DEPARTMENT OF INFORMATION TECHNOLOGY, NITK SURATHKAL
END SEMESTER EXAMINATION, APRIL 2021
IT350 - DATA ANALYTICS

Class: VI SEM B.TECH (IT) **Time: 1½ Hrs. (2:00 - 3: 30)**
Date: 21/04/2021 **Marks: 35**

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NOTE: 1. Answer all questions

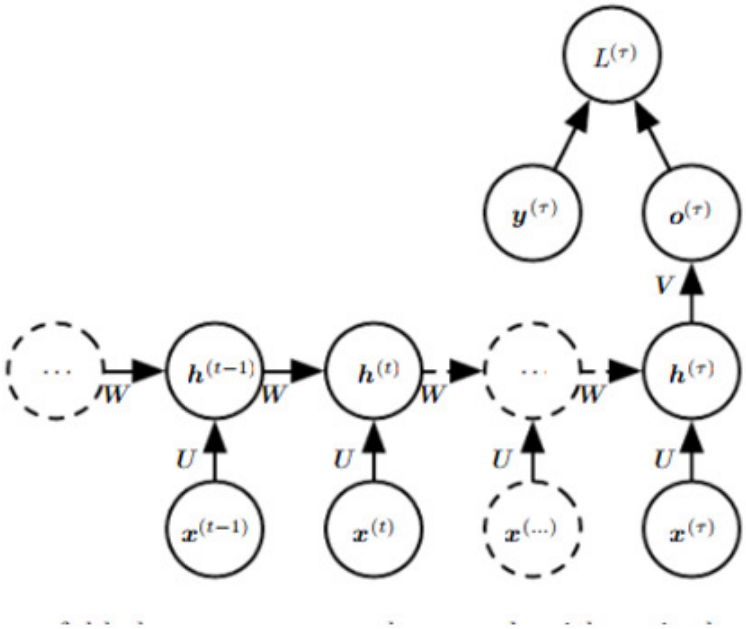
PART-B

1) Design a Convolutional Neural Network with your example and explain mathematically, (10 M)

a. How filter size or kernel size impacts the shape of the output feature map?

b. How the stride of the filter on the input image can be used to downsample the size of the output feature map.

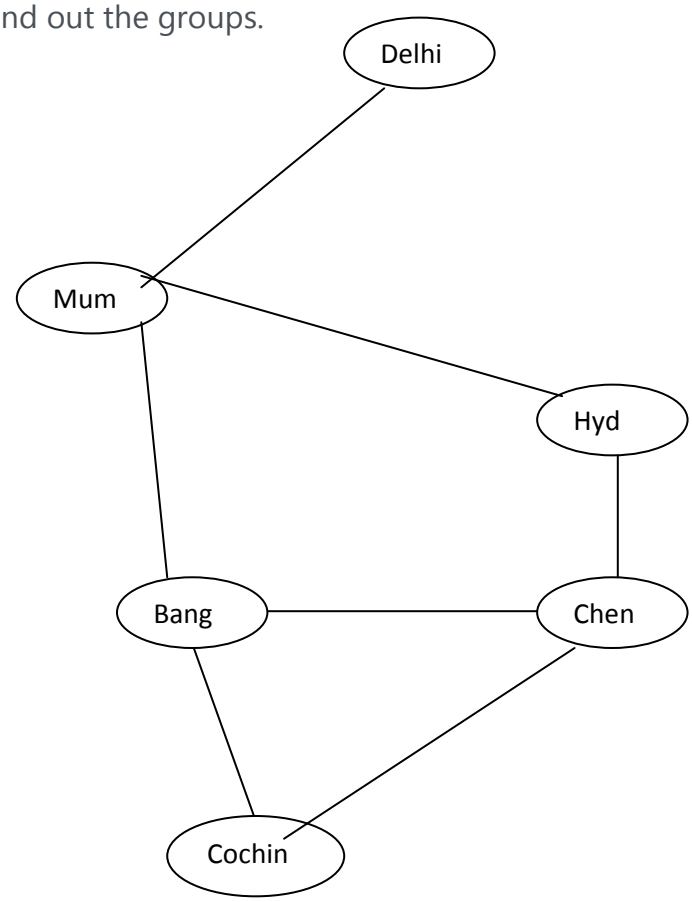
2) The given Figure shows an RNN architecture in which a variable number of inputs are mapped to a single output. Design and develop a suitable application for the below architecture and derive the equations from updating the parameters U, V and W. Use the mathematical method used to calculate derivatives and apply the derivative chain rule. (10M)



3) Assume that a company has its branches in six major Indian cities. The transaction and collaboration between the branches are shown as an undirected edge between them. The company's Governing body decided to form the all the branches into two non-overlapping clusters (i.e.), to similar group units into the same group based on their collaborations. (10 M)

a) Choose a method to exploit the betweenness of edges to find the groups.

b) Try the spectral methods to find out the groups.



4) Consider the tiny social graph in the above Figure. Suppose there are two overlapping communities A and B, with associated probabilities pa and pb. Also,
suppose that we have determined (or are using it as a temporary hypothesis) that
A = {De, Mu, Bang} and B = {Hyd, Bang, Chen, Cochin}. Compute the likelihood of the graph in Fig, given our assumptions about membership in the two communities. (5M)