Deep Learning CS583 Fall 2020
Quiz 2

November 12, 2020

Instructor: Jia Xu

Student name: _____

Student ID: _____

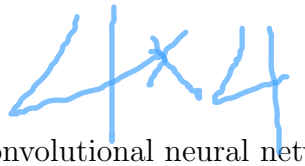
Student email address: _____

- **Read these instructions carefully**
- Fill-in your personal info, as indicated above.
- You have 24 hours.
- There are two questions. Each question worths the same (5 points).
- Both computer-typed and hand-writing in the very clear form are accepted.
- This is an open-book test.
- You should work on the exam only by yourself.
- Submit your PDF/Doc/Pages **by 18:30 Nov 19th** on Canvas under Final exam.

good luck!

1 Question

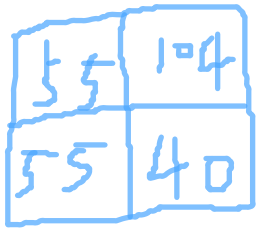
- A convolutional neural network has an input image of 28×28, and the filter is 3×3. The stride is 1. What is the output dimension of the 12th layer?



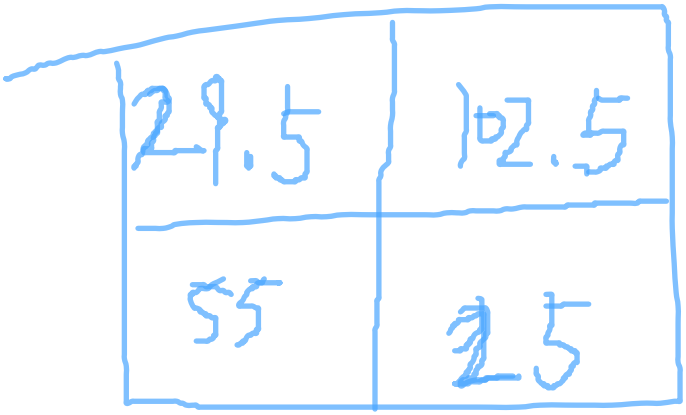
- A convolutional neural network has an input image of 28×28, and the filter is 3×3. The stride is 2. What is the output dimension of the 2nd layer?

- What is the max pooling result of a 2×2 pool size on the below input?

20	55	101	102
32	11	103	104
55	55	10	20
55	55	30	40



- What is the average pooling result of a 2×2 pool size on the above input?



2 Question

- If we have a recurrent neural network (RNN), we can view it as a different type of network by "unrolling it through time". Briefly explain what that entails.

- Briefly explain how unrolling through time is related to weight sharing in convolutional networks.

- In a deep neural network or a recurrent neural network, we can get vanishing or exploding gradients because the backward pass of back-propagation is linear, even for a network where all hidden units are logistic. Explain in what sense the backward pass is linear.

- Name a possible solution for the vanishing of the gradients and explain.