# Crack Detection Comparison and Analysis

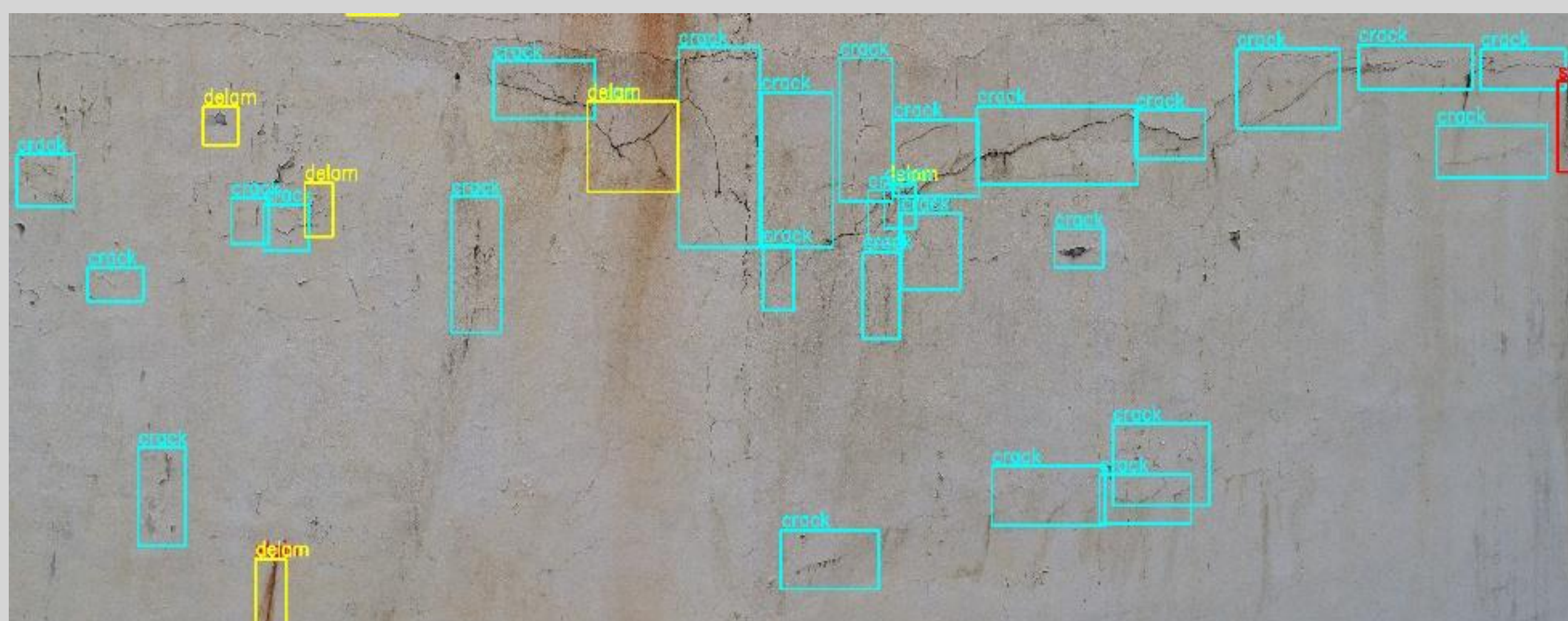## By Luying Ruan, Hua Tong, James Stiegler

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## Purpose

❖ Detect cracks in images using ML models
❖ Compare different models and analyze the output
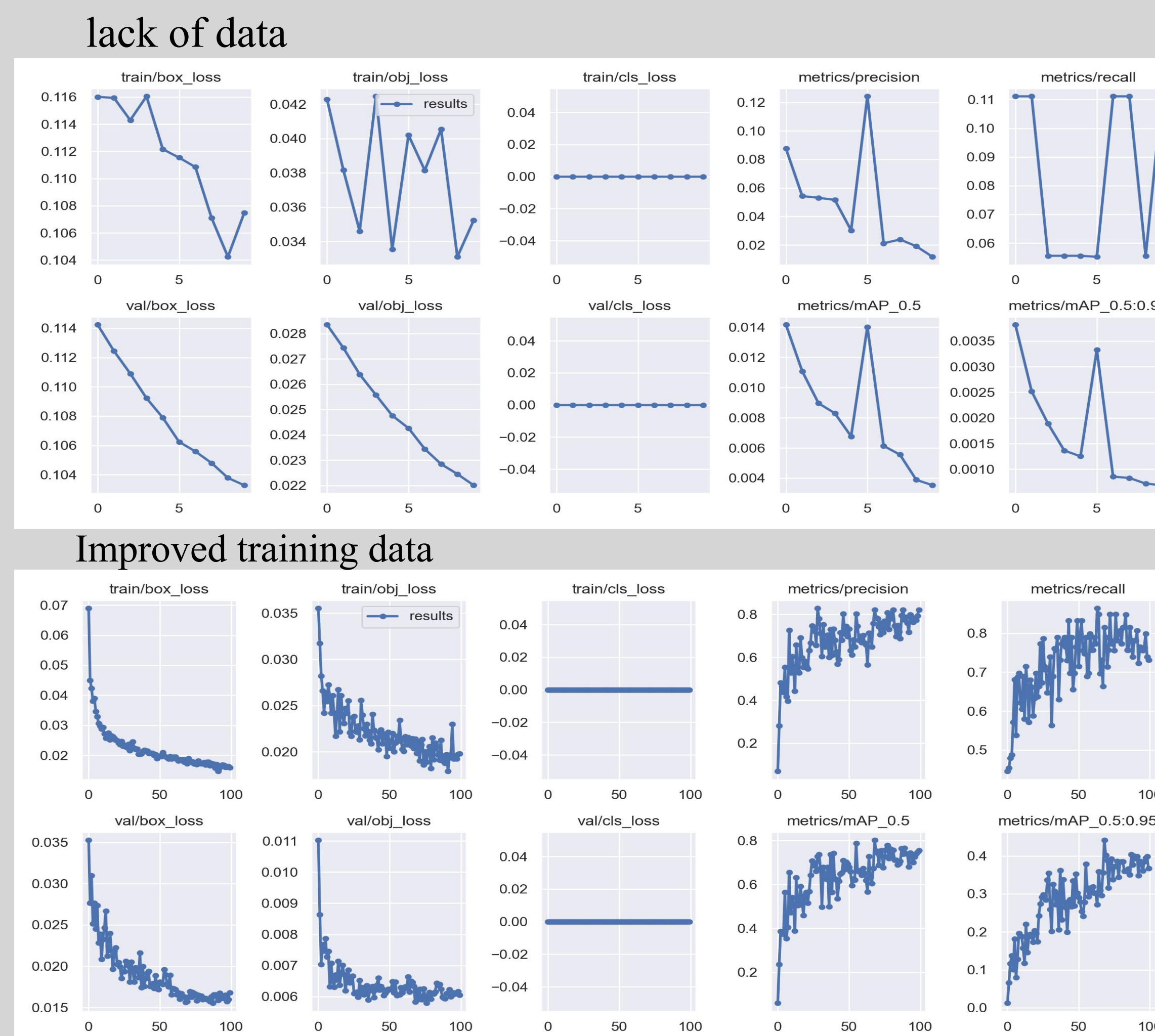❖ Improve existing model to get better result

## Goal



## Methods

❖ Gather different type of crack datasets
❖ Label the images and then organize the processed dataset
❖ Train the YOLOv5
❖ Evaluate and fine-tune model based on results
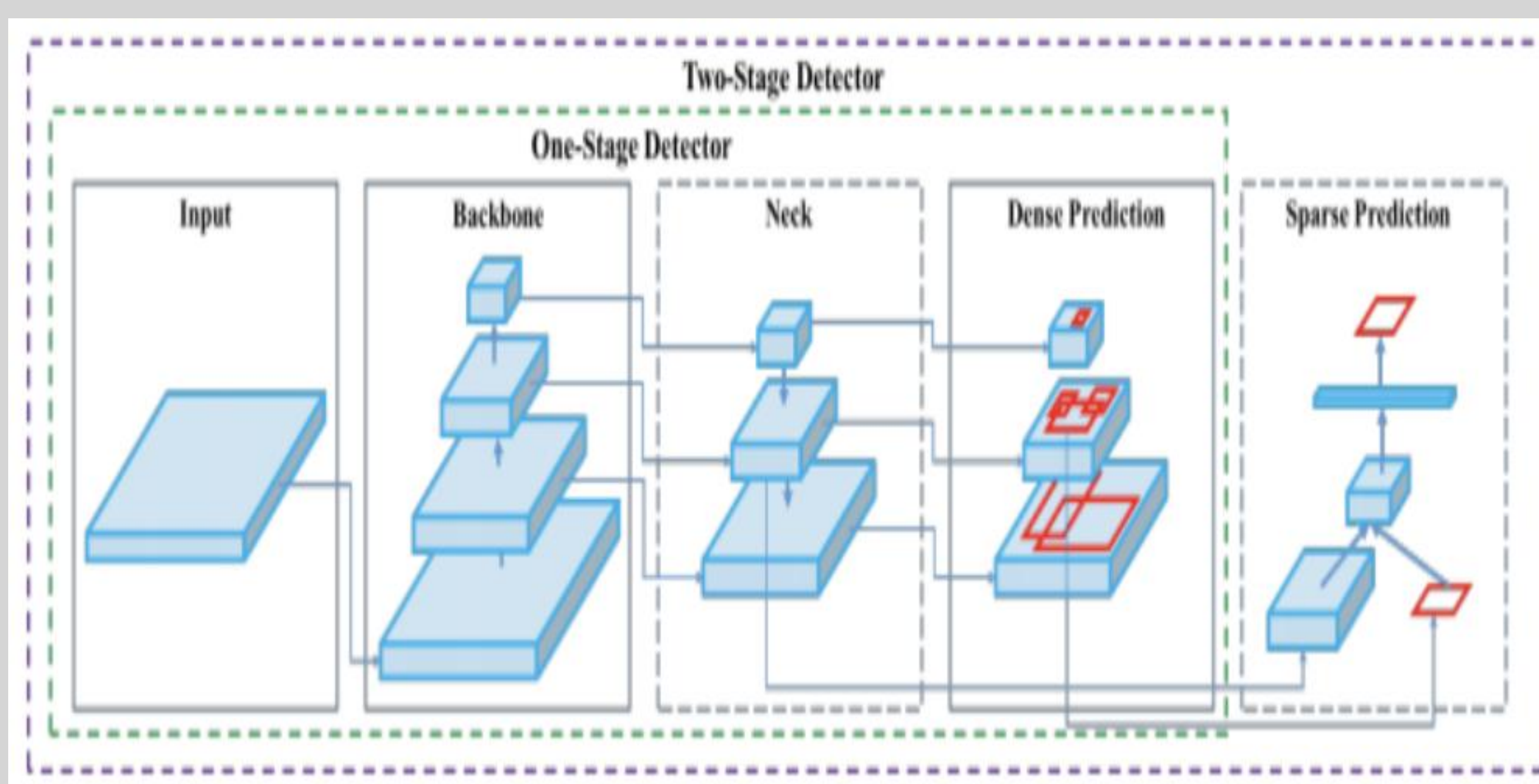


**I. object detection process (citation from YOLO5)**

## Result

lack of data



Improved training data



❖ First line input--training dataset
❖ Second line input--validation dataset
❖ Box_loss: smaller the box, more accurate;
❖ Objectness_loss: smaller the target detection, more accurate
❖ Precision: find the correct positive class / all found positive classes
❖ Recall: number of positive samples found
❖ mAP:overall performance metric for the object detection model

detection output



## Conclusion

❖ With less data and training times, the curve is not as ideal
❖ With training time increasing, loss decreases and also precision rate and recall rate increases
❖ The curve should be smooth instead of fluctuating
❖ With single classification, the class-loss is unchanged

## Next Step
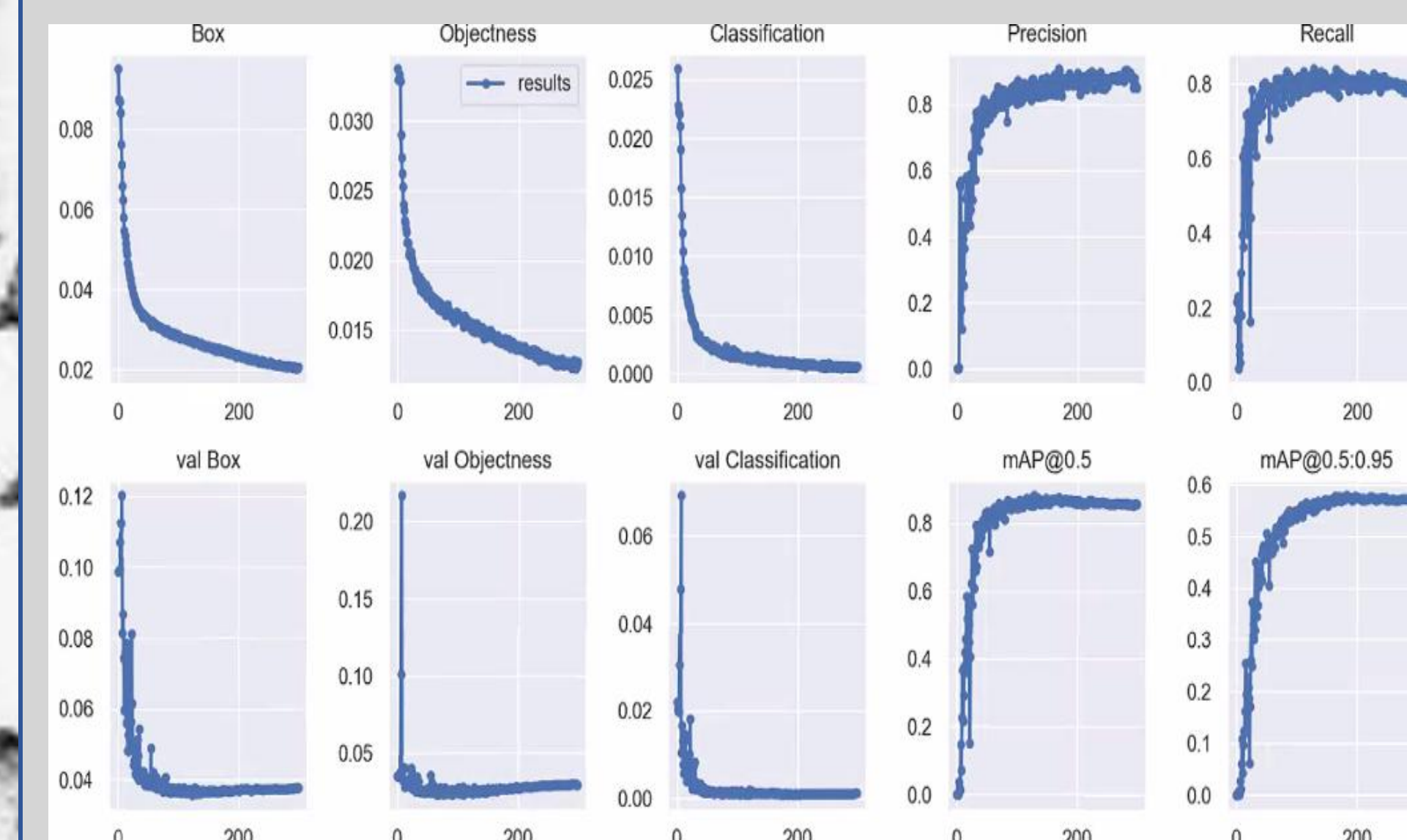


❖ Add more classification of cracks
❖ Train more and adjust the dataset to make curve smoother

## Acknowledgements