

## Surprise Test: Machine Learning

Nov 15, 2021

Time: 50 minutes

### Instructions:

1. The answers can be done in either handwritten or typed format.
  - Every page of the answer sheet MUST include the Roll Number, Name, and Page number. You should number your pages as you go along.
  - You have to make a single PDF file for the submission. The file name MUST be your <roll\_number\_name>. For example, 1821cs05\_Soumitra\_Ghosh.pdf
2. Upload your answer file within the stipulated time in the following link:  
<https://www.dropbox.com/request/CzbYBbT0sfmeHXKQNXqJ>

**Q1.** Prove that XOR cannot be computed by a single sigmoid neuron. Sigmoid function is defined by  $y=1/(1+e^{-x})$ .  $y$  is the o/p of the neuron and  $x$  is the net input to the neuron. 5

**Q2.** For a given Vector Space Model, Cosine similarity can better capture the similarity between the documents than Inner product. Justify this claim with appropriate examples. 5

**Q3.** An ensemble can be constructed either by taking different subsets of any particular data and then joining them through a voting mechanism, or through re-weighting the training instances in an iterative manner. Explain the merits and demerits of these approaches connecting them to the bagging and boosting method. 5

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***Best of Luck***