Individual Project Report

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| Your Name: | Ong Boon Ping |
| Certificate: | Graduate Certificate in Pattern Recognition Systems |

# 1. Your personal contribution to the projects (all of them) in this Graduate Certificate.

# A) Construct the data set which I obtained from the factory without disclosing any confidential data. Provide both labelled resistance data (in 2D wafer) and unlabeled resistance (in 2D wafer)

# B) Choosing the autodecoder based on the reference.

# C) Design the initial autodecoder network model. Choosing Convolution 2D layers (stride 2,2) for downsizing in the encoder phase. Choosing Upsampling-Convolution 2D (stride 1,1) for decoder. Implement necessary lambda layer for 2D resistance array re-fitting after upsampling.

# D) Determine that RMS prop should be used for autodecoder while categorical crossentropy should be used for classifer.

# E) Determine that the training of encoder has been done during autodecoder training phase. The weight of the encoder can be loaded into the classifier and training must be disabled for encoder layers when training the classifier.

# F) Adding description of the dataset into the final report.

# G) Drafting raw description on the model design.

# 2. What you have learnt from the projects.

# I have learnt that autodecoder can be used as denoiser as I noticed unwanted noise are removed while essential features are highlighted.

# I also learn that autodecoder serves as feature extractor and enabled unsupervised learning. It allows less labelled data to be used for autodecoder classifier if compared to the other deep neural networks.

# I also learnt that weight of the Keras neural network layer can be loaded and training of certain layers can be stopped.

# 3. How you can apply this in future work-related projects.

I can apply this project in my work immediately by extending the project to cover more wafer testing result and larger wafer. I can also extend it to burn-in testing and other testing platform where the features can be categorical.

Autodecoder is certainly important tactics since we do not always have all the data tagged with intended classes. Hence, I will apply it detecting faulty/anomly testing board using categorical pass/fail test data or digital temperature sensor data. Sensor fusion is also possible since probe resistance data/temperature data on the similar IC chip can also be obtained at the same time.

The idea, if working, will be written as a paper in company wide competition.