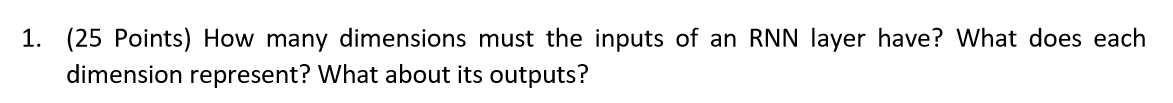
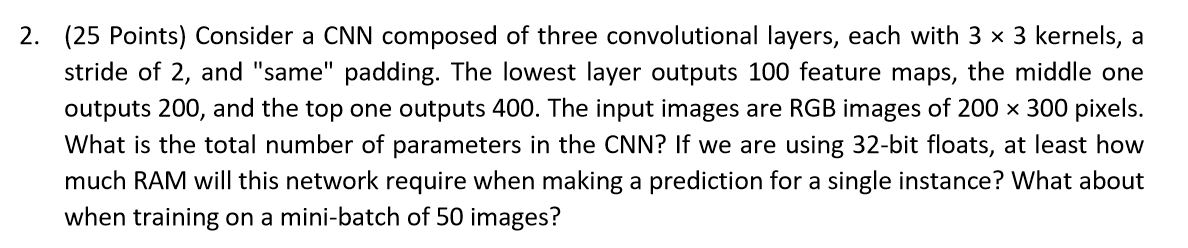
Assignment #2

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**

* *For each recurrent cell the input is X(t)  which is a m*🞩*ninputs matrix where m is the number of instances in mini-batch and ninput is the number of input features.*
* *The output is Y(t) which is a m*🞩*nneurons and contains the layers' outputs at time step t for each instance in mini-batch. M is the number of instances in mini-batch and nneurons is the number of neurons*

**

***Number of parameters for convolutional layer:***

*We add 1 for term bias in each feature map.*

*Layer 1:*

*(memory=4\*2800=0.112Mg)*

*Layer 2:*

*Layer 3:*

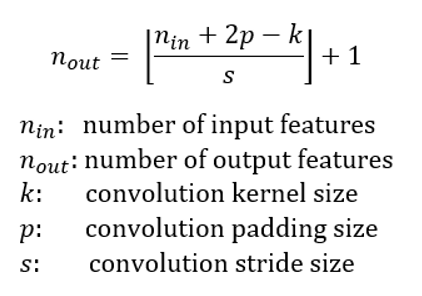
*Total number of parameters:*

*For mini-batch =50:*

*Layer 1:*

*Layer 2:*

*Layer 3:*

**

*For one image:*

*Required memory for input image: 3\*200\*300\*4=720K =0.72 Mg*

*First Layer:*

|  |  |
| --- | --- |
| *k=3\*3*  *p=same*  *s=2\*2*  *nin= 3\* 200 \* 300=* | *3\* 200/2 \* 300/2* |
| *Output feature map= 100*  *Number of bytes: 4* | *Memory=3\*100\*150\*100\*4=18000000 = 18 Mg* |

*second Layer:*

|  |  |
| --- | --- |
| *k=3\*3*  *p=same*  *s=2\*2*  *nin* | *=3\*100/2\*150/2* |
| *Output feature map= 200*  *Number of bytes: 4* | *Memory=3\*50\*75\*200\*4=9000000 = 9 Mg* |

*third Layer:*

|  |  |
| --- | --- |
| *k=3\*3*  *p=same*  *s=2\*2*  *nin* | *3\*50/2\*75/2* |
| *Output feature map= 400*  *Number of bytes: 4* | *Memory=3\*25\*38\*400\*4=4560000 = 4.56Mg* |

*We can consider two different case:*

1. *After computing one layer the memory will release, so we can consider largest memory as required ram. In this case required RAM memory would be:*

*Required memory for input + Required memory for parameters + Required memory for the output= 0.72 +0.112+18 =18.83 Mg*

1. *All the layers' computations will remain in the ram memory. In this case required ram memory would be:*

*Required memory= size of image +*

*memory for parameter in first layer+ memory for result of first layer+*

*memory for parameter in second layer+ memory for result of second layer+*

*memory for parameter in third layer+ memory for result of third layer*

*0.72+0.112+18+2.16+9+8.64+4.56=43.192 Mg*

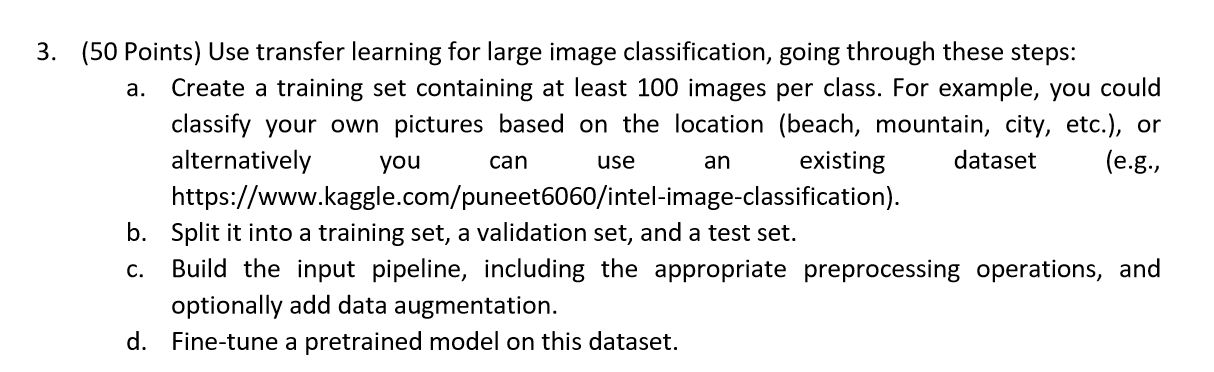
***For Mini-Bach:***

*To compute the total required memory for mini batch we need to compute memory required for a single instance and multiply it by 50 therefore:*

*In first case that after computing one layer the memory will release required memory would be: 18.83 \* 50 = 941 Mg*

*And in second case that we suppose all computation will remain in the RAM, required memory would be:*

*43.192\*50*

**

*Sima\_Shafaei.ipynb*