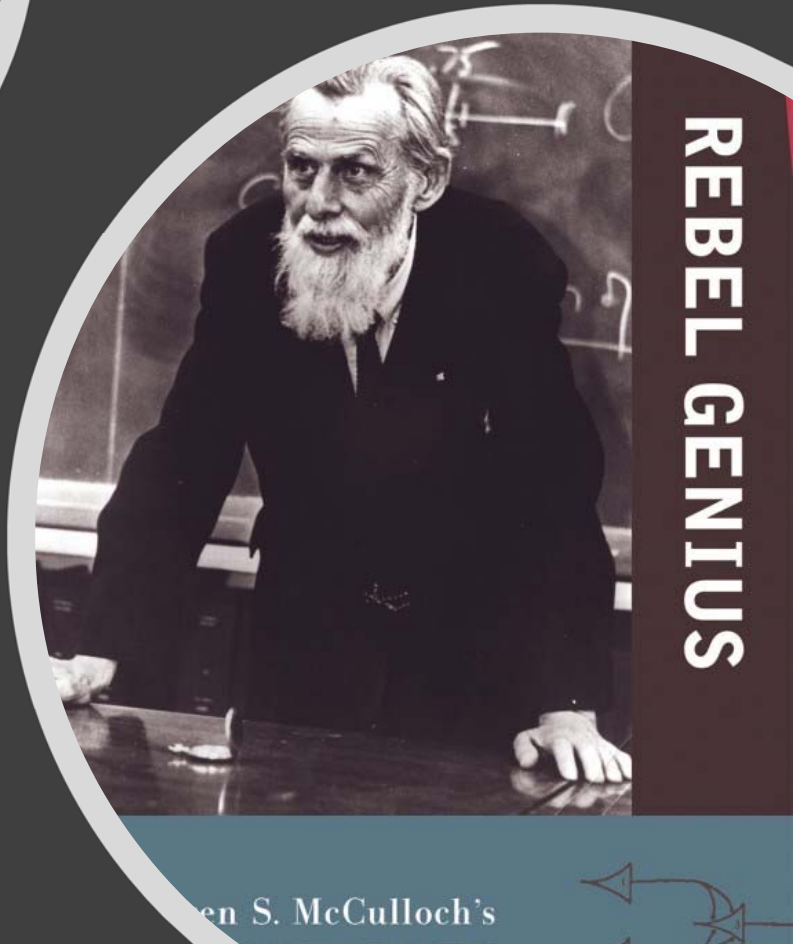


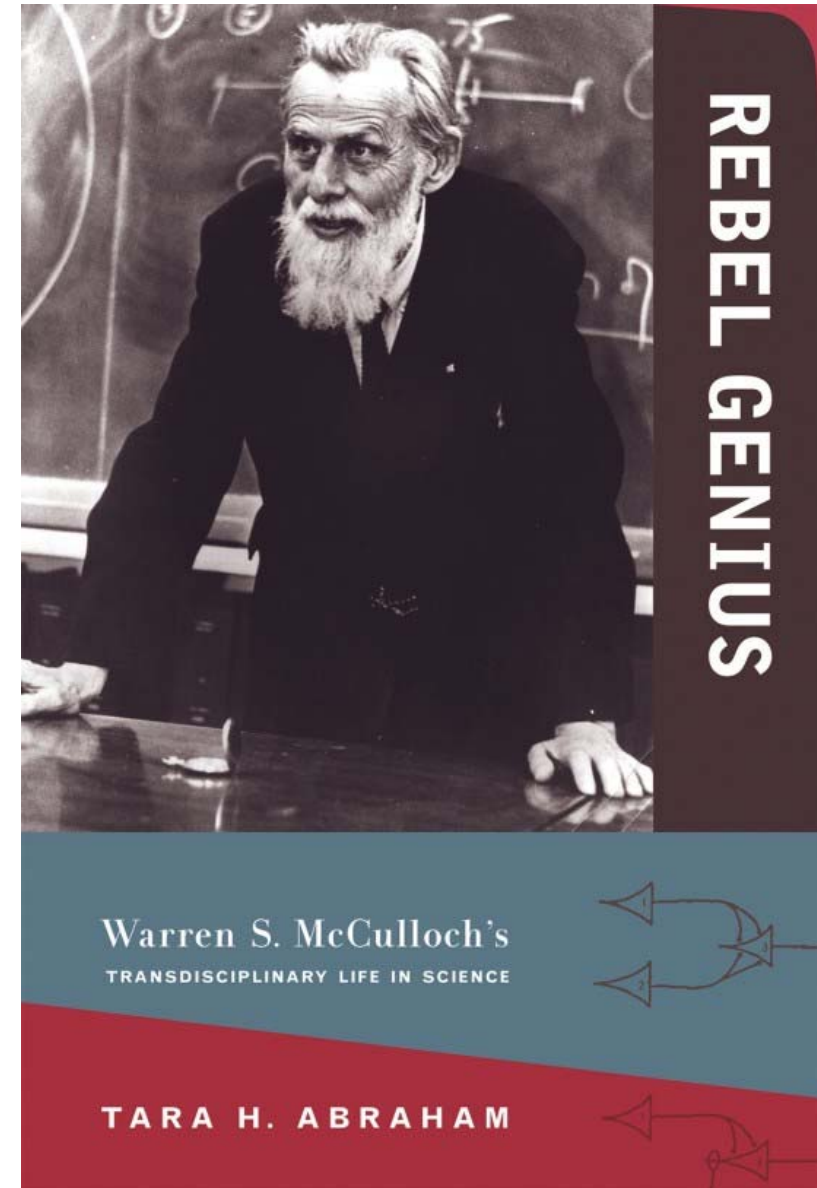
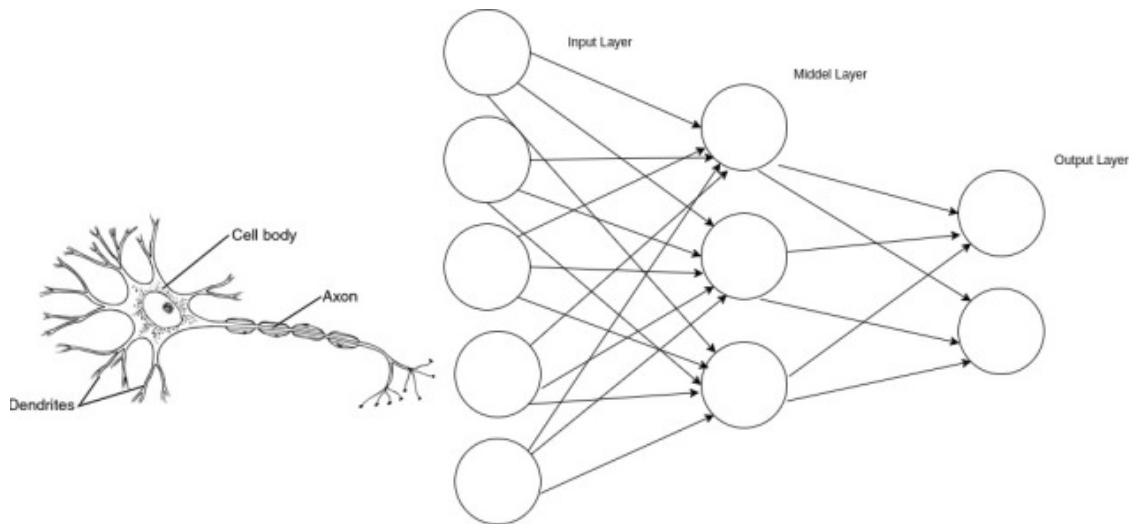
Overview and Case Studies of Cutting Edge Artificial Intelligence Techniques

Hector Menendez III, PhD
Texas A&M University



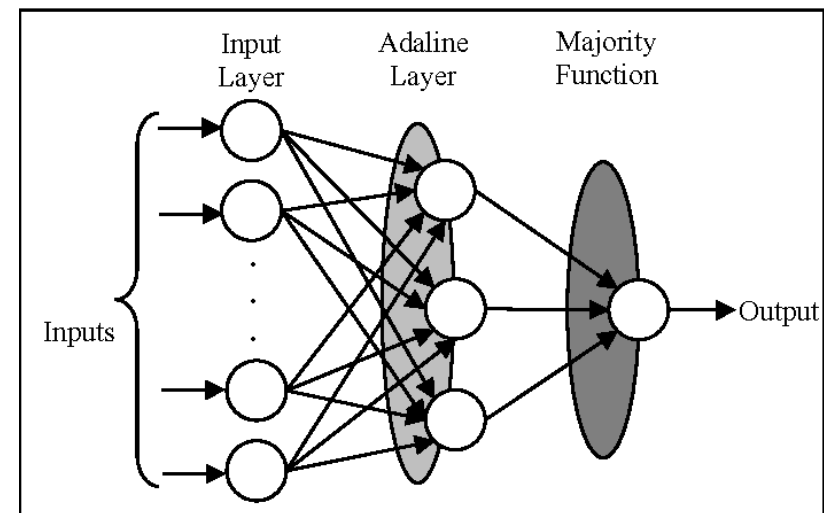
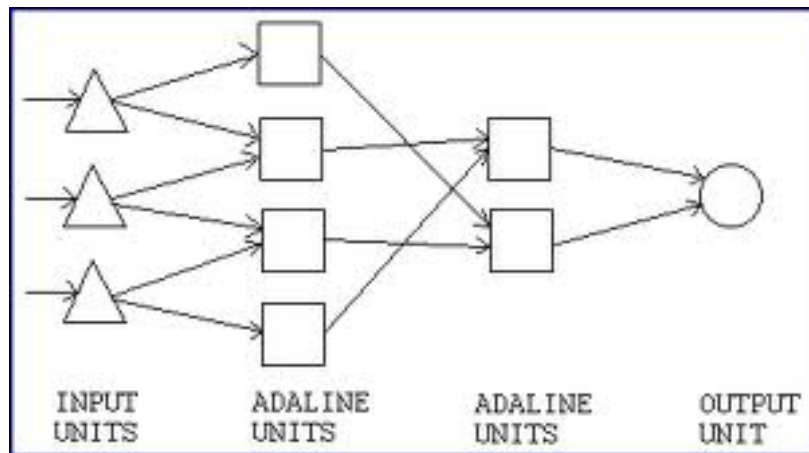
TIMELINE

- 1943 Warren McCulloch
 - How do neurons work?



TIMELINE

- 1959-1962 “MADALINE” Multiple Adaptive Linear Elements
- Basic algorithm still used today
- Take random noise out of telecommunication systems
 - Bernard Widrow and Marcian Hoff of Stanford University



Timeline

- Little to no progress until the 1980's
- Perceptron
- Madaline
- Backpropagation
(Widrow et al., 1990)

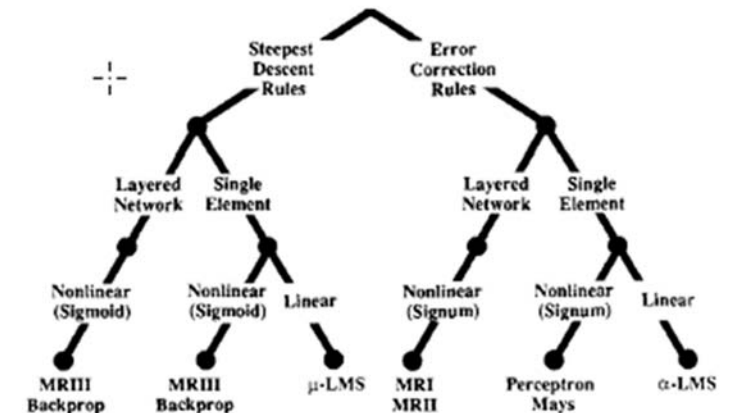


Fig. 33. Learning rules.

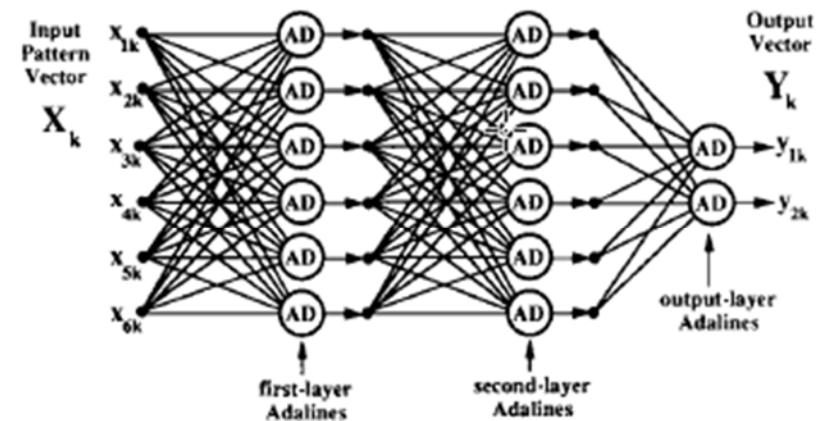
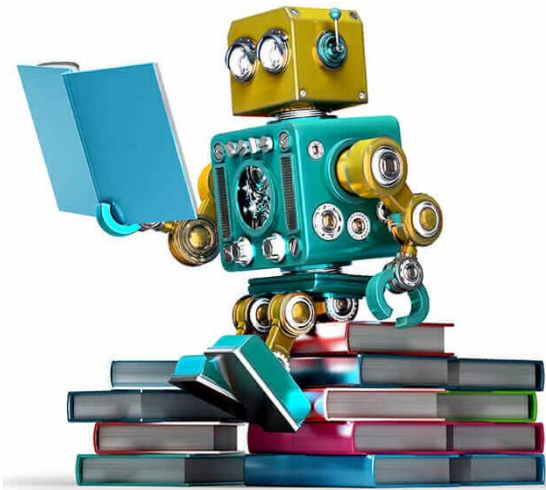
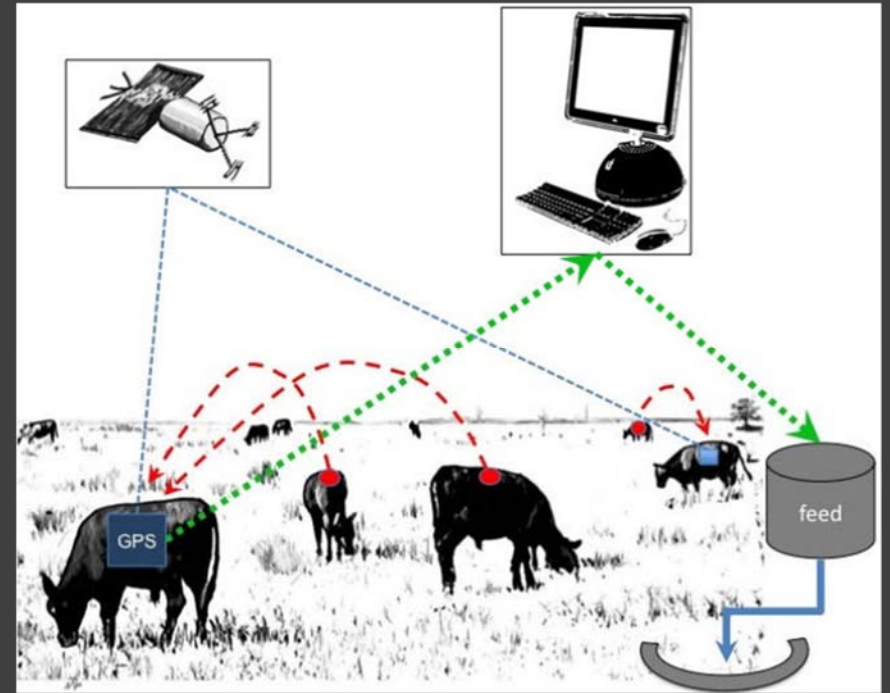


Fig. 11. Three-layer adaptive neural network.

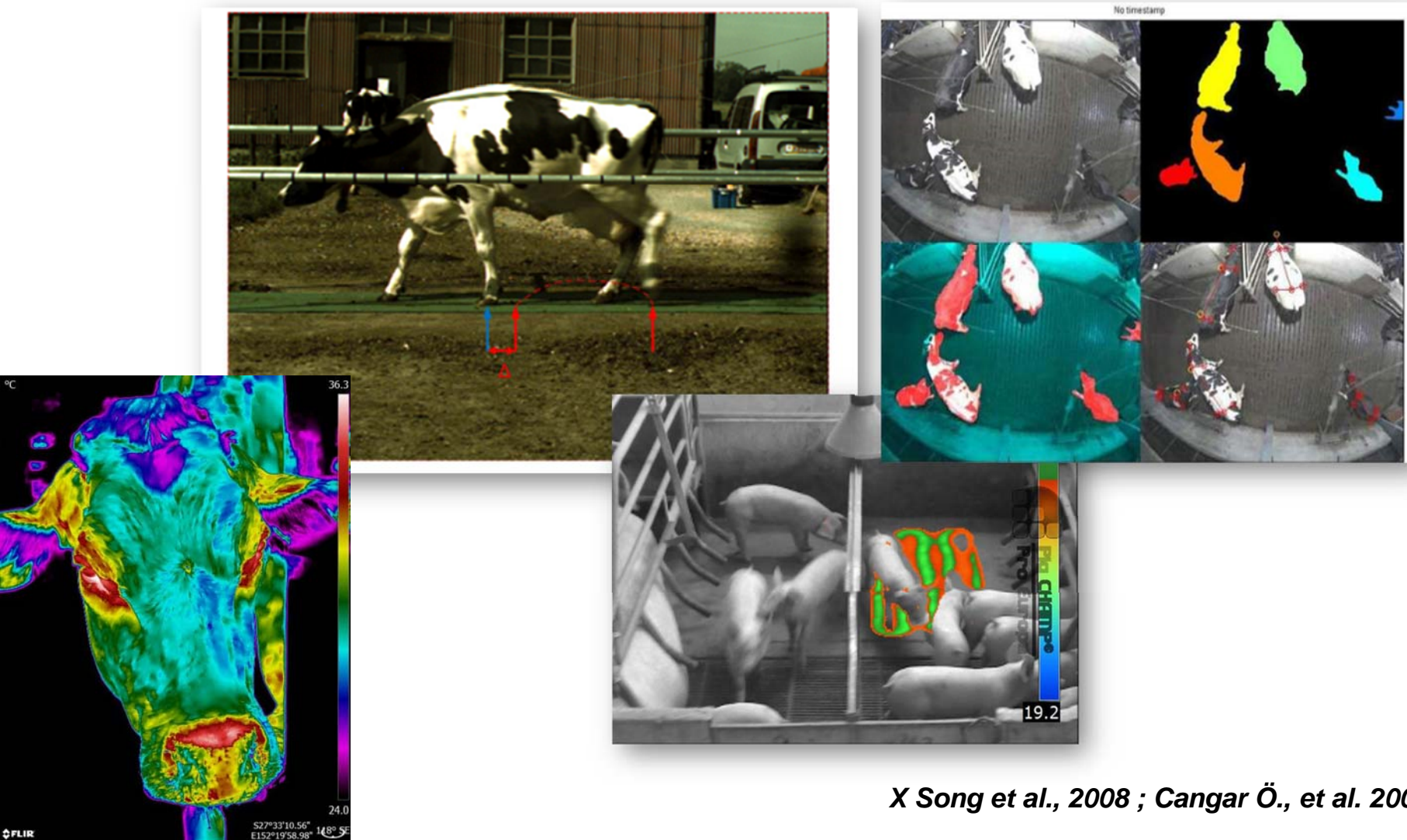


Machine Learning

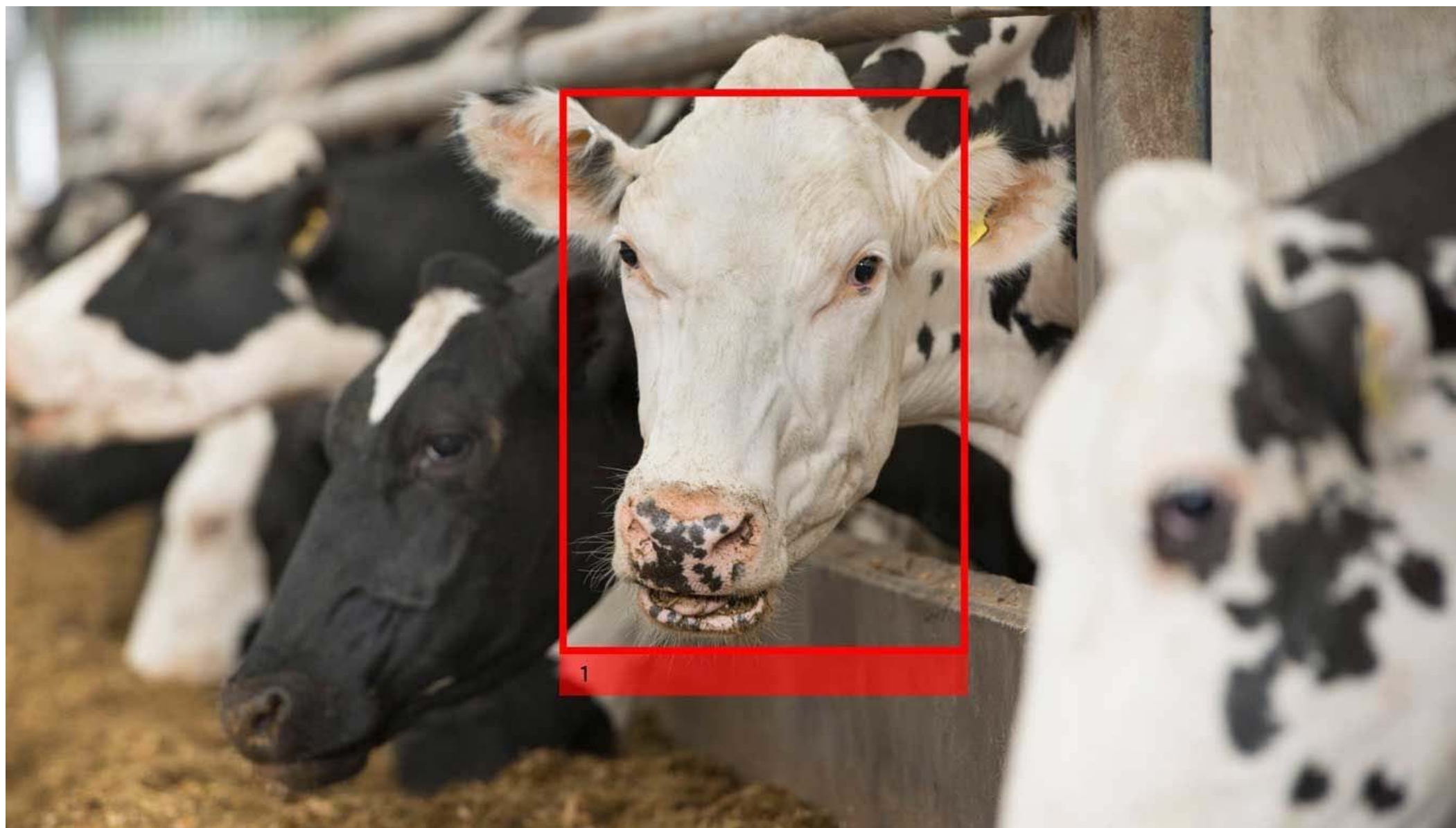


Smart Farms

Image analysis (body temperature, locomotion scores)

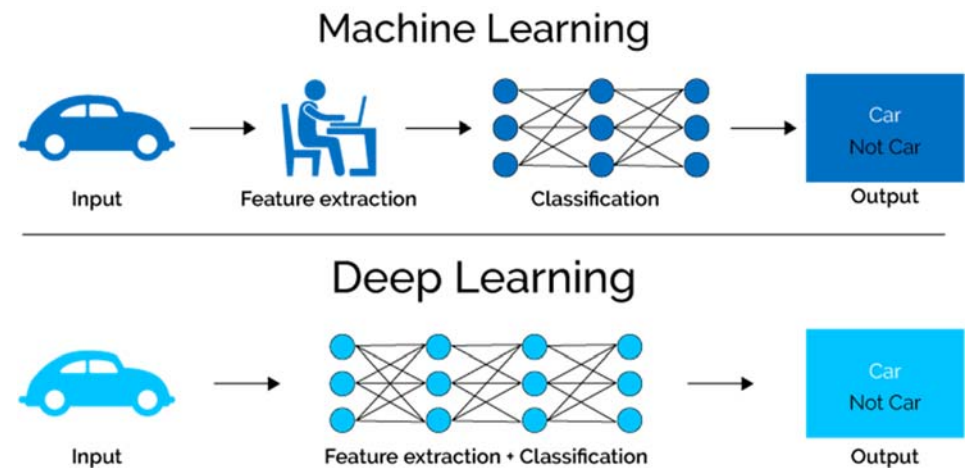
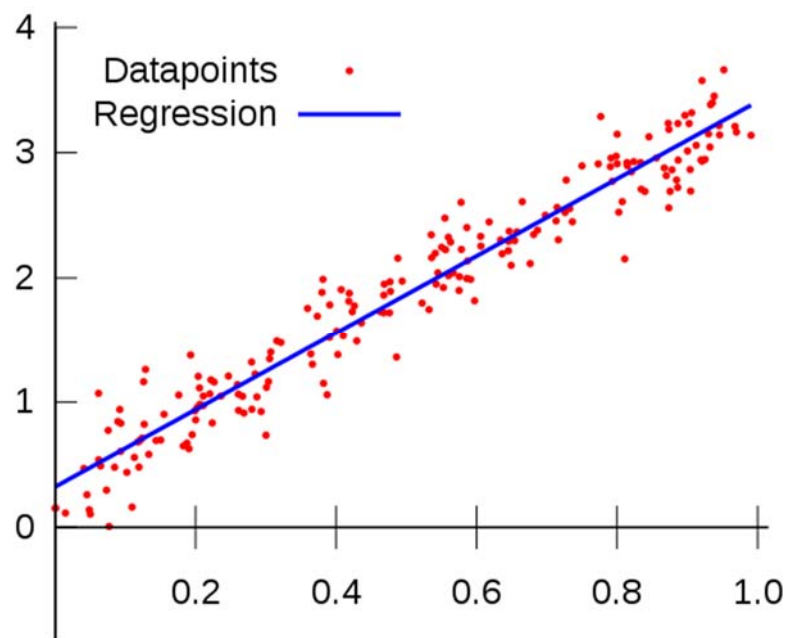


X Song et al., 2008 ; Cangar Ö., et al. 2008 ;



1

Regression and Classification



Exercise

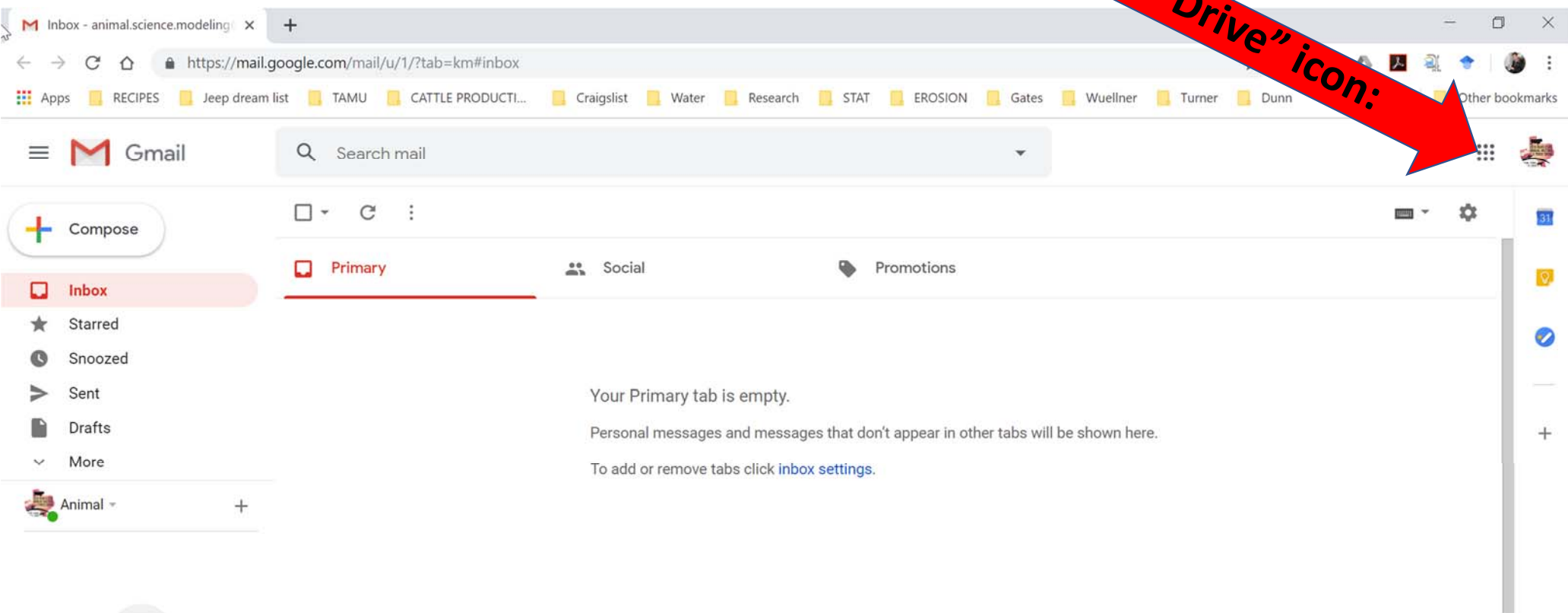


- Google Colaboratory
 - Go to your google drive
 - Login:
animal.science.modeling@gmail.com
 - Password: **animal2019**

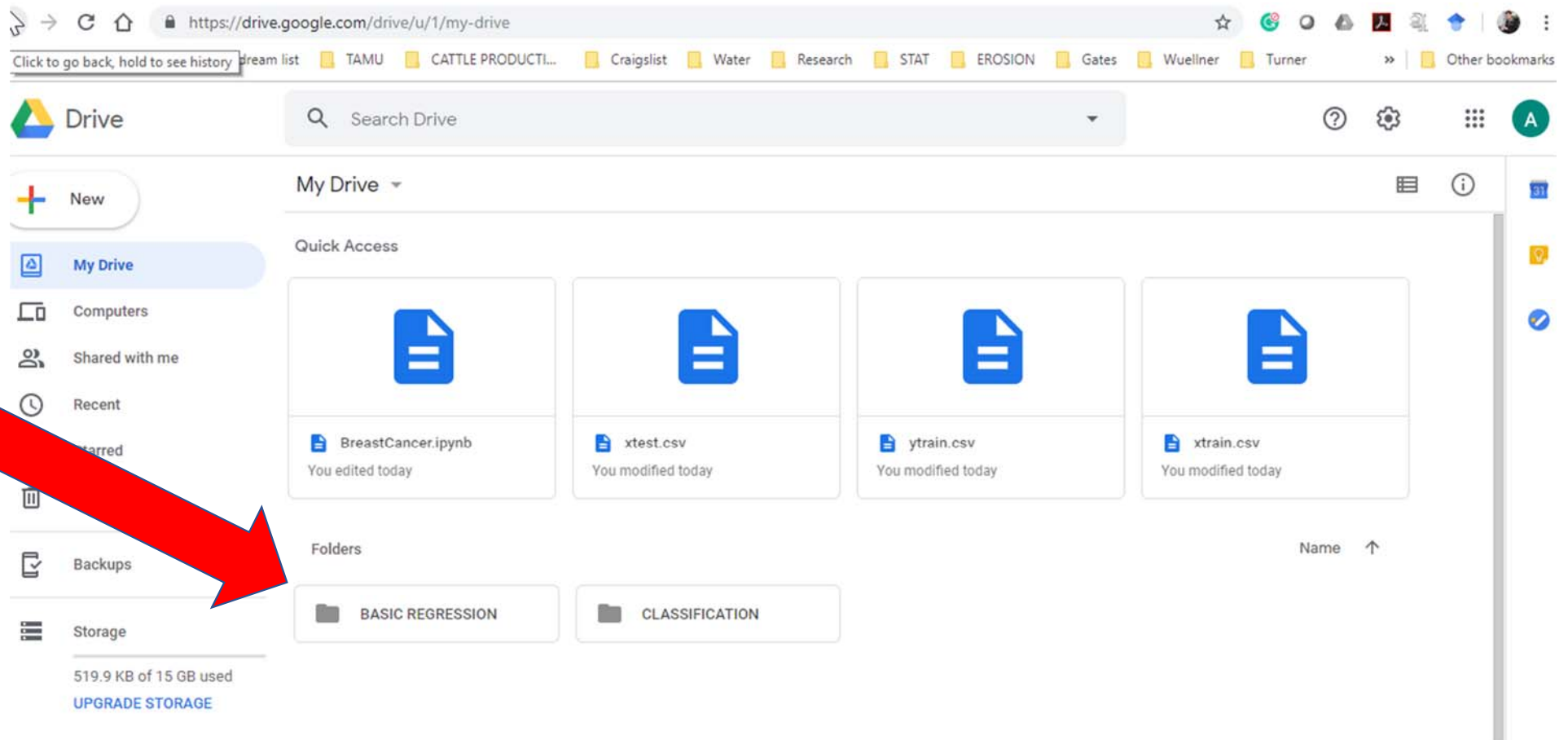
1. Open Google Drive



Drive

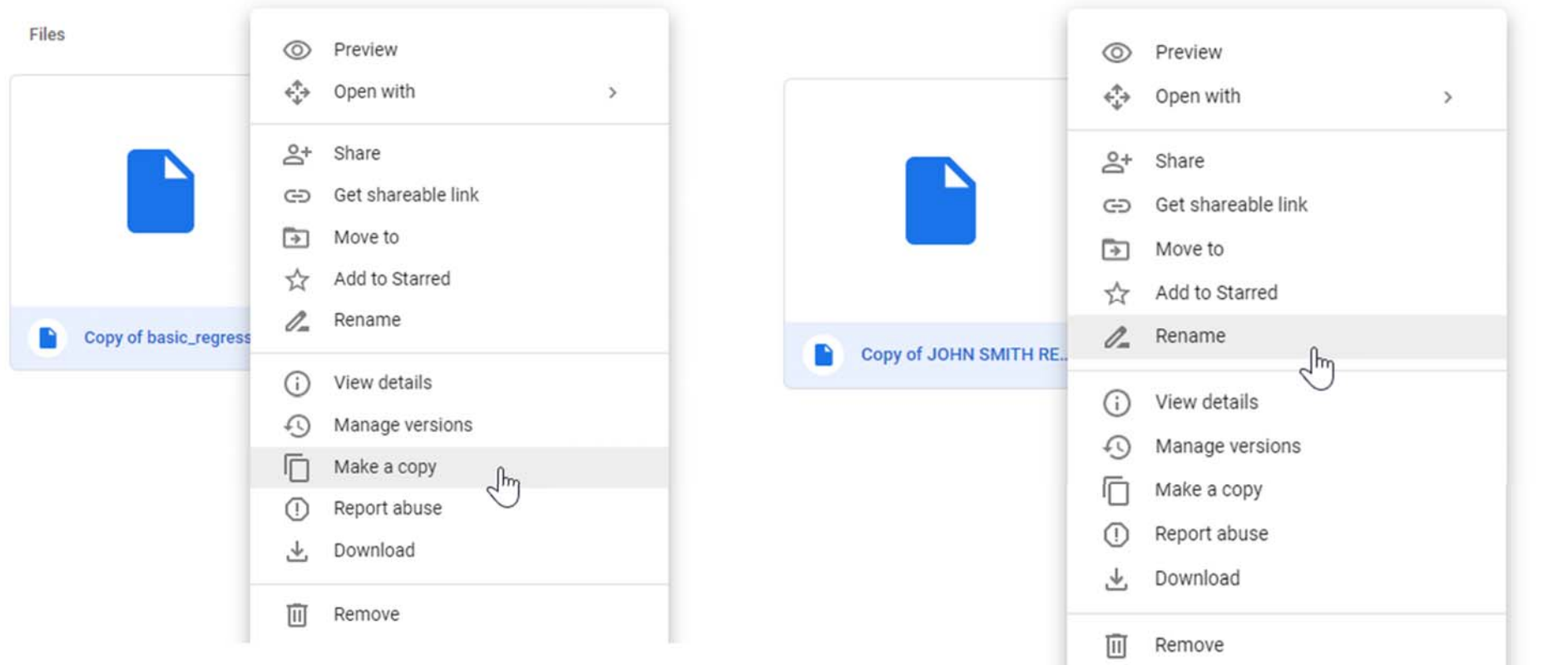


2. Select the Basic Regression Folder

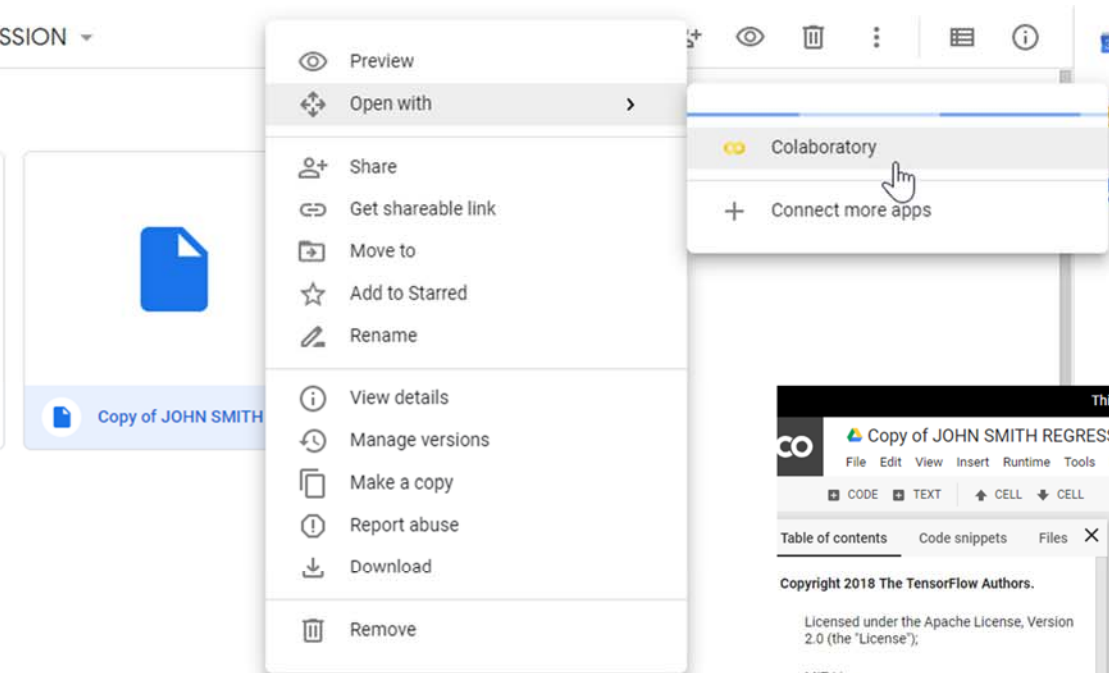


3. Make a Copy then Rename the File

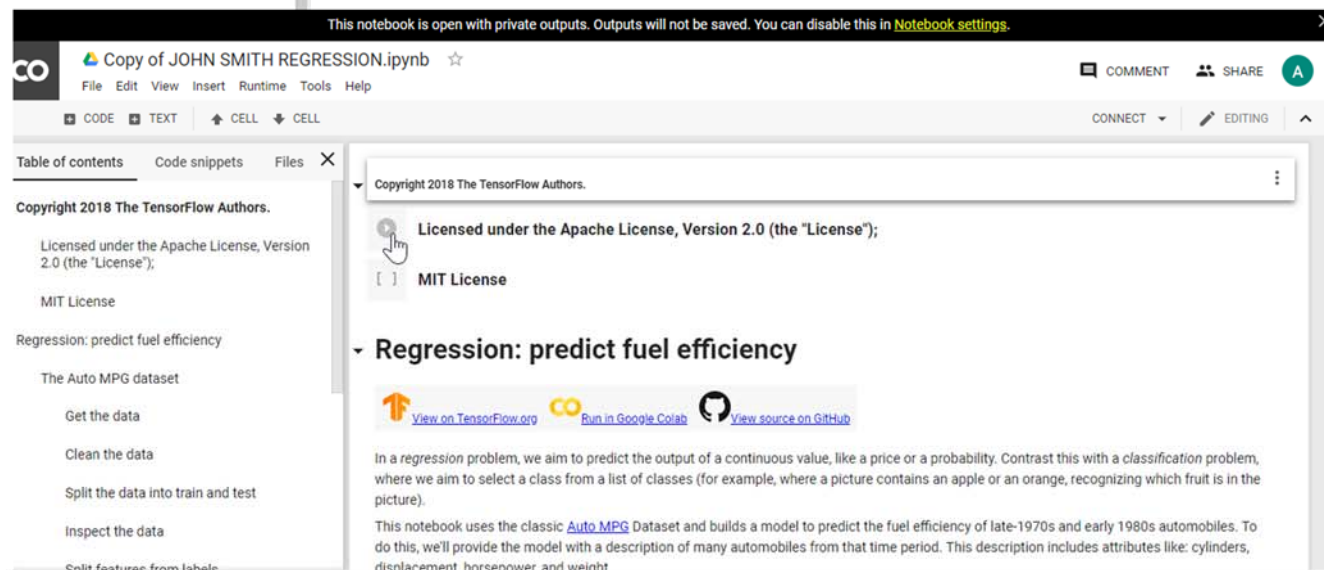
My Drive > BASIC REGRESSION ▾



4. Open and Run the Regression Code



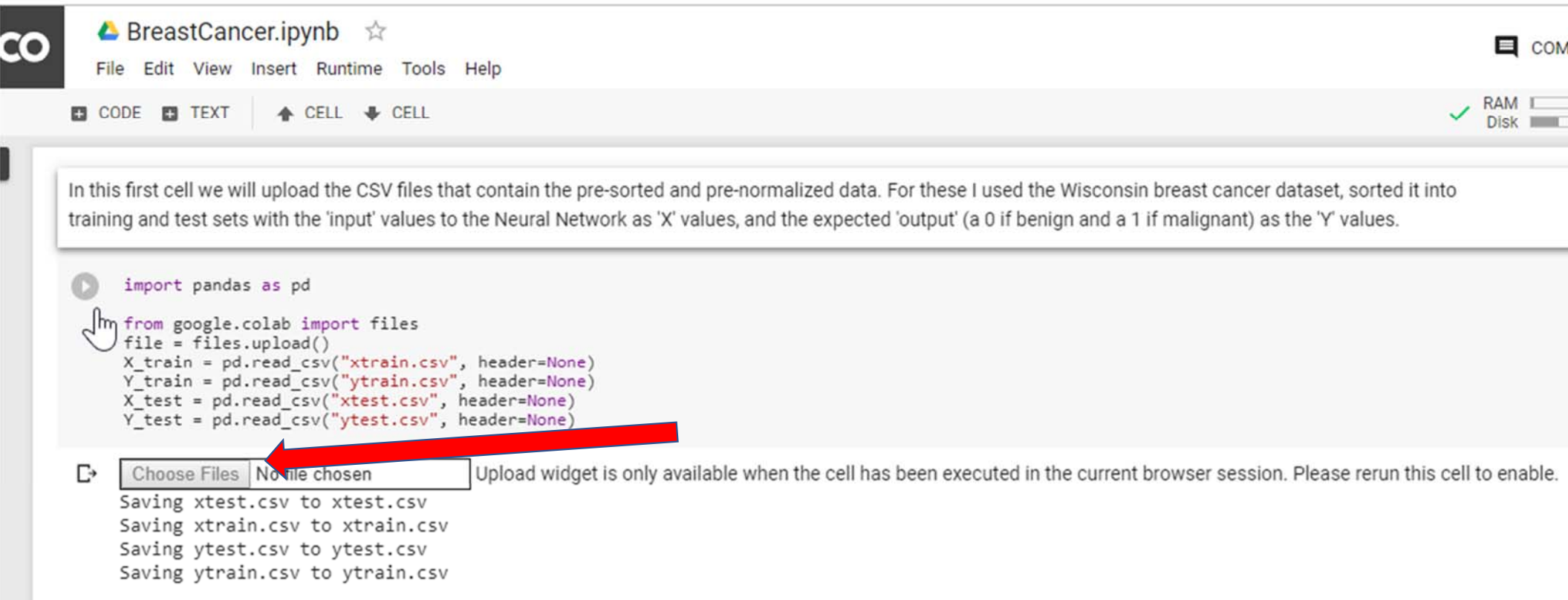
Click between brackets “[]” to run script



5. Go Back to the “My Drive” tab

1. Select Classification Folder
2. Copy
3. Rename “BreastCancer.ipynb” file
4. Save “xtest.csv”, “xtrain.csv”, “ytest.csv”, “ytrain.csv” to desktop
5. Open your copy of the “BreastCancer.ipynb” file

Click run and then click “Choose Files” and select files from desktop



BreastCancer.ipynb ☆

File Edit View Insert Runtime Tools Help

+ CODE + TEXT ↑ CELL ↓ CELL

RAM ✓ Disk

In this first cell we will upload the CSV files that contain the pre-sorted and pre-normalized data. For these I used the Wisconsin breast cancer dataset, sorted it into training and test sets with the 'input' values to the Neural Network as 'X' values, and the expected 'output' (a 0 if benign and a 1 if malignant) as the 'Y' values.

```
import pandas as pd

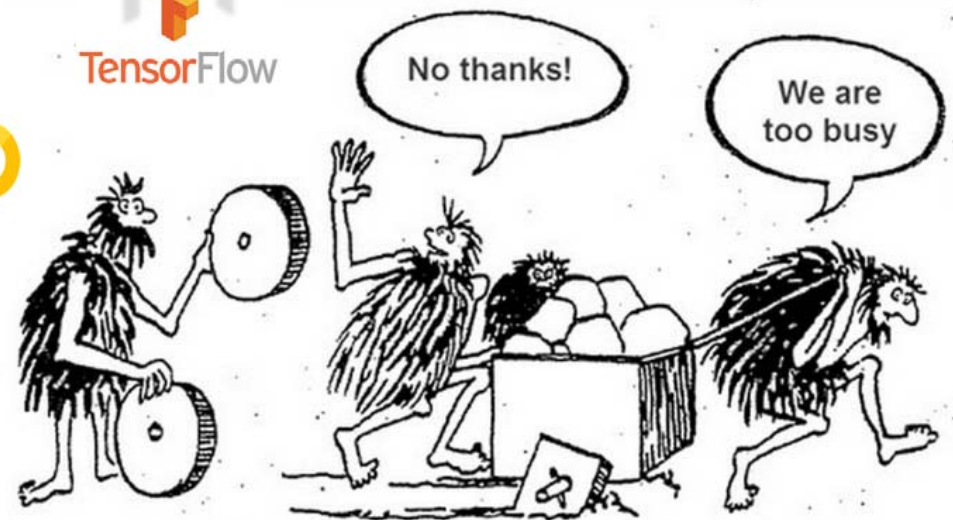
from google.colab import files
file = files.upload()
X_train = pd.read_csv("xtrain.csv", header=None)
Y_train = pd.read_csv("ytrain.csv", header=None)
X_test = pd.read_csv("xtest.csv", header=None)
Y_test = pd.read_csv("ytest.csv", header=None)
```

Choose Files No file chosen Upload widget is only available when the cell has been executed in the current browser session. Please rerun this cell to enable.

Saving xtest.csv to xtest.csv
Saving xtrain.csv to xtrain.csv
Saving ytest.csv to ytest.csv
Saving ytrain.csv to ytrain.csv

Overview

- AI applications are widely available and easy to use
- Avoid re-inventing the wheel





Sources and Photo Credit

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- <https://www.autodesk.com/redshift/machine-learning/>
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