領先創新•
•超越自我

2019 Synopsys ARC盃電子設計競賽

Electronic Component Defect Detection

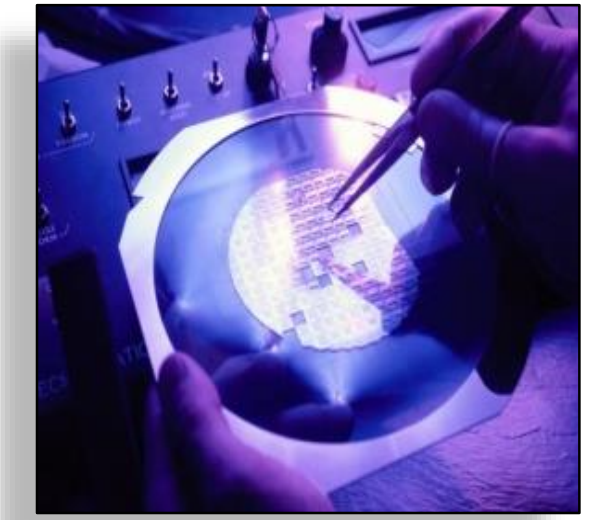
電子元件的瑕疵檢測

Chi-Yuan Sung, Jiun-Wei Juang, Li-Wei Liu
Advisor: Hsie-Chia Chang

Aug. 27, 2019

Agenda

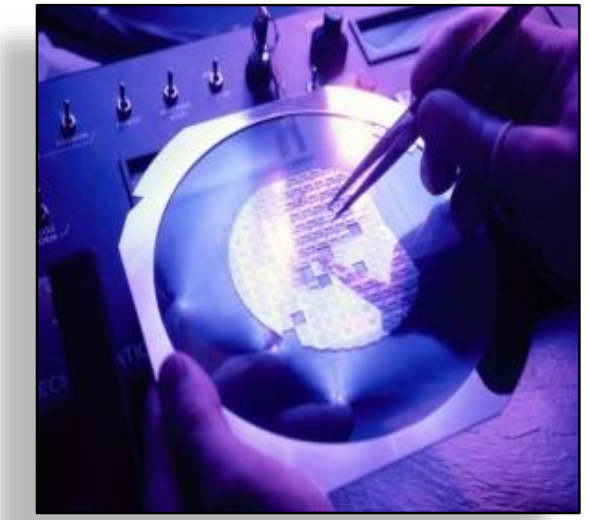
- 項目概述
- 難點與創新
- 設計實現
- 測試結果
- 總結展望



SYNOPSYS®

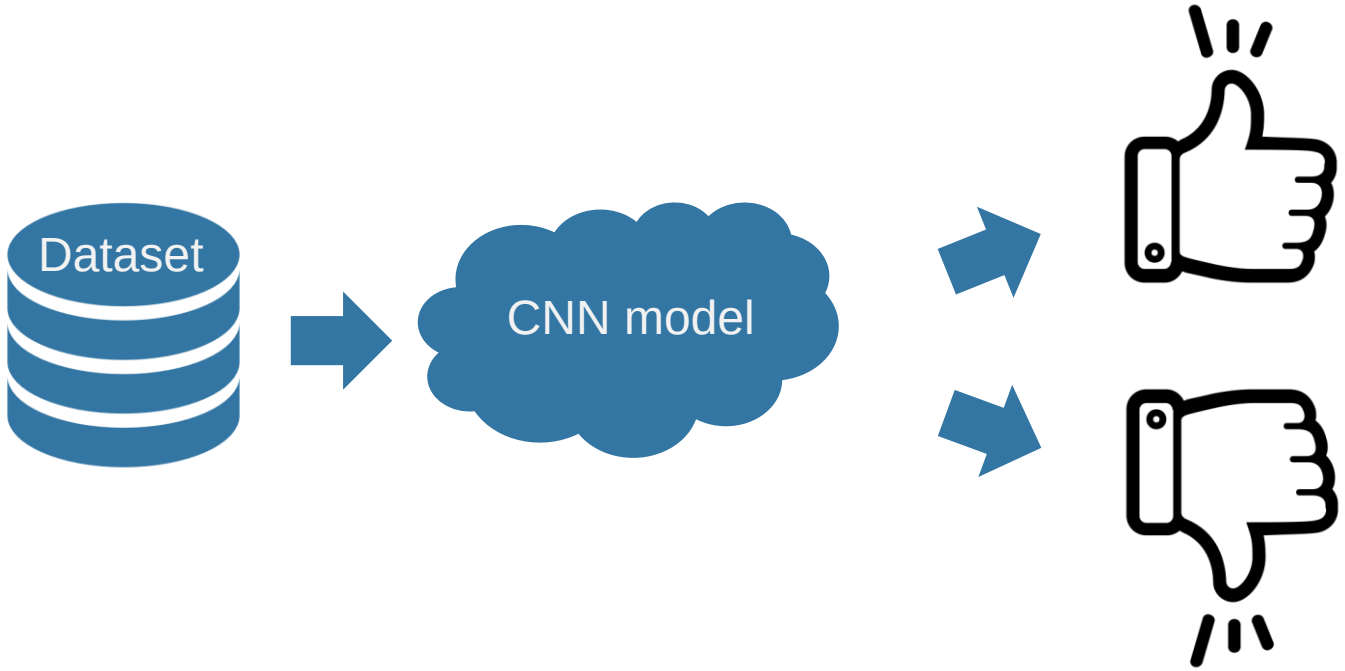
Agenda

- ☞ 項目概述
- 難點與創新
- 設計實現
- 測試結果
- 總結展望



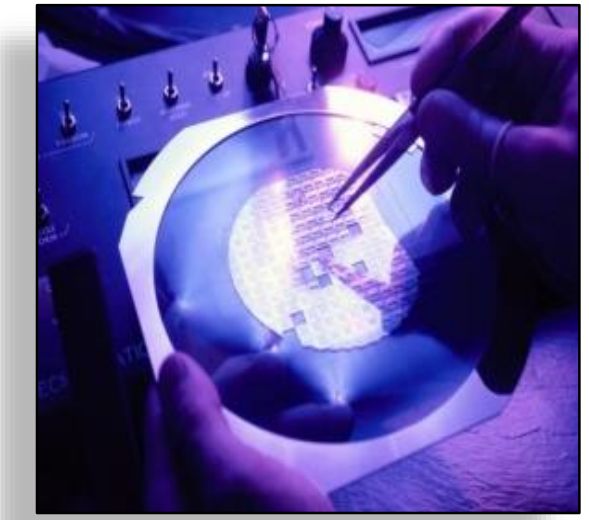
Introduction

- Application
  - Highly accurately classify image into good product and defective product
  - Small convolutional neural network model can be run on IOT Development Kit



Agenda

- 項目概述
- ☞ 難點與創新
- 設計實現
- 測試結果
- 總結展望



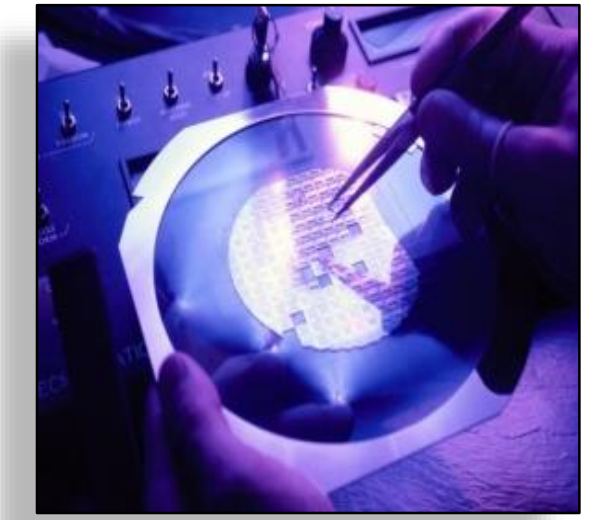
SYNOPSYS®

Features

- Classified by machine
  - Replacing human resource to detect the defect
- Model with small amount of parameter
  - High accuracy
  - Less memory storage

Agenda

- 項目概述
- 難點與創新
- ☞ 設計實現
- 測試結果
- 總結展望



SYNOPSYS®

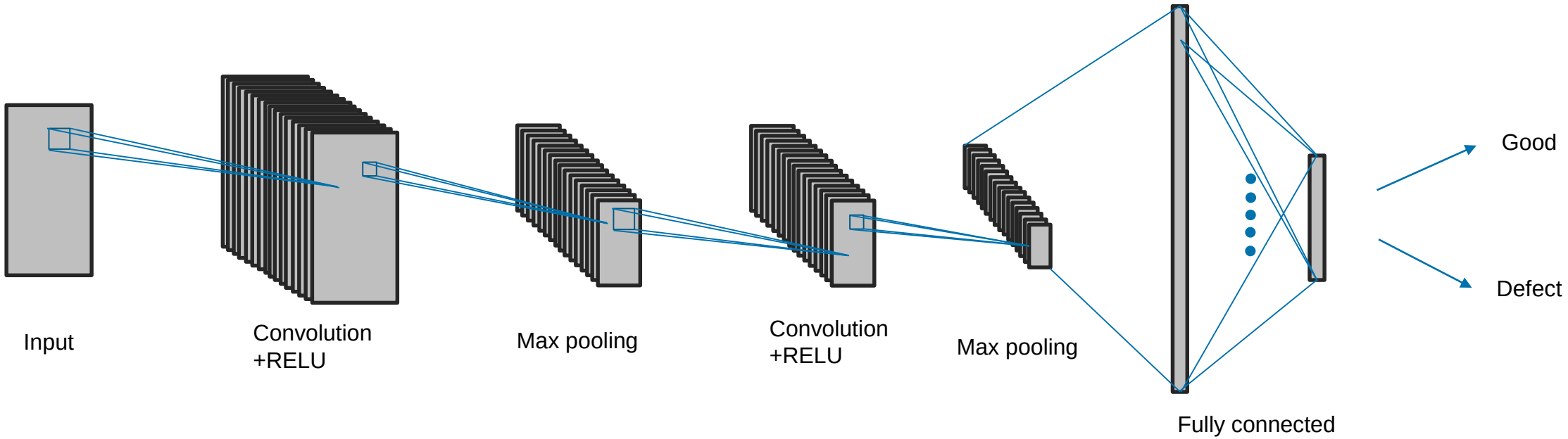
Implementation

- Image preprocessing
  - Resize to 40*20
  - Convert to gray scale(1 color channel)

Implementation

Caffe

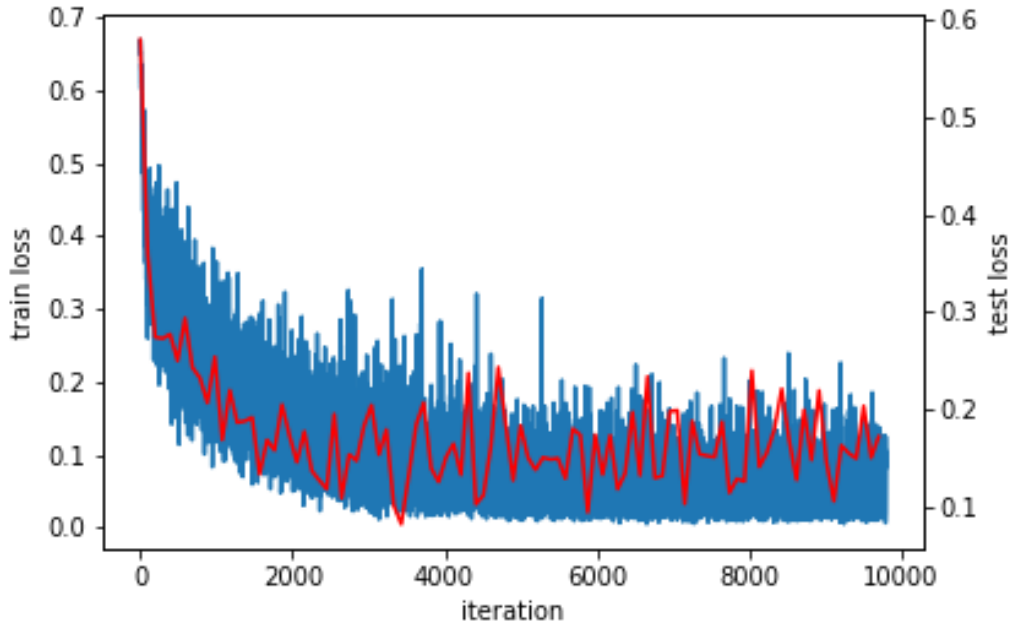
- Convolutional neural network
- Using Caffe to build model



SYNOPSYS®

Training Result

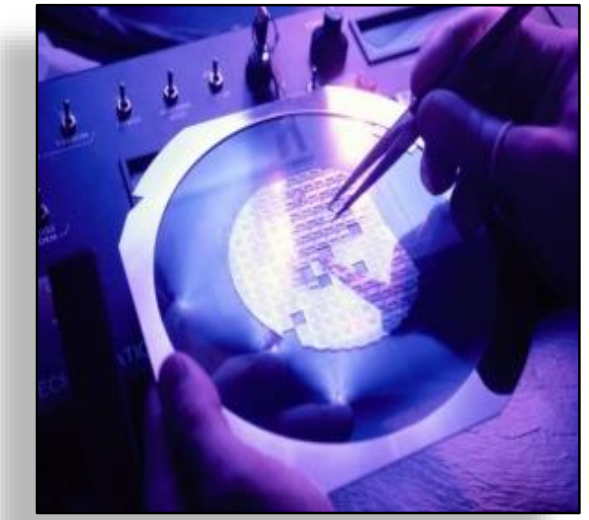
- Training time: 48.2s
- Training accuracy: 98.4%



SYNOPSYS®

Agenda

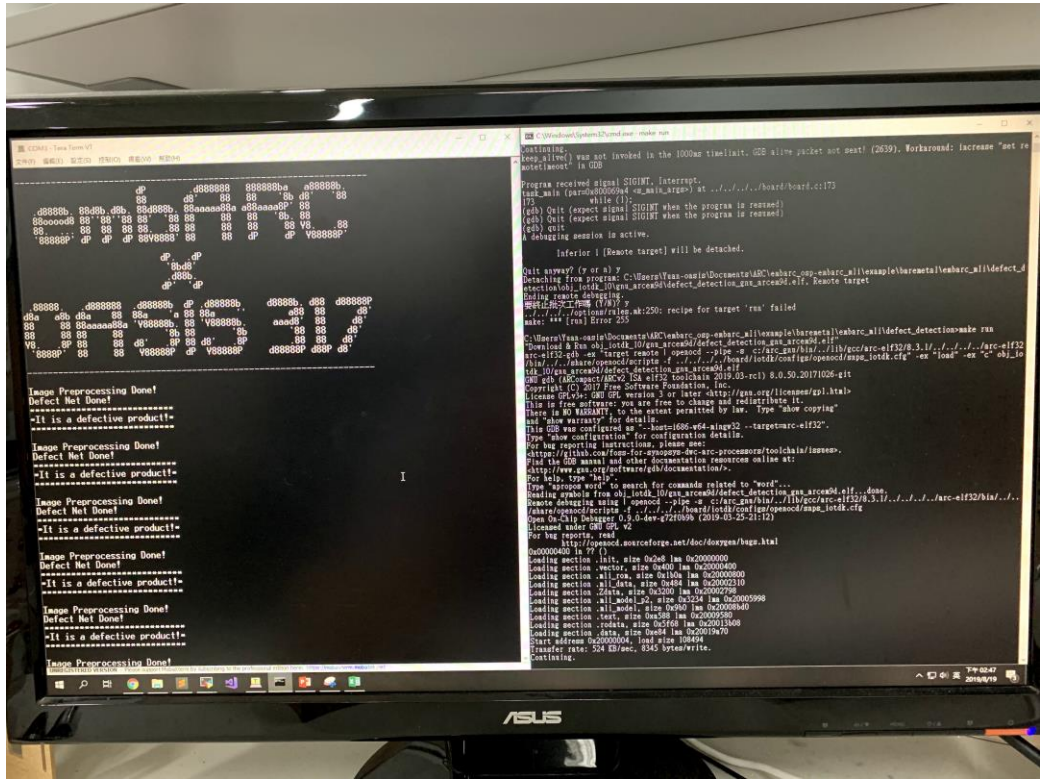
- 項目概述
- 難點與創新
- 設計實現
- ☞ 測試結果
- 總結展望



SYNOPSYS®

Result

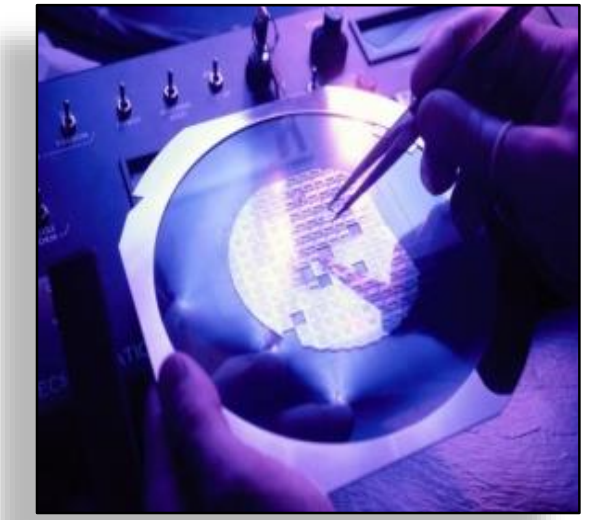
- Accuracy: 82.4%
- Inference time: 8ms/per image



SYNOPSYS®

Agenda

- 項目概述
- 難點與創新
- 設計實現
- 測試結果
- ☞ 總結展望



SYNOPSYS®

Future Work and Conclusion

- Future work
  - Real-time defect detection
  - Detect all kinds of electronic component

- Conclusion
  - Small amount of parameter
  - Accuracy is about 82.4% on IOT Development Kit

Thank You