

30.10.23

Machine Learning With TensorFlow

INTRODUCTION TO TENSORFLOW PART I

- **Quiz**
- **Assignments**
- **Breakout Discussions**
- **Questions**
- **Project Examples**

Introduction to TensorFlow Part I



QUIZ

<https://forms.office.com/r/8WUugxmV3v>

ASSIGNMENTS

ASSIGNMENTS: WHO WILL PRESENT NEXT?

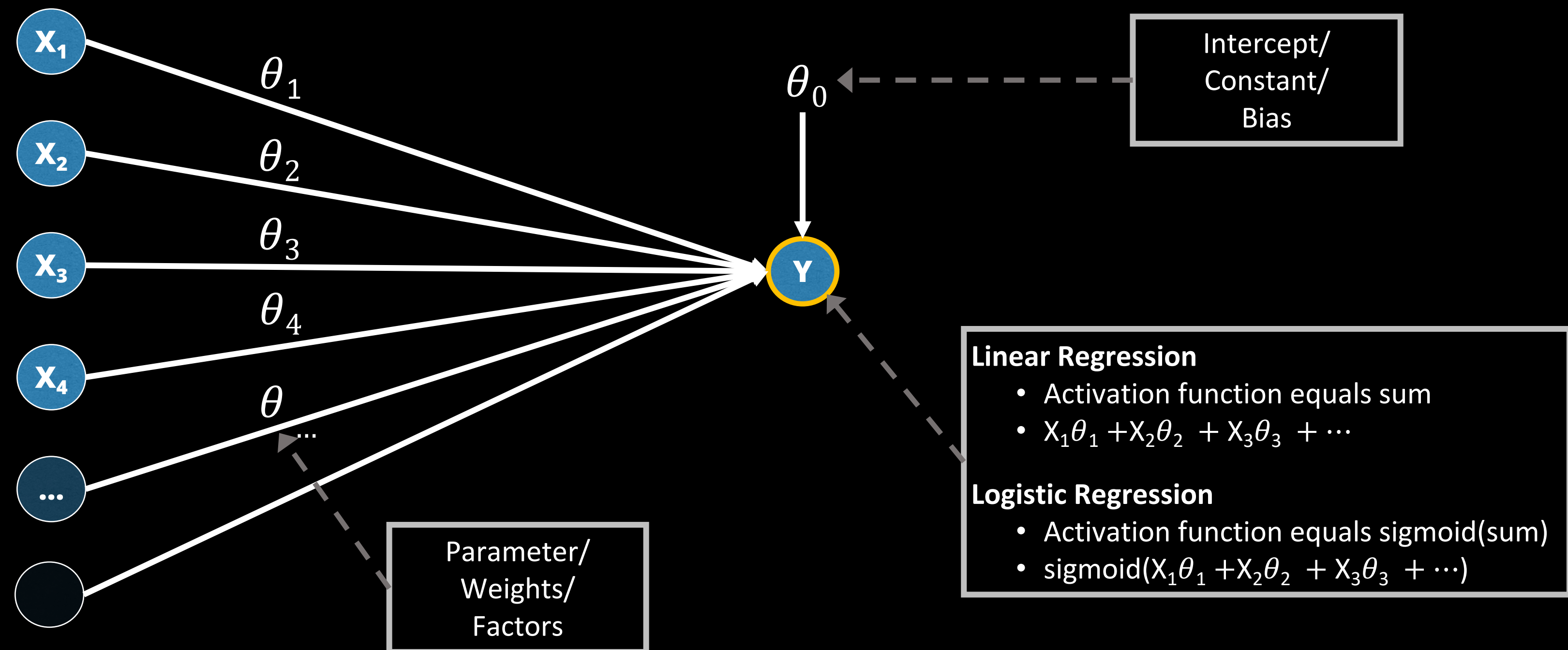
BREAKOUT DISCUSSIONS

- Why is it usually beneficial to adjust the features and labels of the network to values between 0 and 1 or at least relatively close to zero?
- **What is the difference between the approach used in Exercise 1 and a linear regression?**

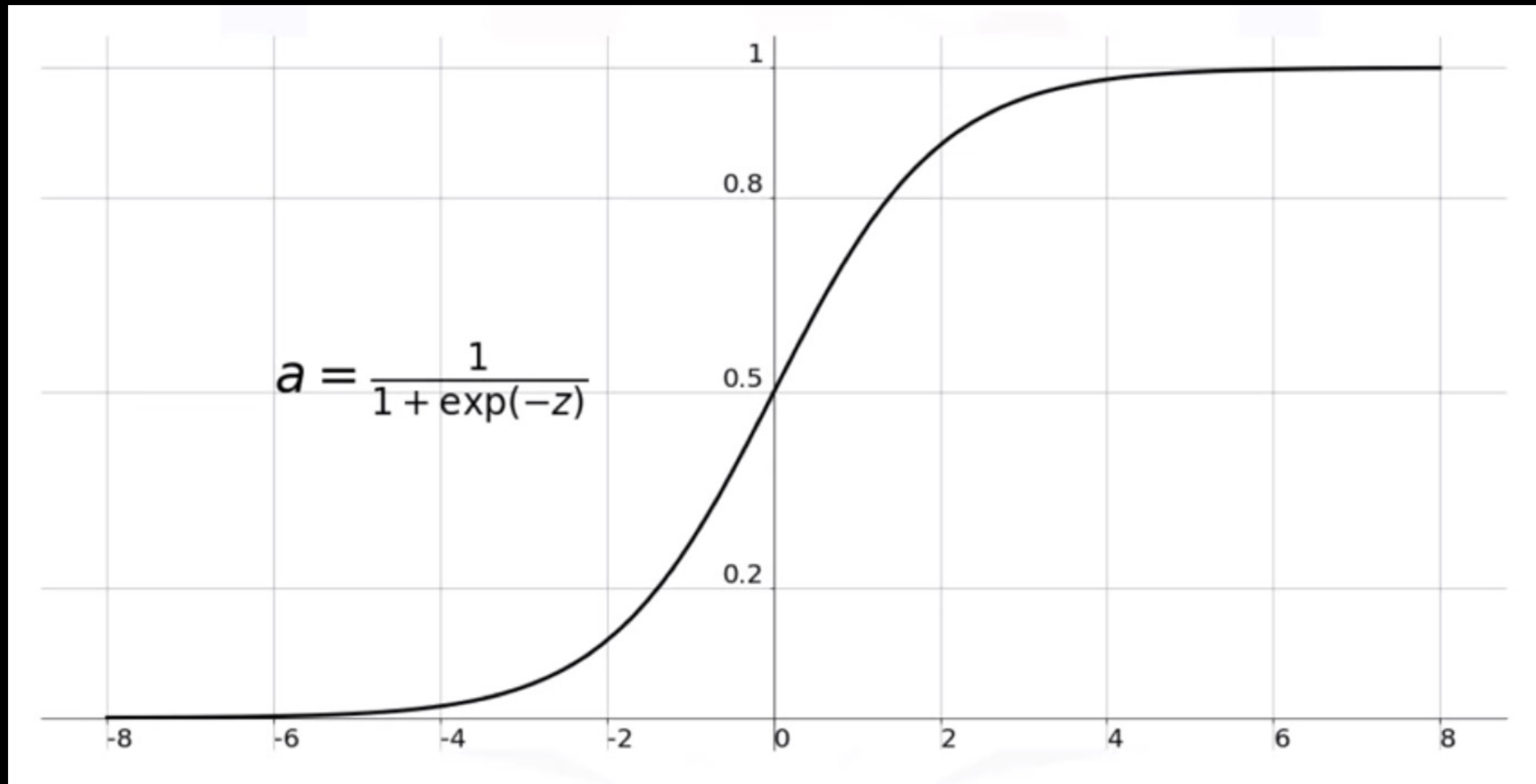
NEURAL NET VS. REGRESSION

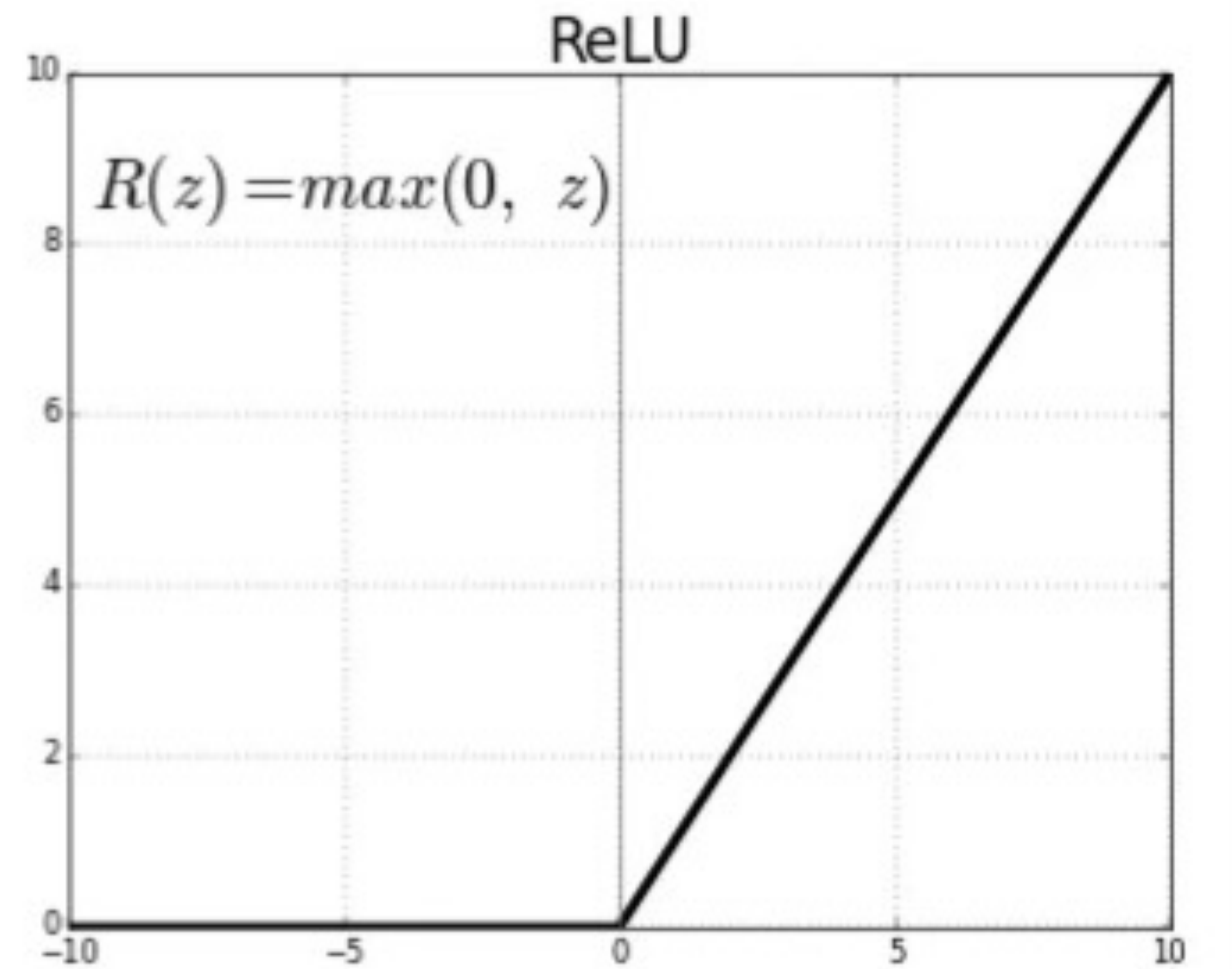
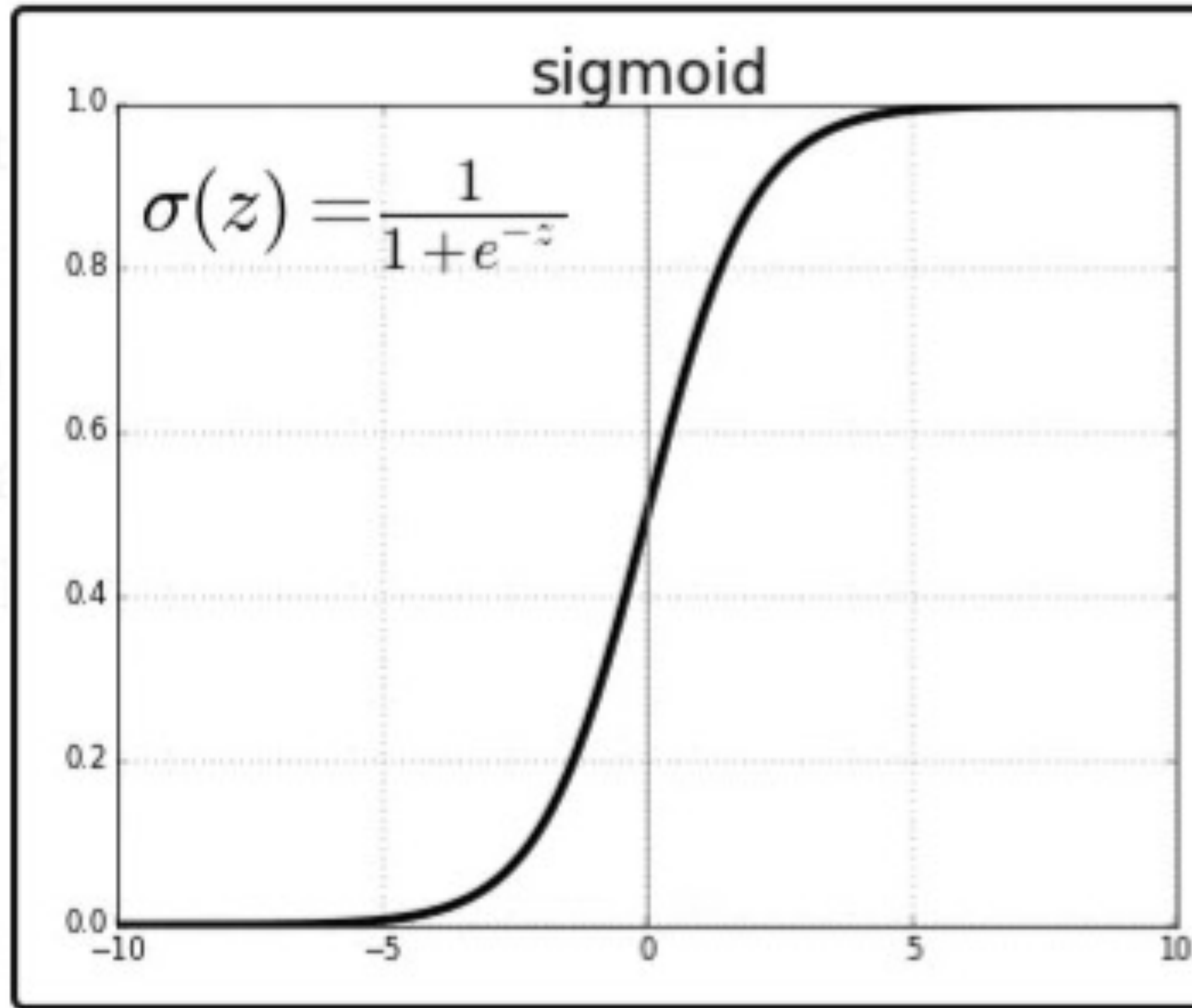
Input Layer
with input variables/ input
features/ input dimensions

Output Layer
summarizing the thetas by applying
an „*activation function*“

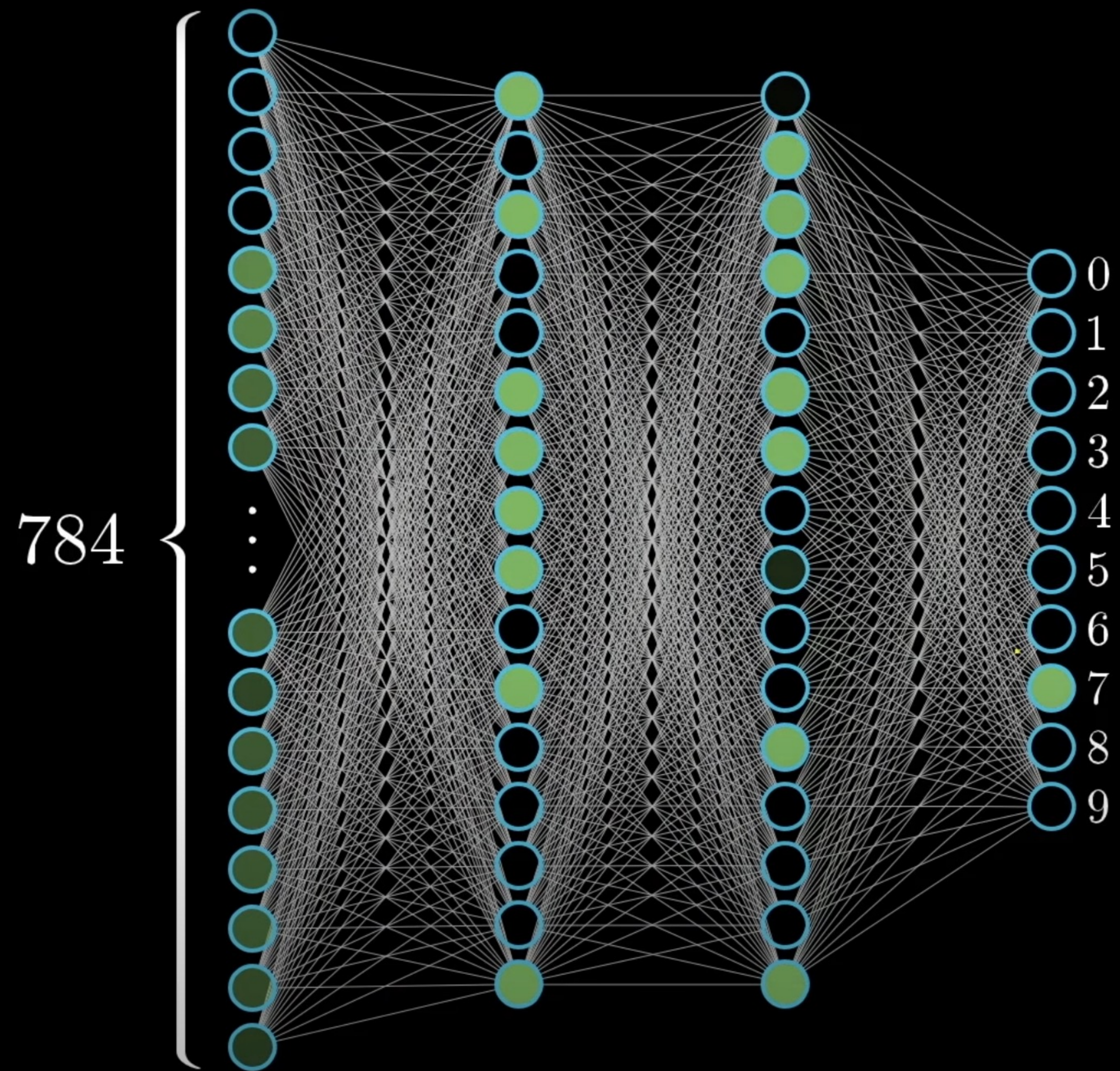


SIGMOID FUNCTION





NEURAL NET (MULTI LAYER PERCEPTRON)



Output
layer

Softmax
activation function

Probabilities

$$\begin{bmatrix} 1.3 \\ 5.1 \\ 2.2 \\ 0.7 \\ 1.1 \end{bmatrix}$$



$$\frac{e^{z_i}}{\sum_{j=1}^K e^{z_j}}$$



$$\begin{bmatrix} 0.02 \\ 0.90 \\ 0.05 \\ 0.01 \\ 0.02 \end{bmatrix}$$

BREAKOUT DISCUSSIONS

- Assume you have the labels 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 describing the age of a product in years and features like color, noise, and speed of the product (which change with the age).
How would you define the output layer of your model?

QUESTIONS

PROJECT MILESTONES

- 06.11 Present your ideas
- 13.11 Form groups
- 20.11 Literature review
- 27.11 Dataset characteristics
- 04.12 Baseline model
- 11.12 Tensorboard
- 18.12 Model & model evaluation
- 08.01 & 15.01 Final presentation

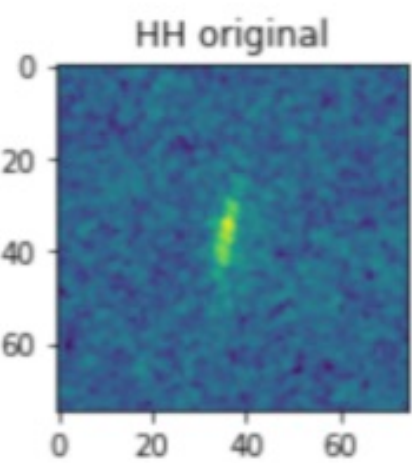
PROJECT EXAMPLES

OC ML Degree Deep Learning **Tensorflow** Natural Language Processing GitHub Repo

Machine Learning with Tensorflow Projects

See the awesome projects people finished during the course

[Take the course and do yours!](#)




Iceberg and Ship Detection in Radar Satellite Imagery (WiSe 20/21)

Eike Schütt, Yi-Jie

This project is aimed at building an algorithm able to detector for SAR imagery which finds and classifies ships, icebergs or unidentified objects.

[Check out the Project!](#)




Classification of illustrations in historic monographies (WiSe 20/21)

Irena Kampa

Digitalizing old collections makes them available to a worldwide public. This project trains a CNN to identify illustrations in monographies from the 15th to the 18th century.

[Check out the Project!](#)

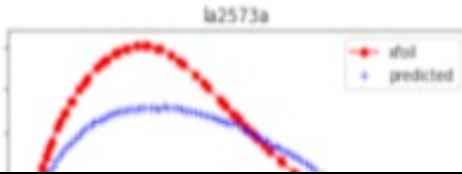


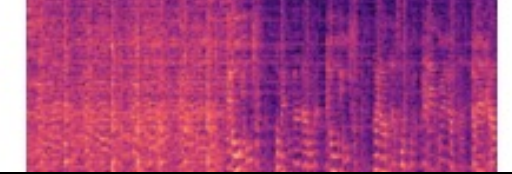
Writing System Recognition (WiSe 20/21)


Manpreet Singh, Adnan Nooruddin, Rahima Akter, Sebastian Koch

Can we detect different language from an image? Here a classifier which is able to distinguish Latin, Chines, Kyrillic and Georgian!

[Check out the Project!](#)







<https://opencampus-sh.github.io/oc-ml-projects/>

TASKS UNTIL NEXT WEEK

- **Completion of the learning material of week 3 and 4 of the course "introduction to TensorFlow"**
- **Complete Exercises 3 and 4 from the course handbook**
- **Bring a first project idea!**