

How to get started with Machine Learning?

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Agenda

Topics	Duration
<input type="checkbox"/> Setup <input type="checkbox"/> Motivation	10 mins
<input type="checkbox"/> Machine Learning Workflow	5 mins
<input type="checkbox"/> Exploration <ul style="list-style-type: none">○ Predicting tsunami intensity	20 mins
<input type="checkbox"/> Summary and Resources <input type="checkbox"/> 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



[Products](#) [Solutions](#) [Academia](#) [Support](#) [Community](#) [Events](#)

MATLAB & Simulink

Access MATLAB for your Deep Learning Workshop

MathWorks is pleased to provide a special license to you as a course participant to use for your Deep Learning Workshop. This is a limited license for the duration of your course and is intended to be used only for course work and not for government, research, commercial, or other organization use.

Course Name:	WiDS Workshop Initiative for October 2021
Organization:	MathWorks Deep Learning
Ending:	27 Oct 2021

[Access MATLAB Online](#)

<https://tinyurl.com/MLOoct21>

Set Up Workshop Environment – Part II

Access workshop files in MATLAB Drive

<https://tinyurl.com/startmlmwoct2021>

MATLAB Drive

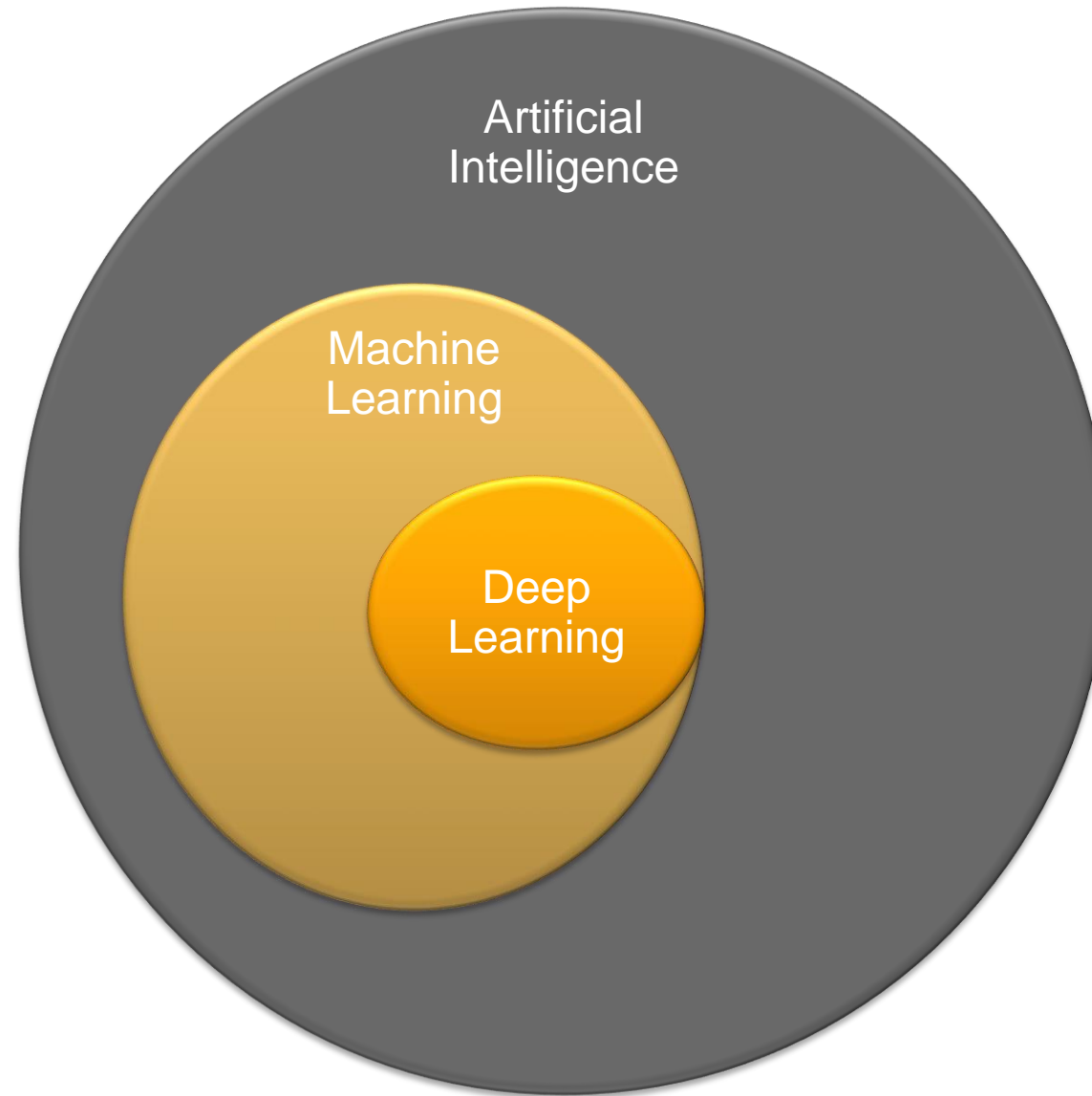
Sharing Preview

+ Add to my Files ▾ | Share Link | Download Shared Folder

Mode...tion

Name	Size
All_boundaries.txt	241 KB
importfile.m	2 KB
Tsunami_Intensity_Prediction_Modeling.mlx	2.18 MB
tsunamis.xlsx	26 KB

Artificial Intelligence Ecosystem



Data Science Workflow and the Connection to Machine Learning

Access and Explore
Data

Preprocess Data

Develop Predictive
Models

Integrate Analytics with
Systems

Files



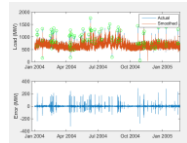
Databases



Sensors



Working with
Messy Data



Data Reduction/
Transformation



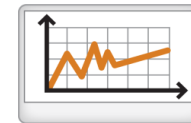
Feature
Extraction



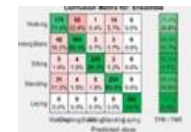
Model Creation e.g.
Machine Learning



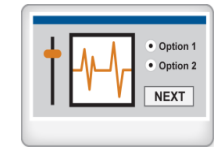
Parameter
Optimization



Model
Validation



Desktop Apps



Enterprise Scale
Systems

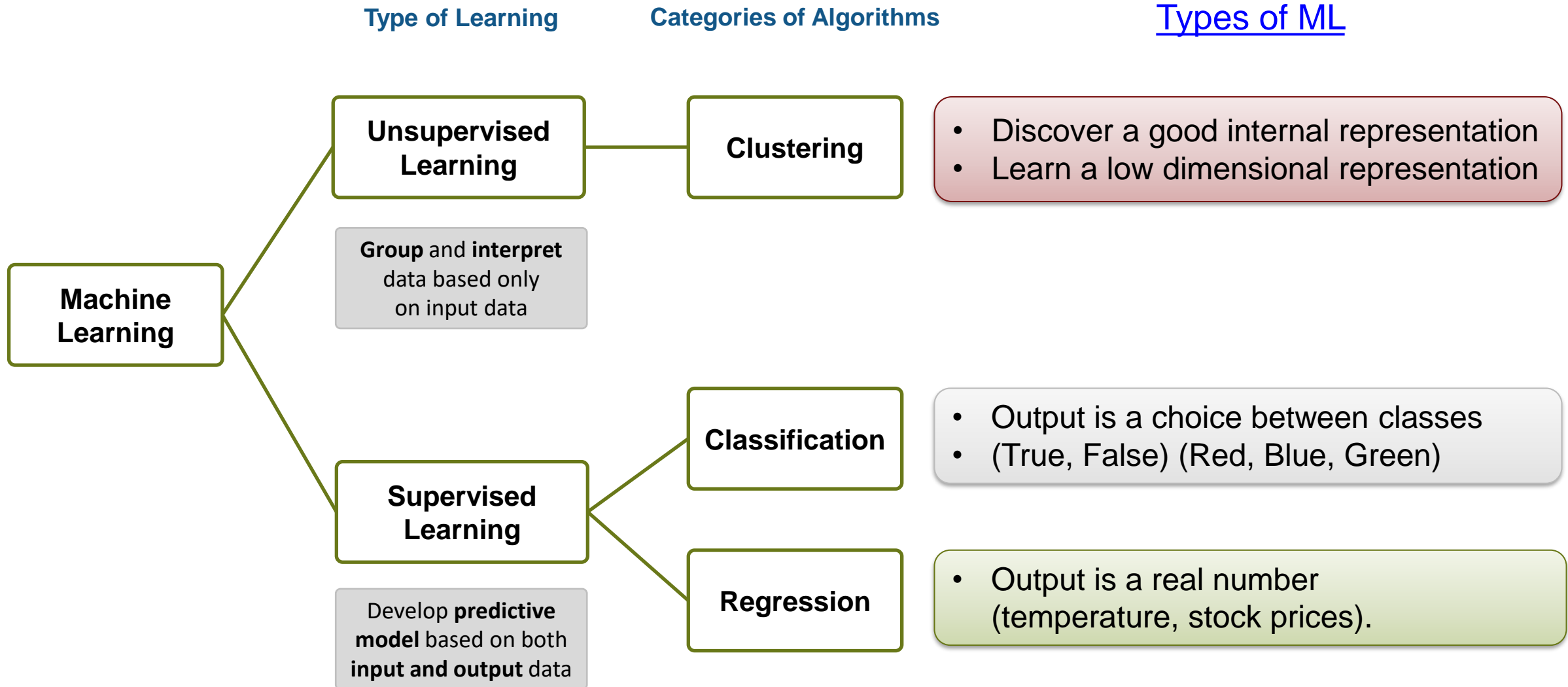
MATLAB Excel
.NET C/C++
.exe Java .dll

Embedded Devices
and Hardware



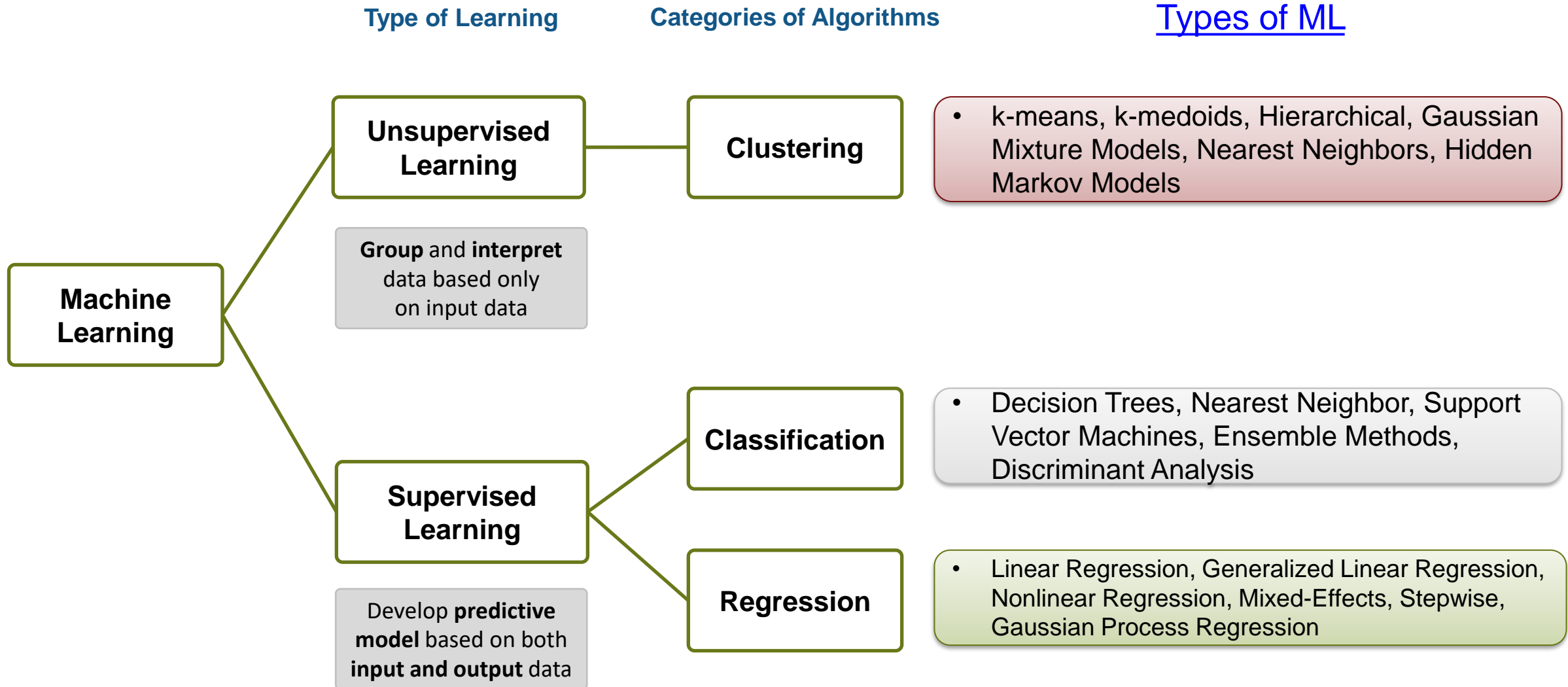
Different Types of Machine Learning

A 4-min Video on
[Types of ML](#)



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A 4-min Video on
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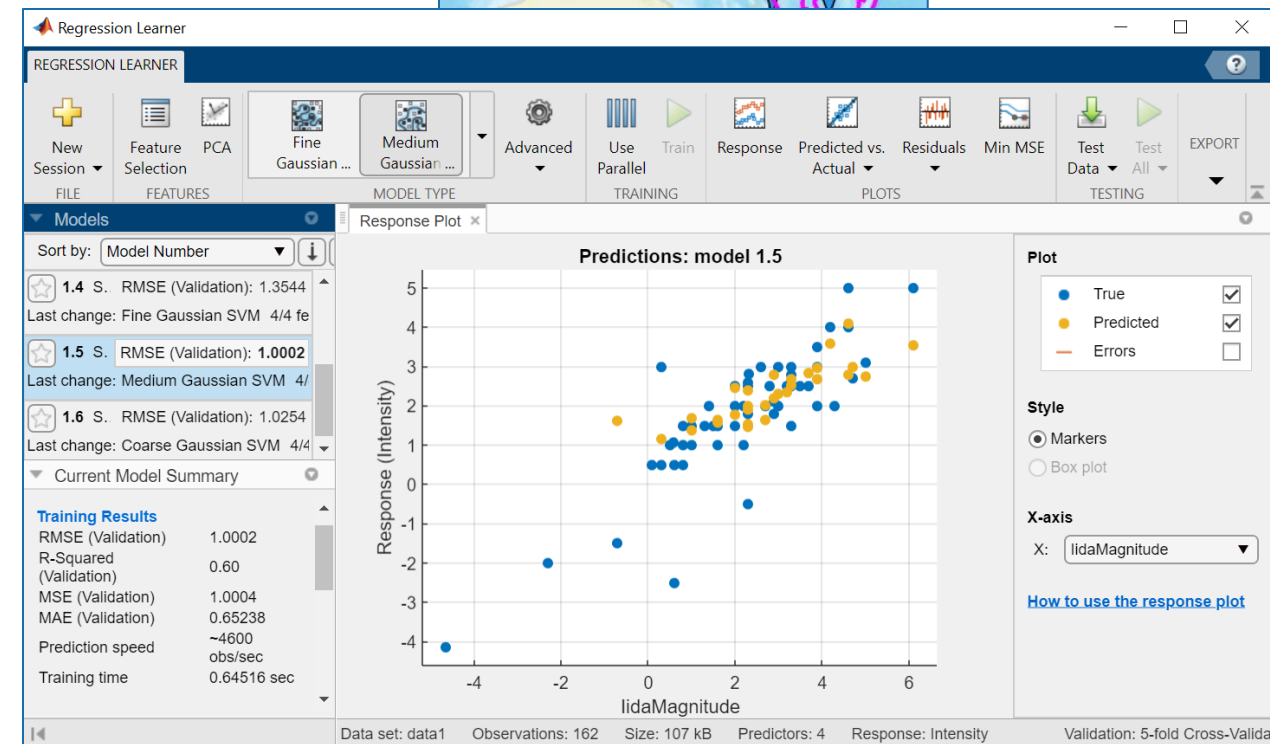
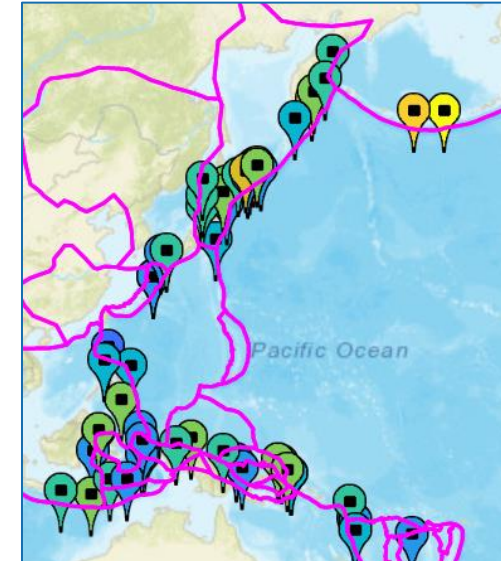
Prediction of tsunami intensity

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  Run and Advance 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.

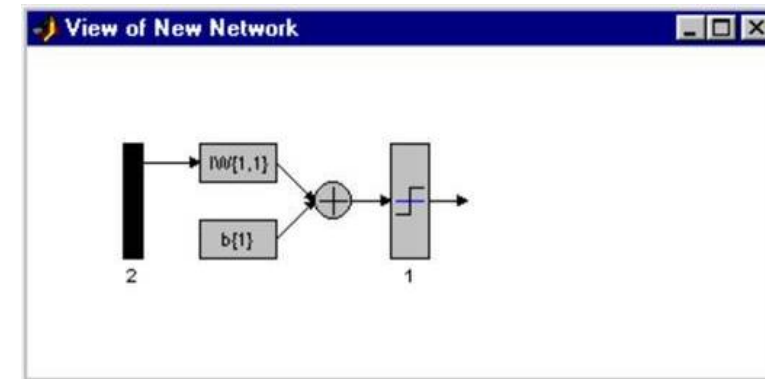
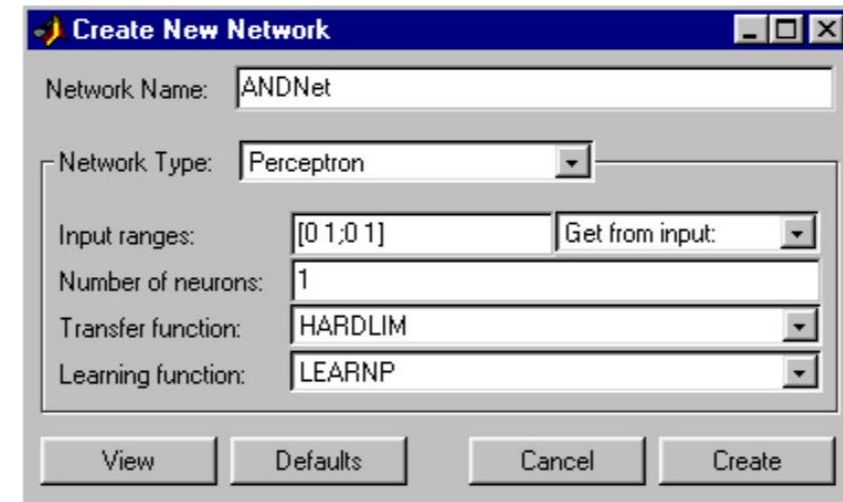
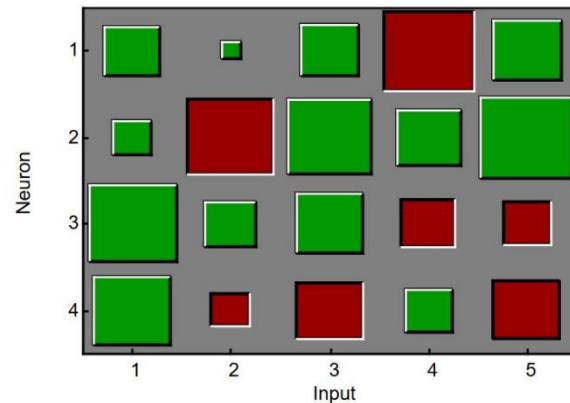
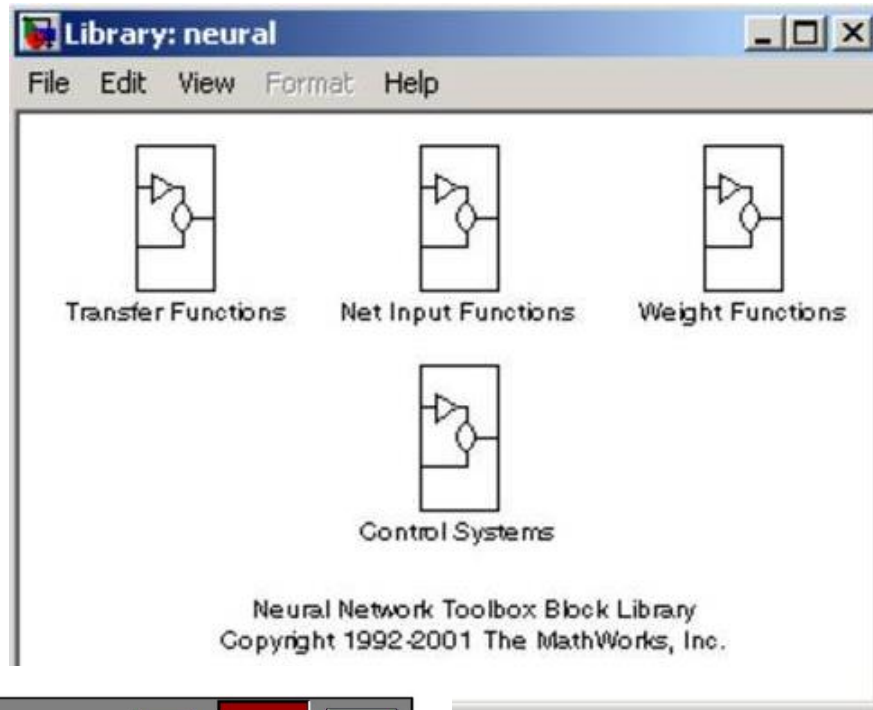
Exploration of Exercise Results

- 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?



MATLAB Onramp

Get started quickly with the basics of MATLAB.



Machine Learning Onramp

Learn the basics of practical machine learning methods for classification problems.



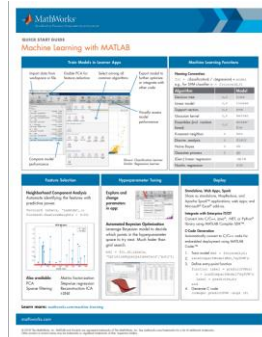
Deep Learning Onramp

Get started quickly using deep learning methods to perform image recognition.

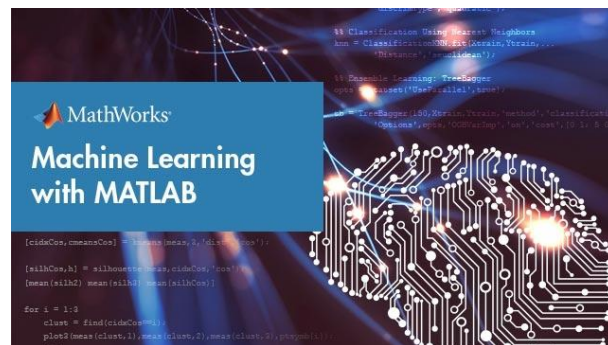
Browse > Data Science > Data Analysis

Offered By

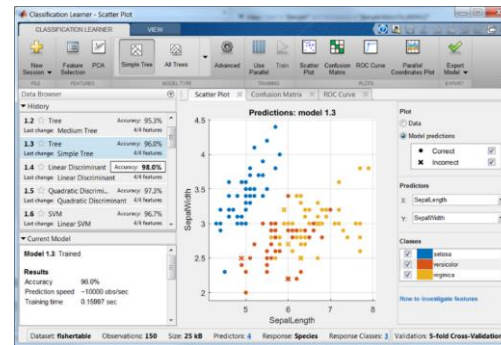
Practical Data Science with MATLAB Specialization



[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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