DEEP LEARNING: EXERCISE SHEET 1 (SoSe2018)

QUESTION 1 REGRESSION AND CLASSIFICATION - 5 POINTS

Explain:

a)(1.Point) What is the difference between regression and classification?

b)(1.Point) What is a softmax activation function?

c)(3.Points) What would be the output of:

$$Softmax(x), \quad x = (1, 0, 2)$$

QUESTION 2 STOCHASTIC GRADIENT DESCENT - 15 POINTS

Consider the data-set below and the function:

DATA-SET

ID	Bias	x_1	x_2	y
#1	1	1	2	2
#2	1	2	4	4
#3	1	4	8	8

$$\hat{y}(x, \theta) = bias * \theta_0 + x_1 * \theta_1 + x_2 * \theta_2$$

With the loss function as, for each sample x:

$$\mathcal{L}(\theta, x, y) = (y - \hat{y}(x, \theta))^2$$

Perform one step of the stochastic gradient descent with step-size $\alpha = 0.001$ and weights $\theta^{(t=0)}$ initialized as $(0.5, \quad 1.5, \quad 0.5)$. (For the sake of correction: Update in the same order as your samples). What is your new $\theta^{(t=1)}$ and how much your total loss improved? What would happen if we updated the weights again? What would happen if we used $\alpha = 0.1$ in the first update? Comment on your findings.

BONUS POINTS!

During the tutorials, you will have the chance of earning up to 10% of extra points to your final exam. Submission grades represent 75% of this bonus. The rest (25%) is earned by attending to at least 70% of the tutorial sessions OR submitting at least 70% of the sheets.

HOW TO SUBMIT?

Inside the Samelzonplatz Campus, there is a post-box cluster to the right corridor from the entrance. Look for the "Deep Learning Post-Box" (we will set it up on Monday).

Keep in mind that your solution sheets are important documents, so make sure they are clean and organized. Non-readable sheets will not be graded.

REMEMBER TO KEEP A COPY OF YOUR SOLUTION FOR YOURSELF!

Soon we will change the submission format. Fill in this form if you want to get updates on this: https://goo.gl/forms/gLtEWaBM4vx9zj8T2