Machine Learning@NTUT - Computer Vision

License Plate Recognition

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Task

Real-life License Plate Data

Overview Data Discussion Leaderboard Rules Team Host My Submissions **Submit Predictions**

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https://www.kaggle.com/t/873e6c9eaa1c494ebe59ab0d4db0938f

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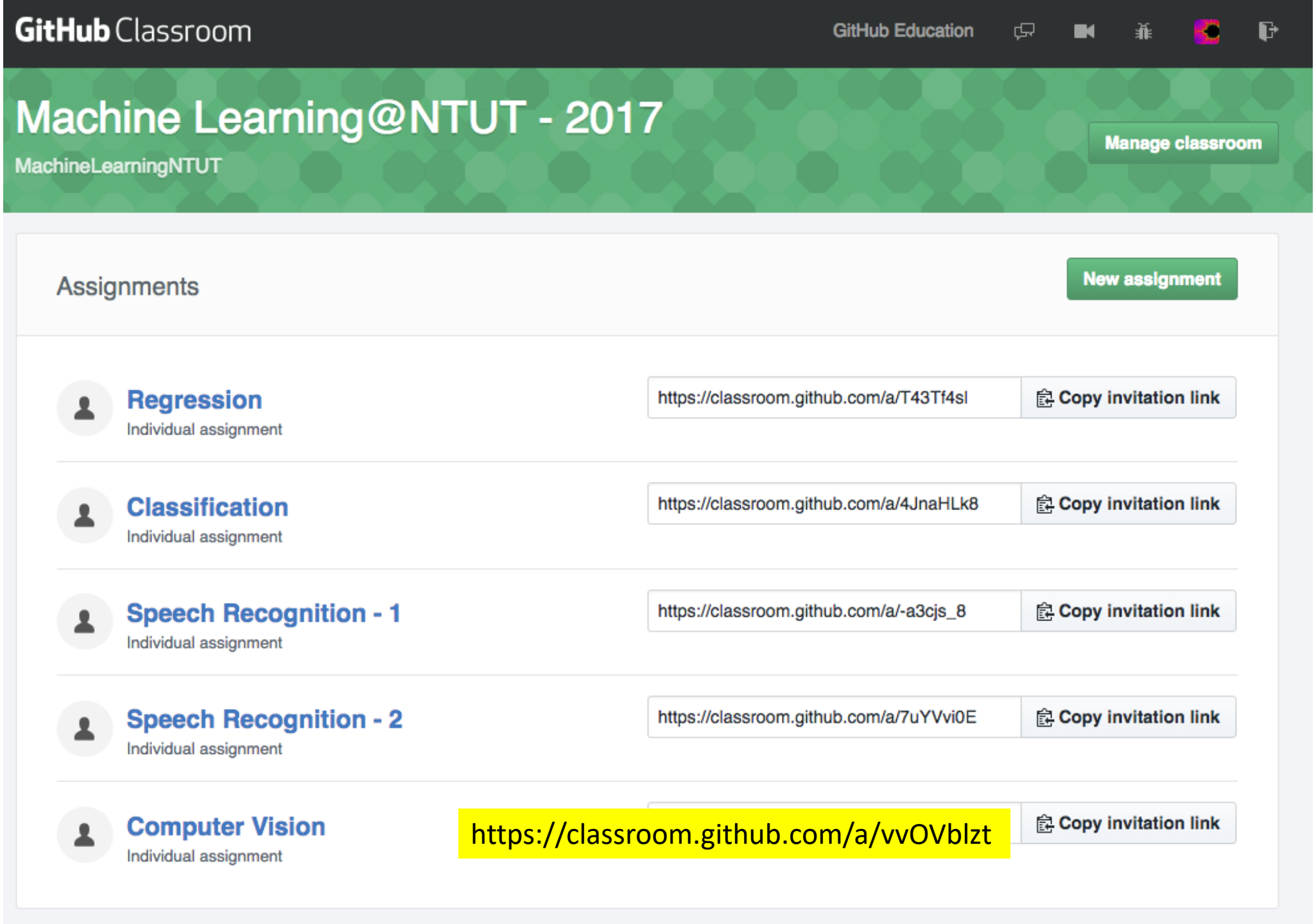
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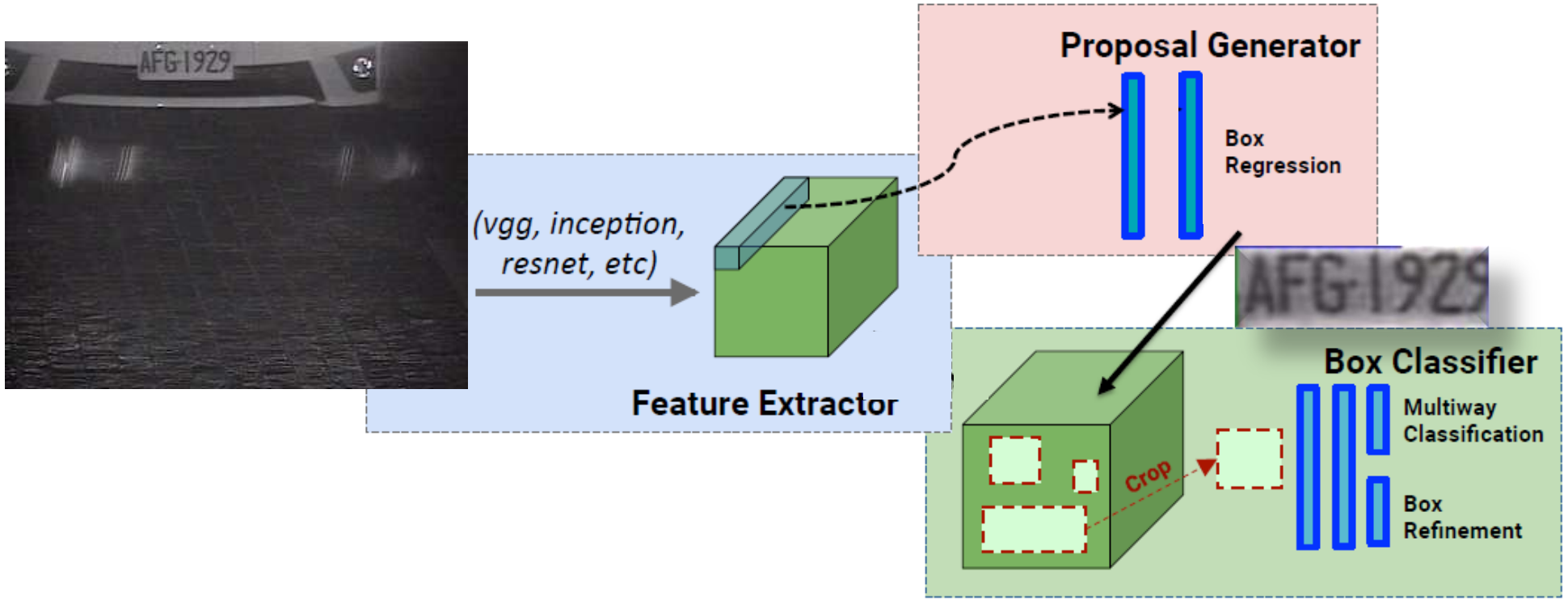
Vehicle registration plates of Taiwan

- https://en.wikipedia.org/wiki/Vehicle_registration_plates_of_Taiwan

Two-Stage Approach

- Stage 1 – Object Localization
  - One Feature Extractor + One Proposal Generator
  - Loss function 1 = regression error
- Stage 2 – Object Classification
  - Another Feature Extractor + One “cropped Image” Classifier
  - One-Hot plate number encoding
  - Loss function 2 = classification error



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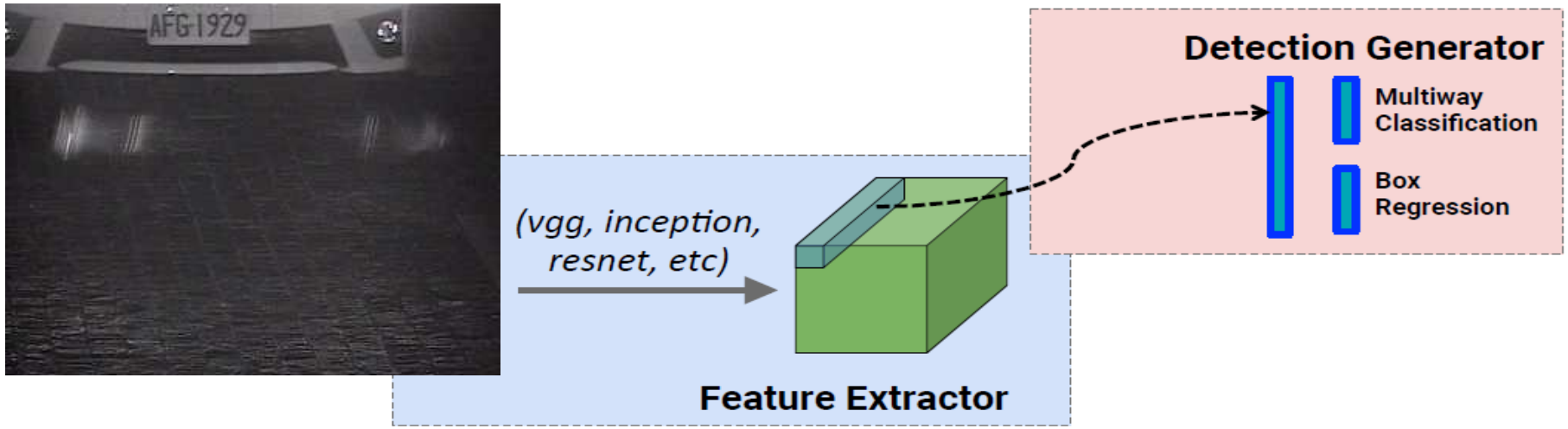
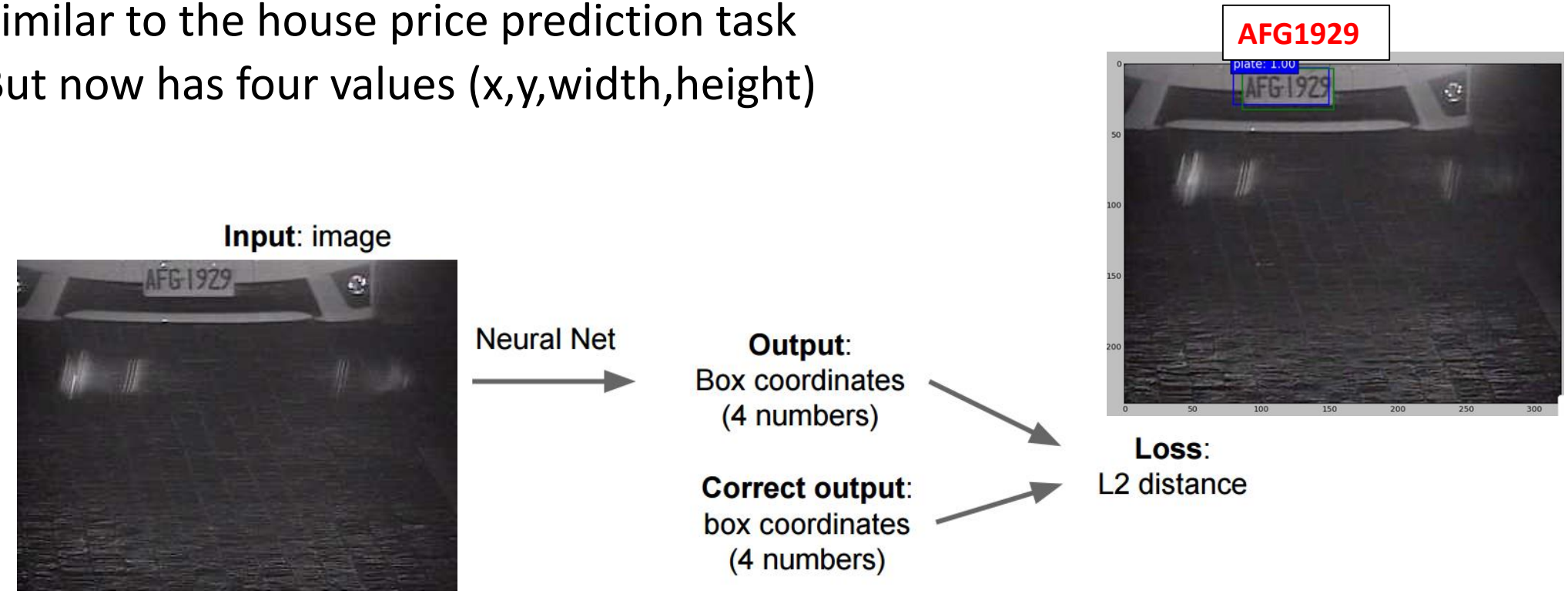
One-Stage Approach

- One Feature Extractor
- Two Output Heads
- Loss function = classification error + regression error



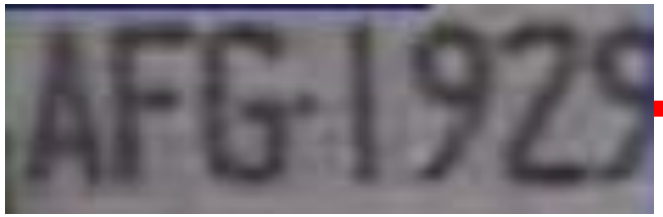
Output Head 1 – Localization Proposal

- Box Regression
  - Similar to the house price prediction task
  - But now has four values (x,y,width,height)



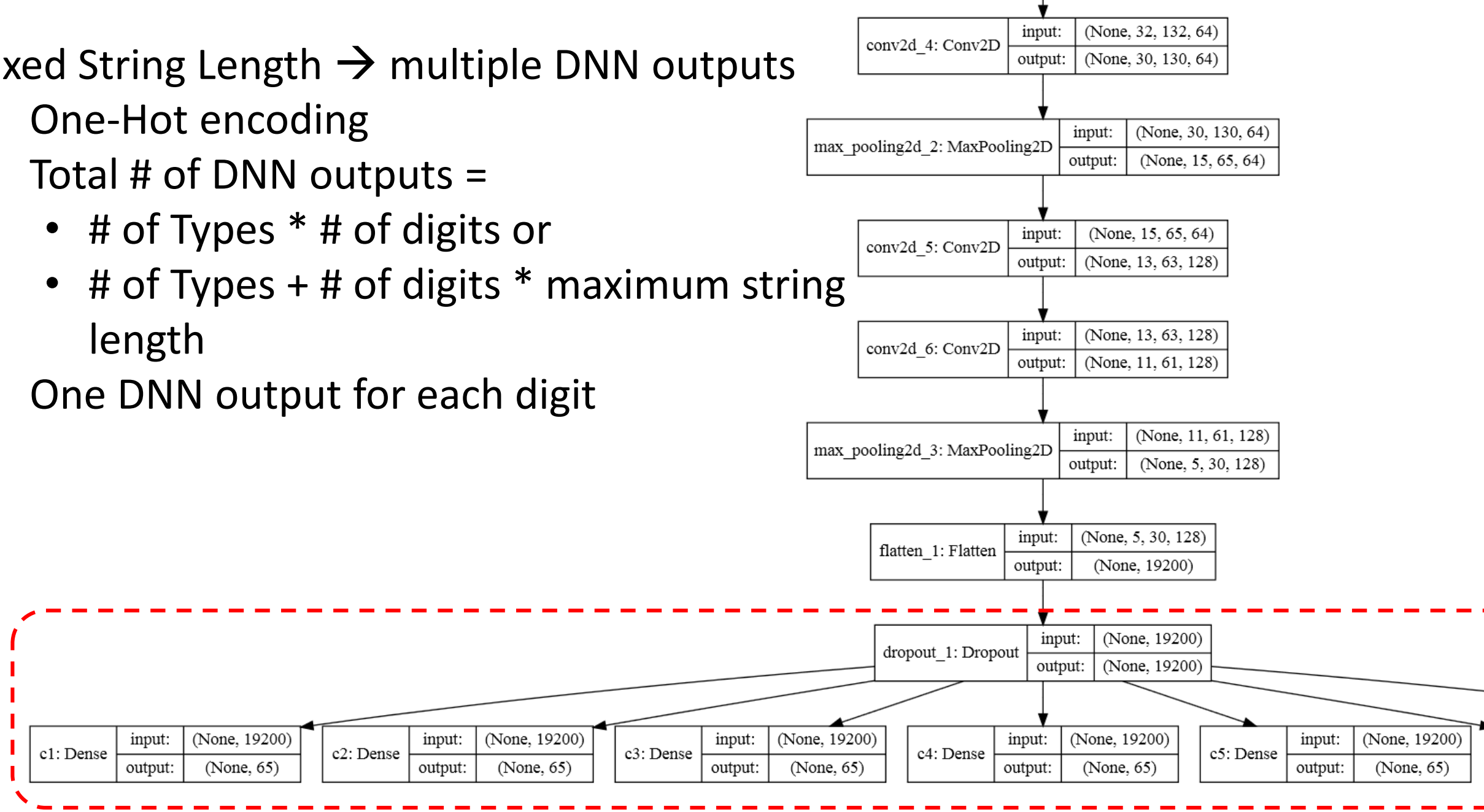
Output Head 2 – Number Classification

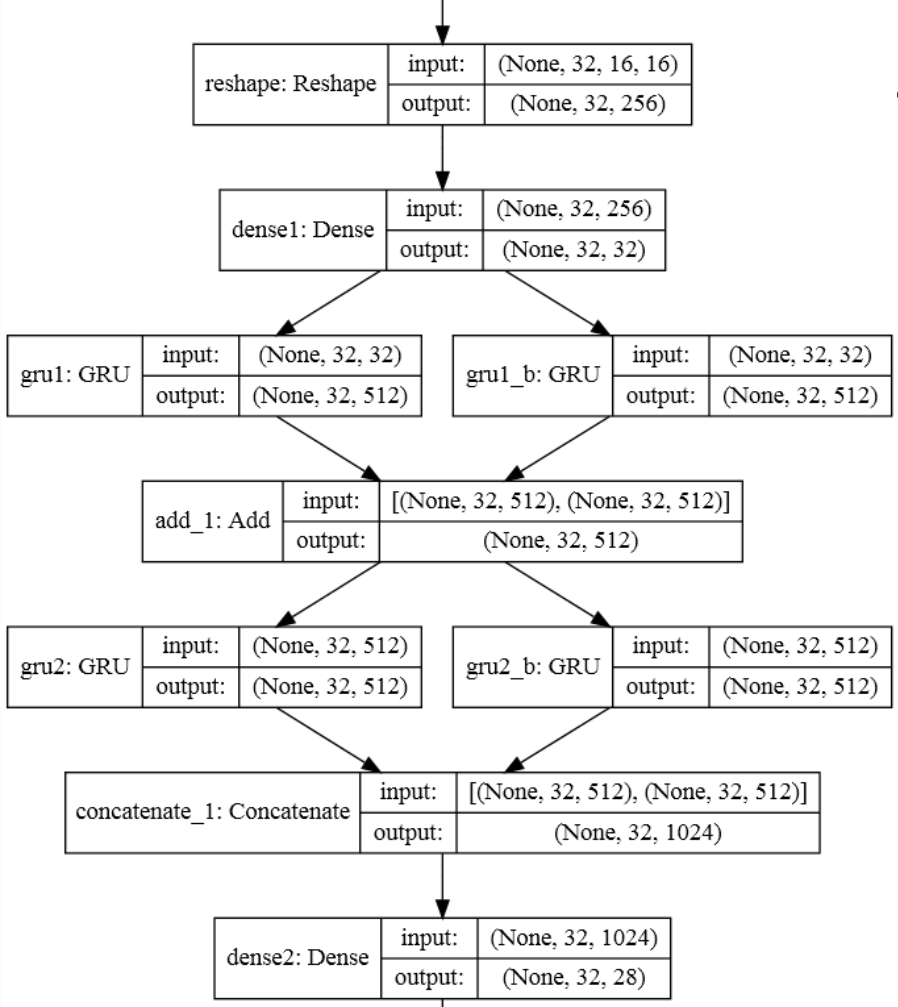
- One-Hot encoding



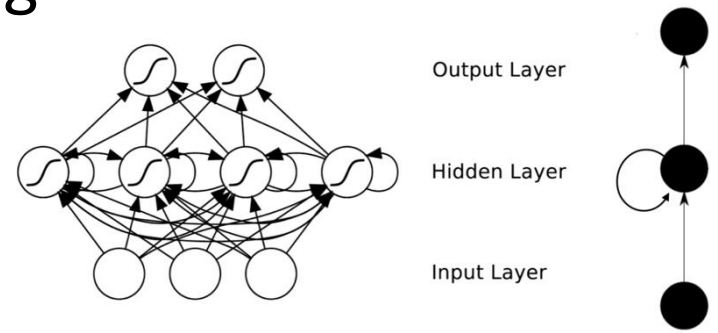
	A	B	C	D	E	F	G	…	Z	0	1	2	3	4	5	6	7	8	9
A	1																		
F						1													
G							1												
1											1								
9																			1
2												1							
9																			1

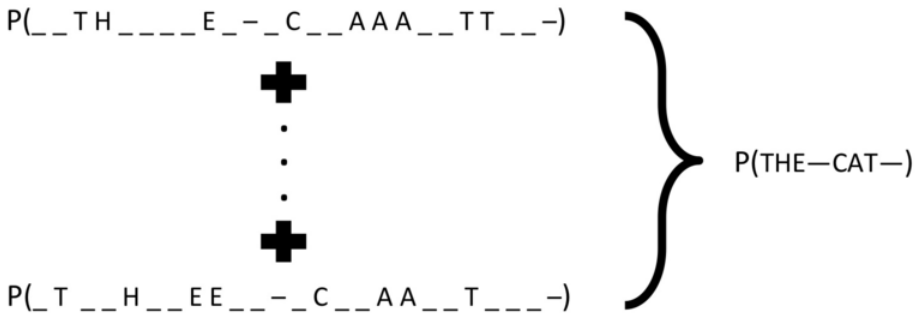
- Fixed String Length → multiple DNN outputs
  - One-Hot encoding
  - Total # of DNN outputs =
    - # of Types * # of digits or
    - # of Types + # of digits * maximum string length
  - One DNN output for each digit

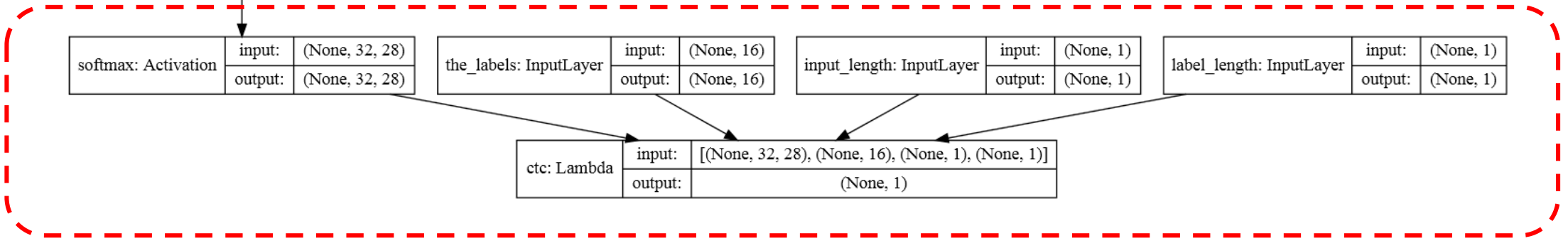




- Variable Length → Recurrent Neural Networks
  - One-Hot encoding
  - BPTT
  - CTC
  - Attention







Resources

- SSD: Single-Shot MultiBox Detector implementation in Keras
  - https://github.com/pierluigiferrari/ssd_keras
    - Use a smaller 7-layer version “ssd7_training.py” as a template
    - n_classes = 2

- Number plate recognition with Tensorflow
  - https://matthewearl.github.io/2016/05/06/cnn-anpr/

- 使用腾讯云GPU学习深度学习系列之五：文字的识别与定位
  - https://www.qcloud.com/community/article/680286