

# Fall 2017

7. (10 points) We work for the investment firm Golden Sacks, and we are trying to build several predictive models about the stocks of companies.

(a) Companies are described to us in terms of 4 features. For each feature, describe a transformation that one should apply to convert it to features that could be concatenated to make a feature vector representing the company, or indicate that it should be omitted from the input representation.

i. Market segment (one of "service", "natural resources", or "technology")

ii. Number of countries in which it operates (1 – 50)

iii. Total valuation (-1 billion to + 1 billion)

iv. Company name

(b) Now, consider output representation. For each goal below, specify the number of output units you would use, as well as the activation and loss function.

i. Your goal is to predict whether or not the company will have an IPO in the next year.

$\alpha$ ) Number of units \_\_\_\_\_

$\beta$ ) Activation function

$\gamma$ ) Loss function

ii. Your goal is to predict the net profit of the company next year.

$\alpha$ ) Number of units \_\_\_\_\_

$\beta$ ) Activation function

$\gamma$ ) Loss function

iii. You have 100 favorite clients each of whom has certain preferences for the types of stocks they buy. You have to predict, for a given new stock  $x$ , which clients will like it and which will not.

$\alpha$ ) Number of units \_\_\_\_\_

$\beta$ ) Activation function

$\gamma$ ) Loss function