

Deep Learning Homework

Q1. Which of the following function cannot be used as activation function?

- A. $\max(0, x)$
- B. $1 / (1 + e^x)$
- C. $2^x - 1$
- D. $(e^x - 1) / (e^x + 1)$

Q2. Which of the following application should not use LSTM?

- A. Face detection in photos
- B. Virtual assistant system, like Siri
- C. Surveillance system on road
- D. Document (text) understanding

Q3. Describe main difference between DNN, CNN and RNN.

Q4. What's the benefit of designing a very deep network? What's the potential problem it bring?
Any method to solve it?

Q5. Coding problem
Implement a DNN:

1. Input layer has 10 nodes, it also means the input is a vector with length 10

2. Followed by a FC (fully connected) layer with 20 nodes, activation function ReLu
3. Followed by a FC layer with 15 nodes, activation function ReLu
4. Output layer is also a FC layer with 5 nodes, activation function Sigmoid

Also calculate how many parameters in the DNN need to be trained.

Codes: []

```
model = Sequential()
```

```
# TODO: FC layer with 20 nodes, Relu
```

```
# TODO: FC layer with 15 nodes, Relu
```

```
# TODO: FC layer with 5 nodes, Sigmoid
```

Q6. Coding problem

Implement a CNN:

1. Takes a 32x32 RGB image as input
2. Followed by a Convolutional layer with 10 5*5 kernels, activation function relu
3. Followed by a 2x2 max pooling layer
4. Followed by a fully-connected layer with 10 nodes, activation function softmax

Also calculate how many parameters in the CNN need to be trained.

Codes: []

```
model = Sequential()
```

```
# convolutional layer with 10 5x5 kernels, activation function relu, input image is 32x32x3
```

max pooling

flatten before connected with fully-connected layer.

fully connected layer with 10 nodes, softmax