

# Detection and Ripeness Classification of Bananas Using Deep Learning Methods

Group 5

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# Outline

- 1 Problem Description
- 2 Why is the Problem Important?
- 3 How is the Problem Addressed?
- 4 System Architecture and Main Modules
- 5 References

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# Problem Description

- Automate the ripeness classification of bananas
- Predict when a banana will have the level of ripeness desired by the user

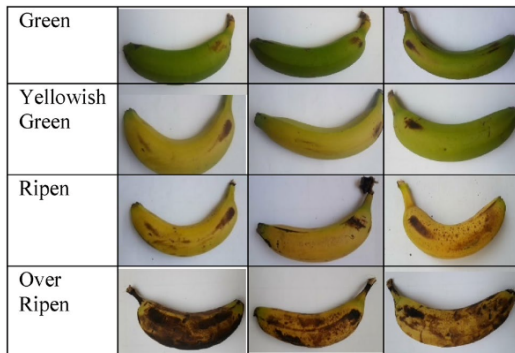


Figure 1: Samples from a dataset

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# Why is the Problem Important?

Food waste:

- Totals 1/3 of food produced worldwide

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- Costs close to 940 billion US dollars

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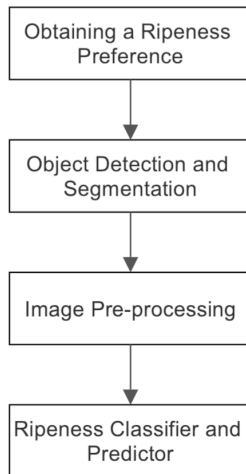
- Totals 1/3 of food produced worldwide
- Costs close to 940 billion US dollars
- Is responsible for 10% of global greenhouse gases emissions.



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# General Workflow



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- Data augmentation techniques
- Combining multiple datasets

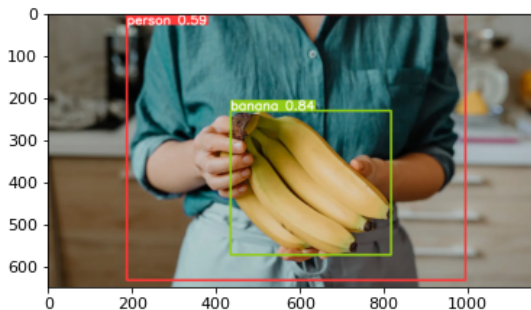
- Data augmentation techniques
- Combining multiple datasets
- Use the dielectric coefficient of the banana
- Use data from an infrared sensor

- Using different color spaces
- Segmenting the brown areas of the banana in the image

# Object Detection

- Deep Learning
- YOLO is the state-of-the-art
- Segmentation might be needed (YOLO can do that too!)

# YOLO in action





# Ripeness Classifier

- NN's
- CNN's

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- NN's
- CNN's
- Transformers?

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