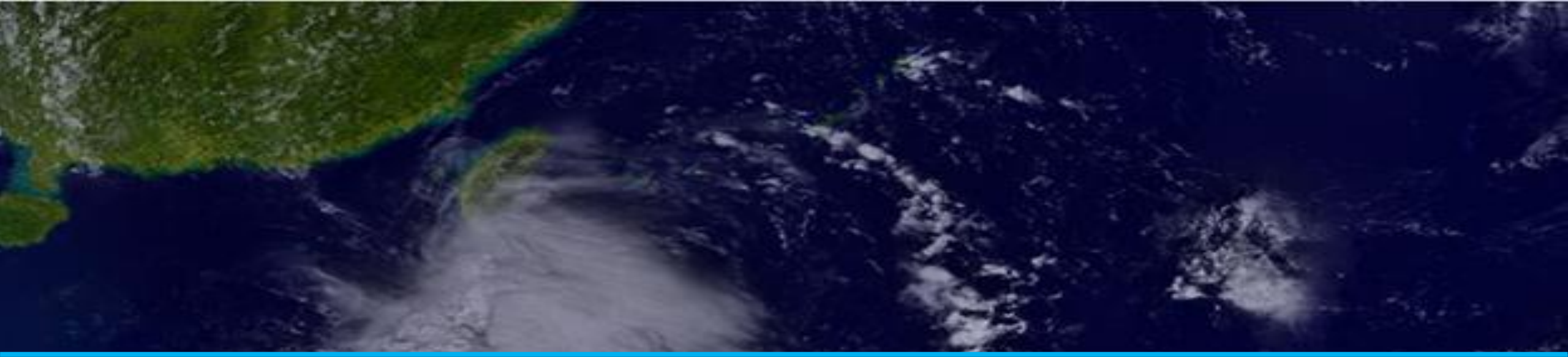

How to get started with Machine Learning?

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MathWorks®

Agenda

Topics	Duration
❑ Setup ❑ Motivation	10 mins
❑ Machine Learning Workflow	5 mins
❑ Exploration ○ Predicting tsunami intensity	20 mins
❑ Summary and Resources ❑ Q&A	5 mins

Preparing to Participate in this Workshop

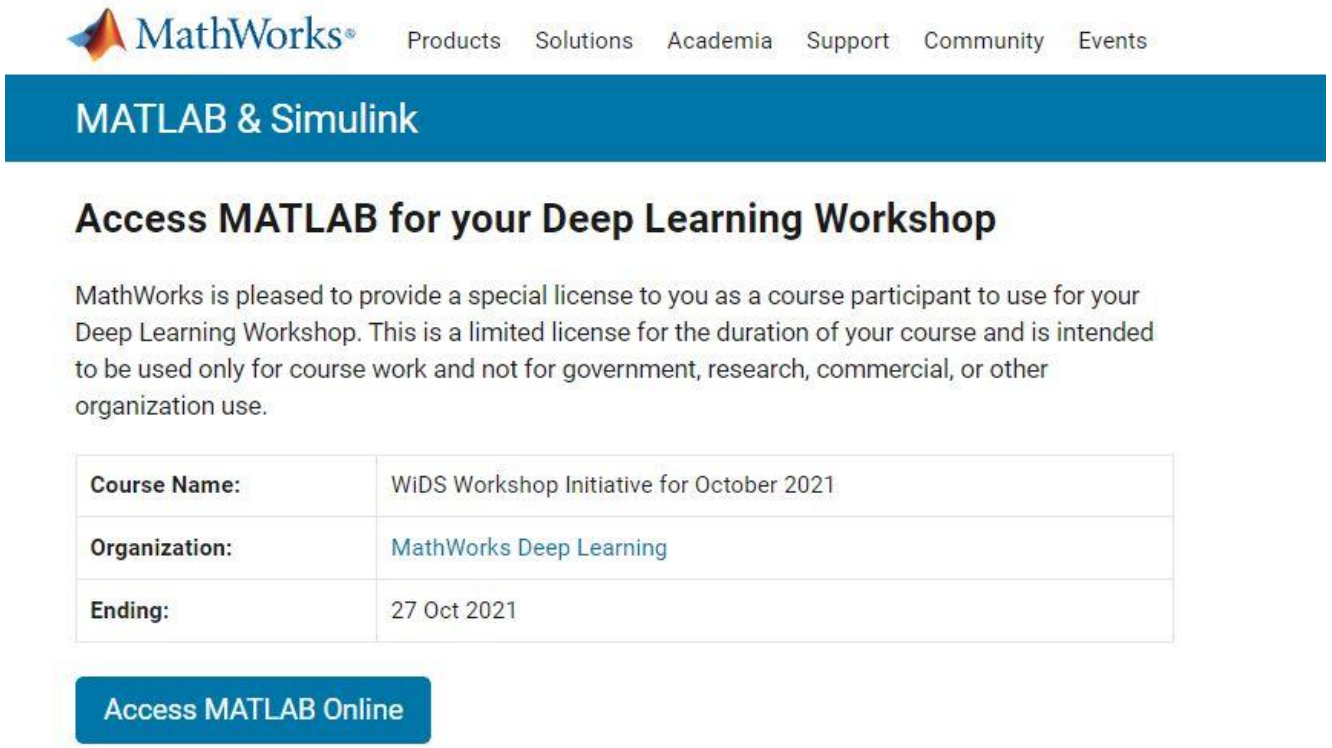
Use your:  

Questions: communicate via chat window

Please complete the **prework** that was provided to you for this workshop

Link to prework is:
https://tinyurl.com/getstartedmlpreworkoct2021

Set Up Workshop Environment – Part I

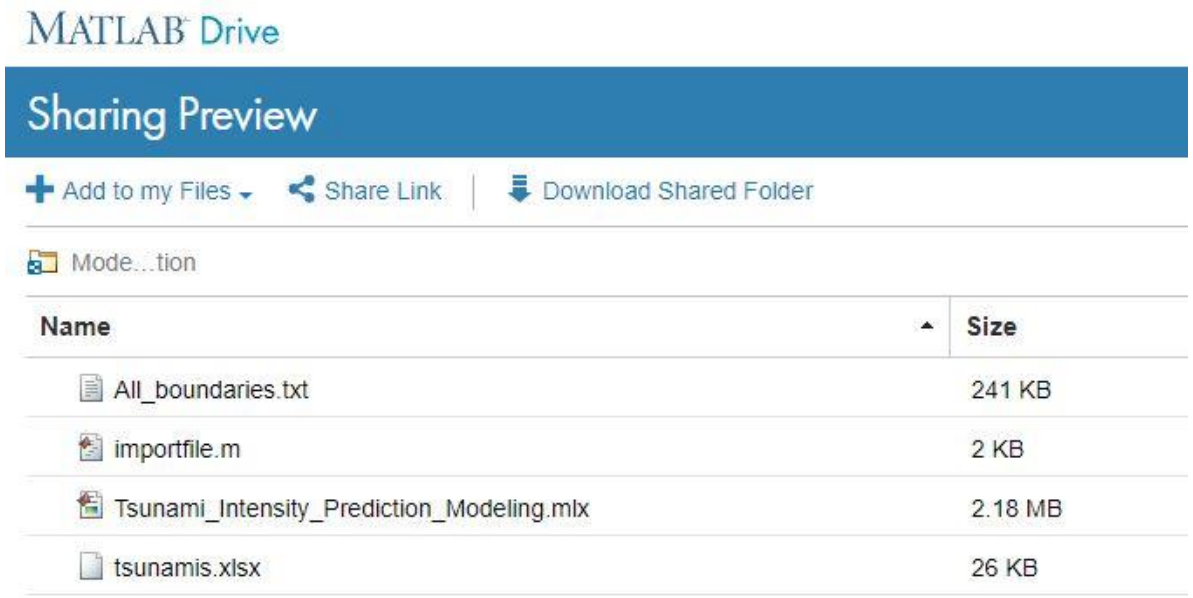


https://tinyurl.com/MLOoct21

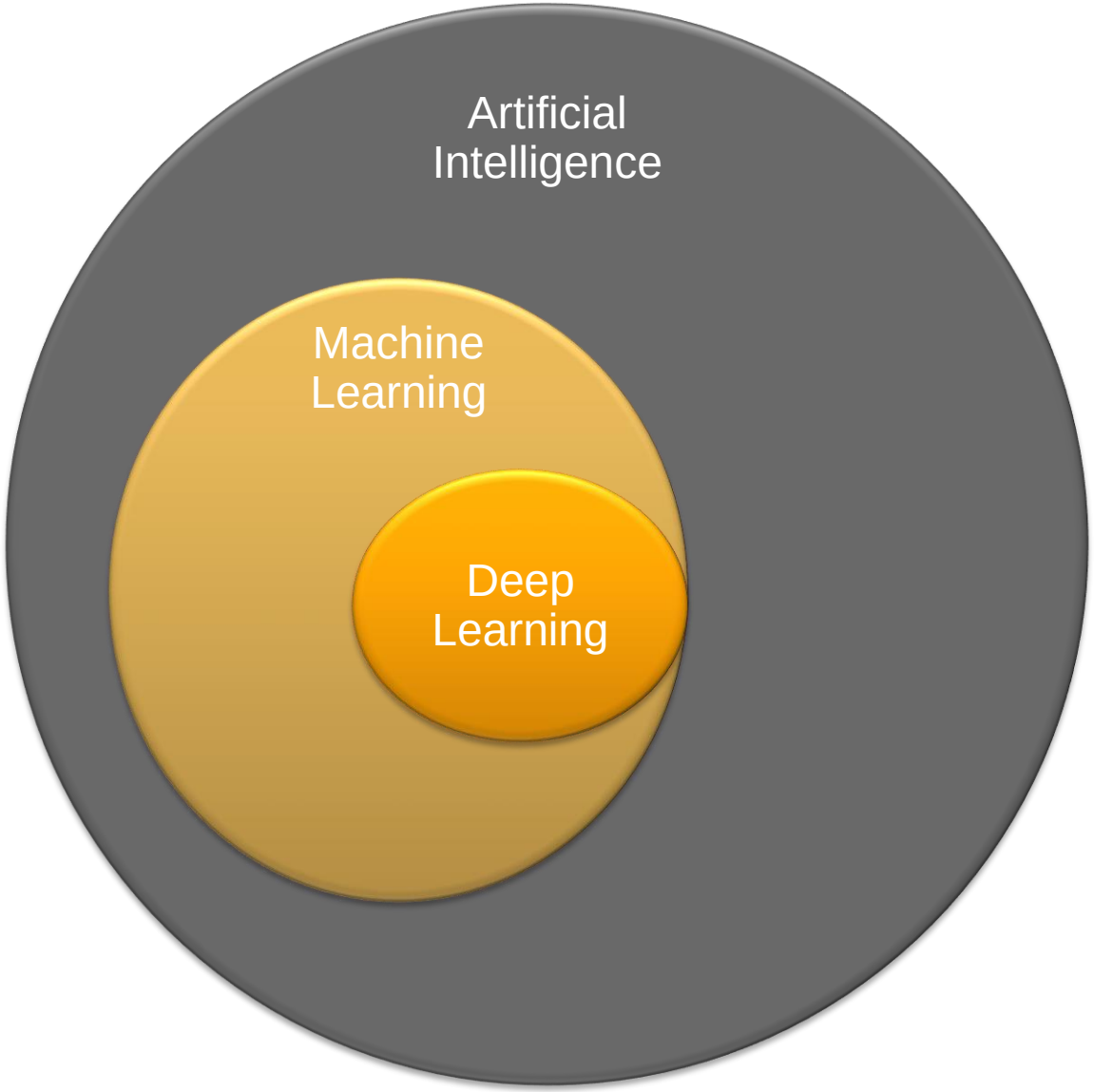
Set Up Workshop Environment – Part II

Access workshop files in MATLAB Drive

https://tinyurl.com/startmlmwoct2021



Artificial Intelligence Ecosystem



Data Science Workflow and the Connection to Machine Learning

Access and Explore Data

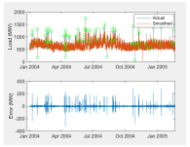
Files

Databases

Sensors

Preprocess Data

Working with Messy Data



Data Reduction/ Transformation

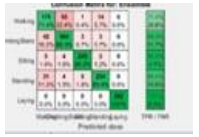
Feature Extraction

Develop Predictive Models

Model Creation e.g. Machine Learning

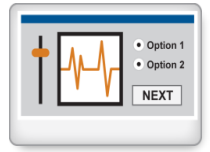
Parameter Optimization

Model Validation



Integrate Analytics with Systems

Desktop Apps



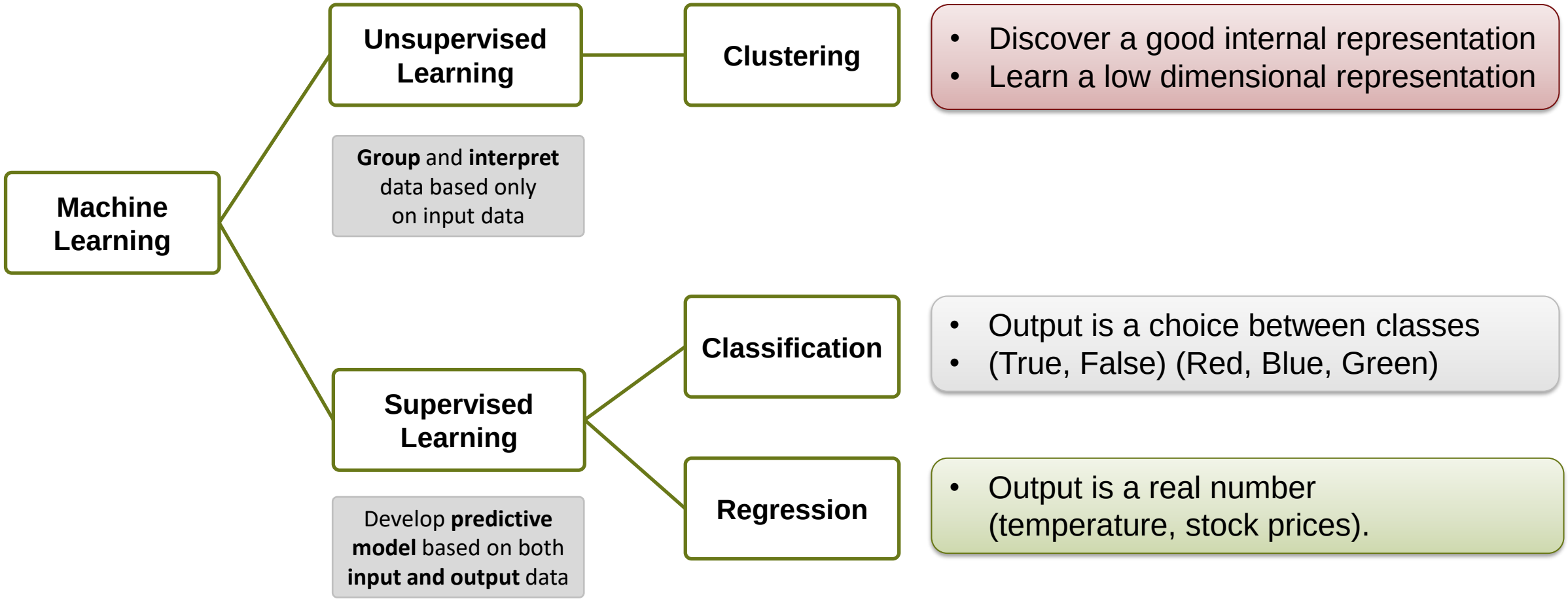
Enterprise Scale Systems

MATLAB Excel .NET .exe C/C++ Java .dll

Embedded Devices and Hardware

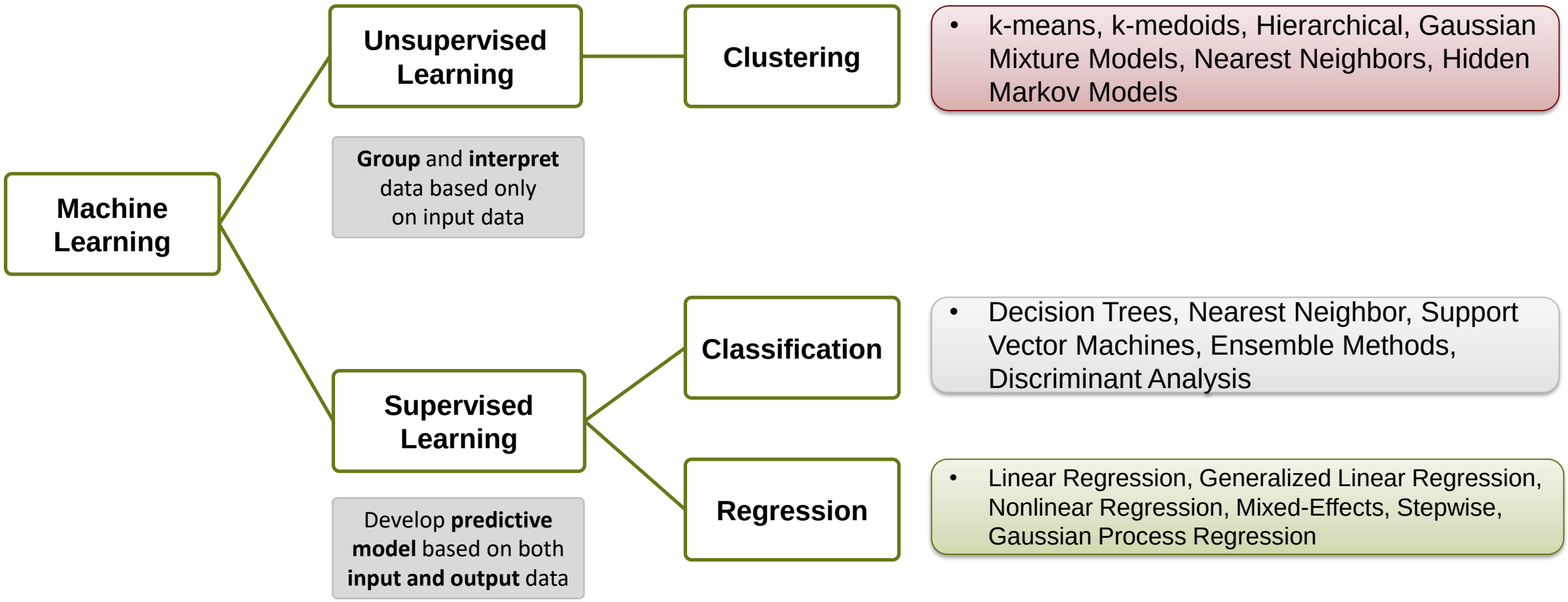
Different Types of Machine Learning

A 4-min Video on
Types of ML

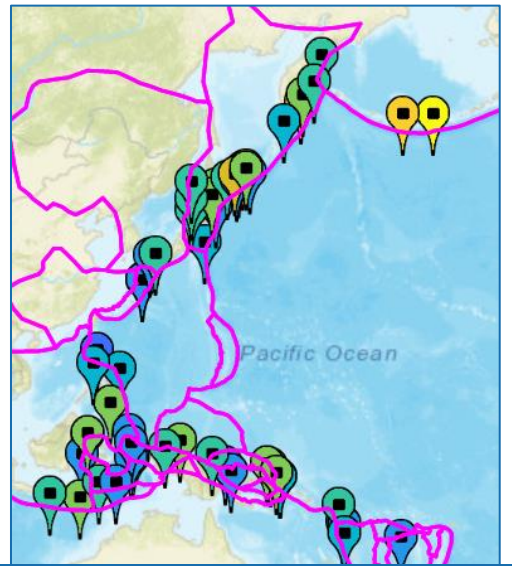


Different Types of Machine Learning

A 4-min Video on
Types of ML



Prediction of tsunami intensity

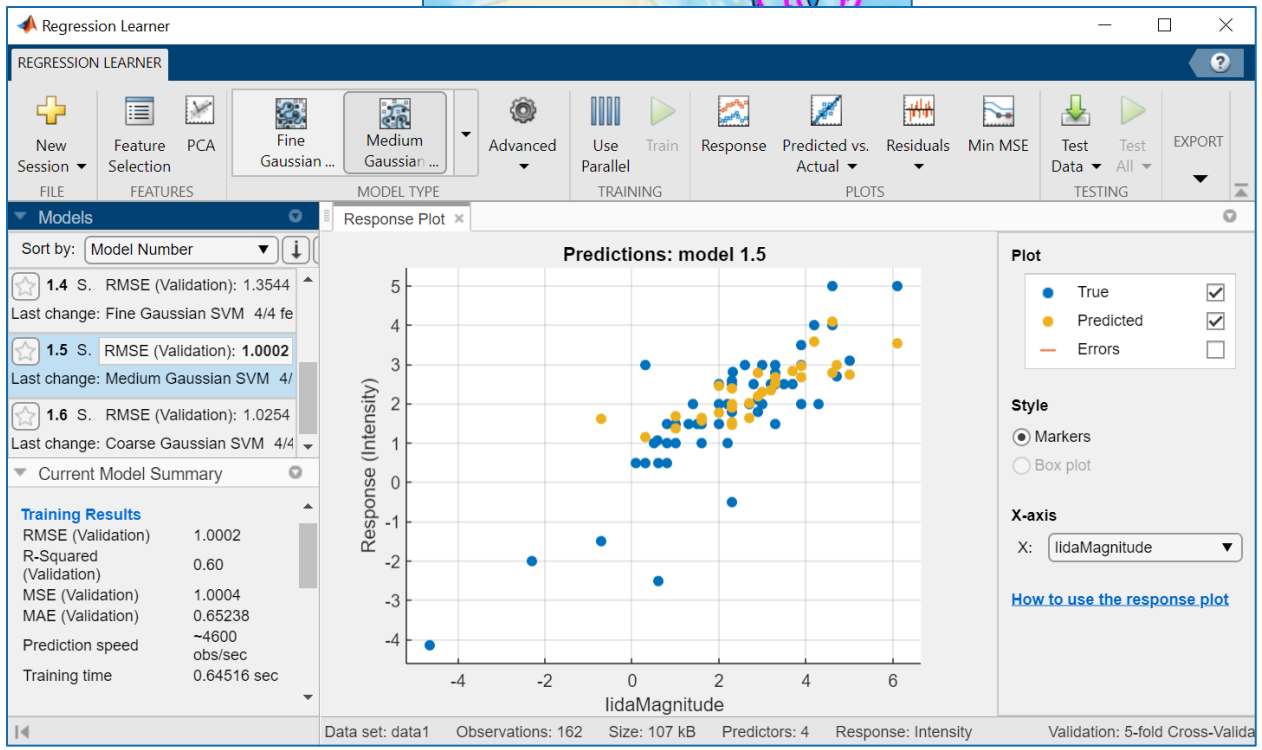


Goal: Study predictors of tsunami

- Explore data and build initial models
- Don’t need to be a regression expert

Approach:

- Load data in MATLAB
- Use interactive tools and Mapping Toolbox for data visualization
- Use the Regression Learner App to run multiple regression algorithms
- Create a model which can predict tsunami intensity for a new set of predictors
- Convert live scripts into reports



You will explore using an app to assist with Machine Learning

Tsunami_Intensity_Prediction_Modeling.mlx

```
data1 = readtable('tsunamis.xlsx')

data2 = data1(:, {'Latitude', 'Longitude', 'EarthquakeMagnitude', 'IidaMagnitude',
'Intensity', 'MaxHeight', 'Validity', 'Location', 'Country'})

data2 = rmmissing(data2)

[train, test] = crossvalind('HoldOut', length(data2.Intensity), 0.1);
train_data = data2(train, :);
test_data = data2(test, :);


regressionLearner
```

Exercise: You will explore using an app to assist with Machine Learning

1. Open Tsunami_Intensity_Prediction_Modeling.mlx  by double-left clicking on this file in the Current Folder window.

2. Once the file is open, have your cursor on the first line in the file.

3. Use the 

button to run the code until you get to the regressionLearner function.

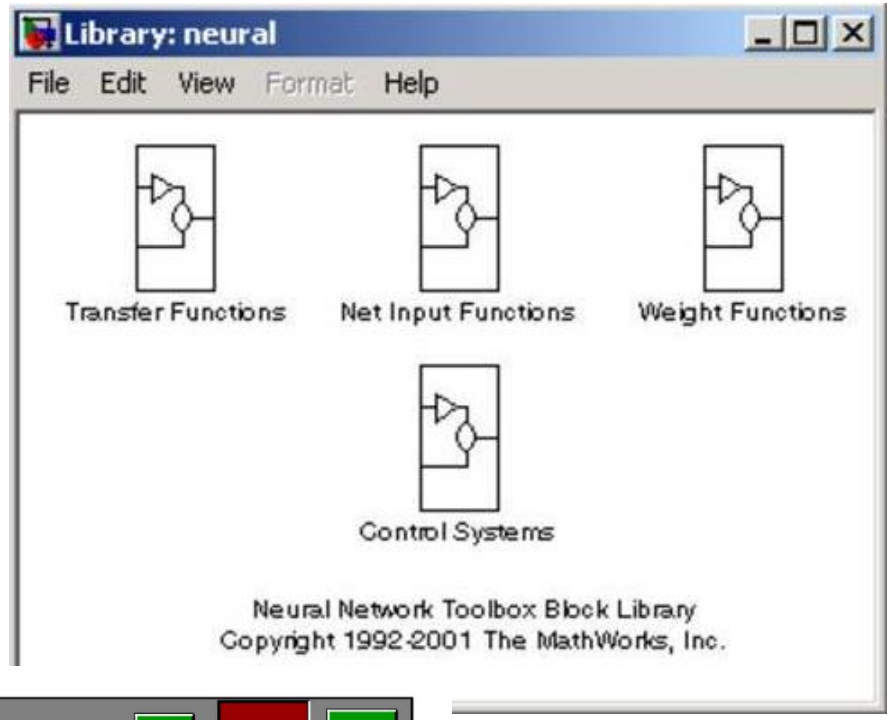
4. Follow the rest of the instructions in the file.

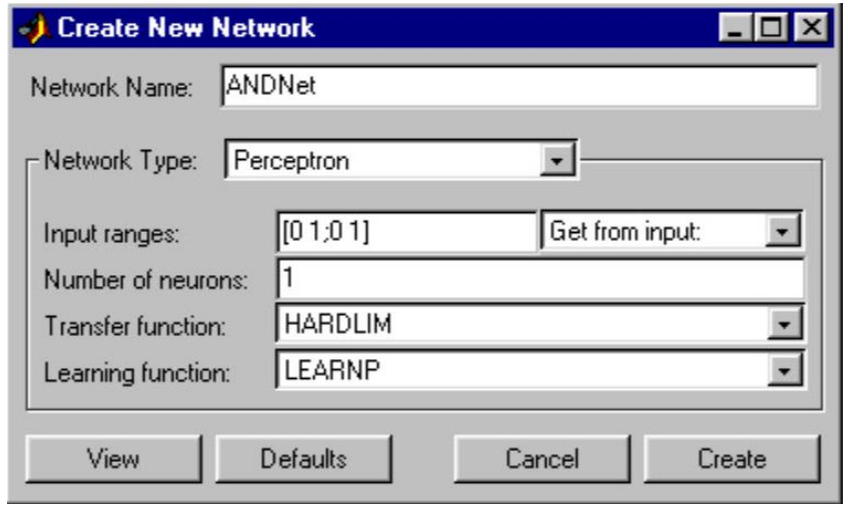
NOTE: Executing the last section of code is optional.

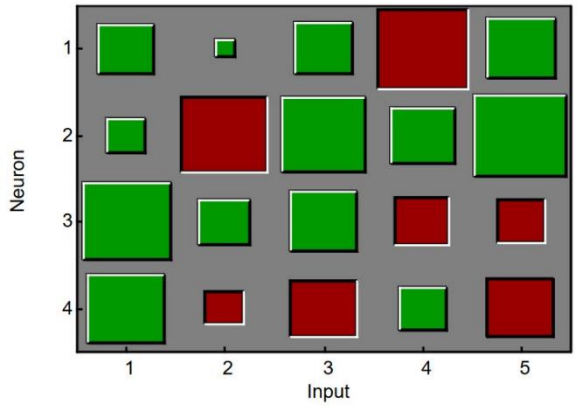
Exploration of Exercise Results

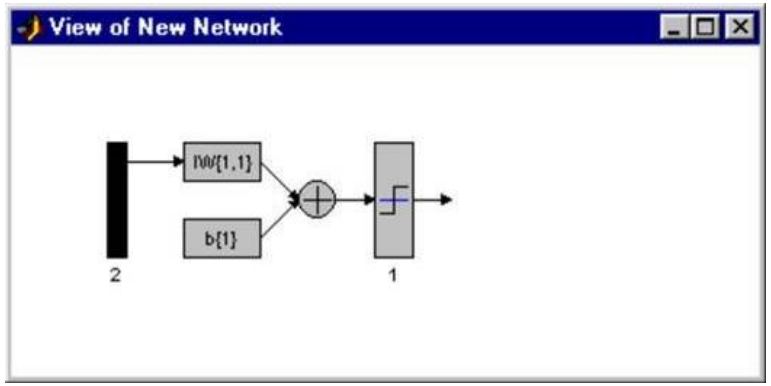
- What model type did you use?
- Why did you select the model type?
- What did the response type plot look like with the selected machine learning model?
- Were you able to export a machine learning model?
  Bonus:
  Can you get a sense of which predictors seemed to have an impact on the machine learning model?

Fun fact: Neural Networks in MATLAB 1992

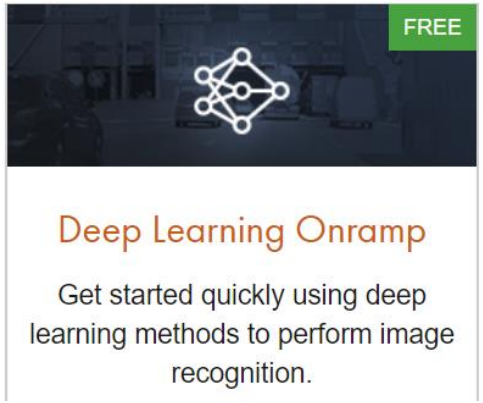


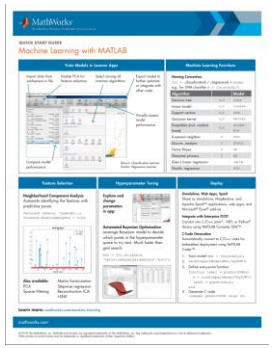




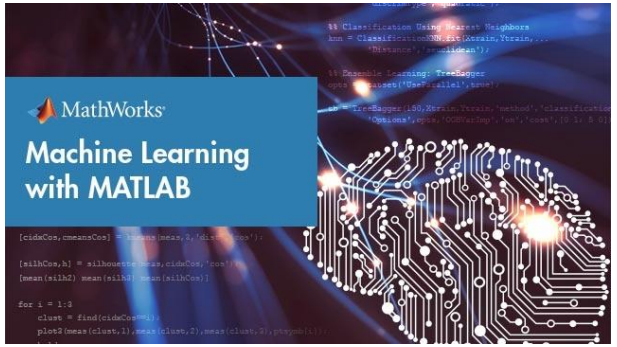


Where do you go from here?

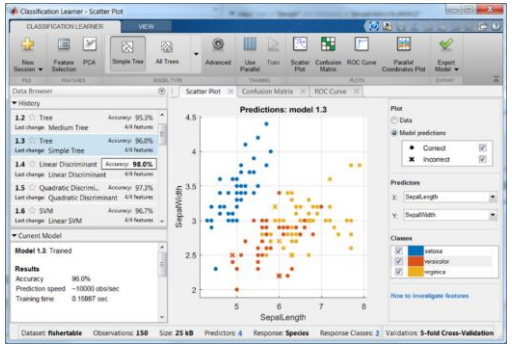




ML Cheat Sheet



E-Books: Introductory ML | Mastering ML



Try Classification Learner in Browser

Online Resources

- ML and DL Onramps
  - Free of Charge | No License Req.
  - Available to all registered on MathWorks website
  - Access to a Course Completion Certificate
  - ML and DL with MATLAB (if you've CWS)
- MOOC
  - Coursera Specialization
- Documents
  - Common machine learning challenges
  - ML vs DL: Choosing the right approach
- Demos, webinars and blogs
  - Earthquakes and big data
  - Air quality with Thingspeak
  - Damage costs of weather events
  - Various energy forecasting demos

Thank you. Are there any questions?

#shelovesmatlab

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