation using **PCR** can be **costly**.
- Diagnose disease through observation and experience; **Time-consuming and inherently vulnerable to errors**.

OBJECTIVES

- To implement the **Deep Learning** to detect and classify diseases from chicken fecal images.
- To apply with an automated technology with **LINE Office Account**; providing user-friendly accessibility, prioritizing speed and simplicity.

SYSTEM ARCHITECTURE



RESULT & MODEL EVALUATION

Dataset	Architecture	Performance on Testing Data			
		Mean average precision(mAP)			
456 YOLO-labelled images with full size.	YoloV3			75.31 %	
	Yolov5			82.06 %	
6812 YOLO-labelled images with full size.	YoloV3			82.13 %	
	Yolov5			87.10 %	
Architecture	Dataset	Class	Performance on Testing Data		
			Accuracy	Precision	Recall
RestNet-50	ROS with Zenodo dataset: a total 10500 images	Coccidiosis	0.84	0.94	0.90
		Healthy		0.77	0.81
		Newcastle Disease		0.82	0.86
		Salmonella		0.82	0.77
	8067 images from Zenodo's original dataset	Coccidiosis	0.80	0.88	0.91
		Healthy		0.77	0.80
		Newcastle Disease		0.43	0.44
		Salmonella		0.82	0.74

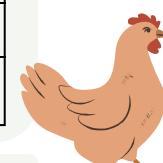
CONCLUSION

ChickenME, an automatic system that can identify diseases in chickens through photos of chicken droppings. ChickenME is designed to help relieve the burden on villagers and animal husbandry in identifying chicken diseases promptly.

The automated system is used by Deep learning with two models: YOLOv5 for object detection and segmentation of ROI, and ResNet50 for the image classification for classifying the diseases from the image obtained from segmentation.

Currently, both models are in the process of improving overall performance for better results in the future

EXAMPLE IMAGES LINEOA



ChickenME DEMO



REFERENCE

- 1) M. Z. Degu and G. L. Simegn, "Smartphone based detection and classification of poultry diseases from chicken fecal images using deep learning techniques," doi: 10.1016/j.atech.2023.100221.
- 2) D. Machuve, E. Nwankwo, N. Mduma, H. Mbewwa, E. Maguo and C. Munisi, "Machine Learning Dataset for Poultry Diseases Diagnostics". Zenodo, doi: 10.5281/zenodo.4628934.