

# Understanding Machine Learning with Python

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GETTING STARTED IN MACHINE LEARNING



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# Module Overview



**What is Machine Learning?**

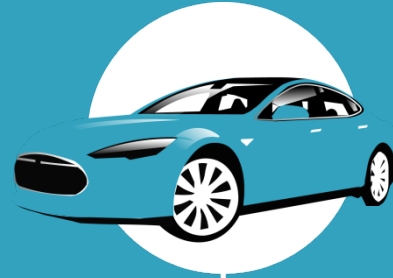
**Machine Learning vs Traditional  
Development**

**Types of Machine Learning**

**Course Content**

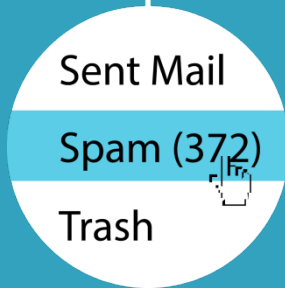
**Machine Learning and Data Science**

**Python and Jupyter Notebook Demo**



Is this email spam?

What will people buy?

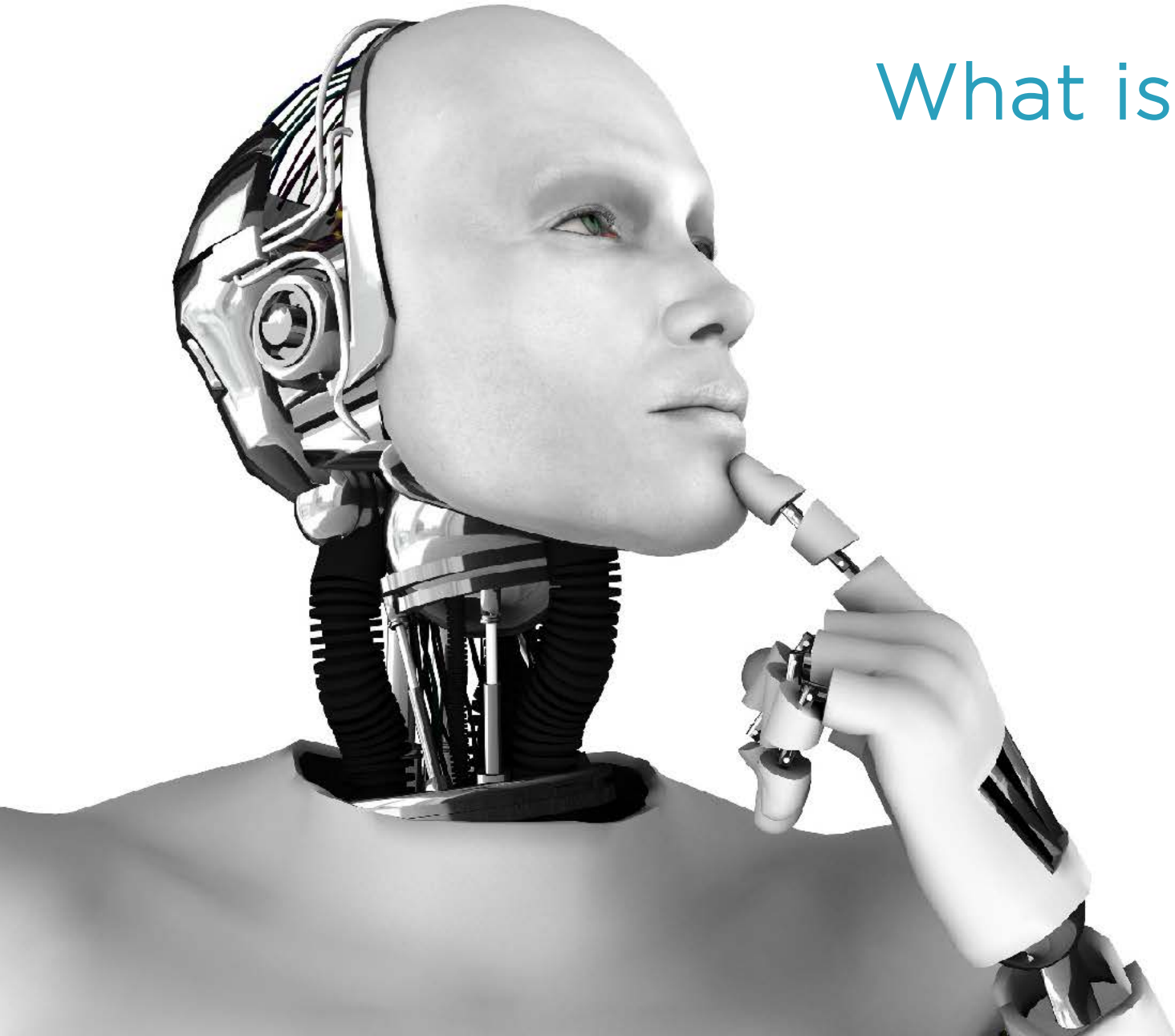


How can cars drive themselves?



# Machine Learning in Action

# What is Machine Learning?



# Machine Learning

Building a model from example inputs to make data-driven predictions vs. following strictly static program instructions.

# Machine Learning

Building a **model from example inputs** to make data-driven predictions vs. following strictly static program instructions.

# Machine Learning

Building a model from example inputs to make data-driven predictions vs. following strictly **static program instructions**.



# Traditional Programming



# Traditional Control Logic

**If**

**Case**

**While**

**Until**

# Machine Learning Logic

**Data**

**Algorithm**

**Data Analysis**

**Model**

```
graph TD; ML[Machine Learning] --- S[Supervised]; ML --- U[Unsupervised];
```

Machine Learning

Supervised

Unsupervised

```
graph TD; ML[Machine Learning] --- S[Supervised]; ML --- U[Unsupervised];
```

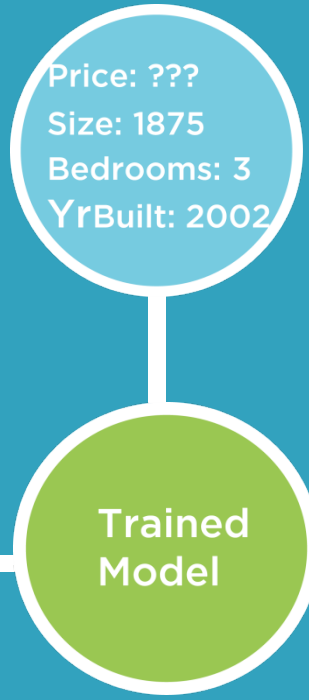
Machine Learning

Supervised

Unsupervised

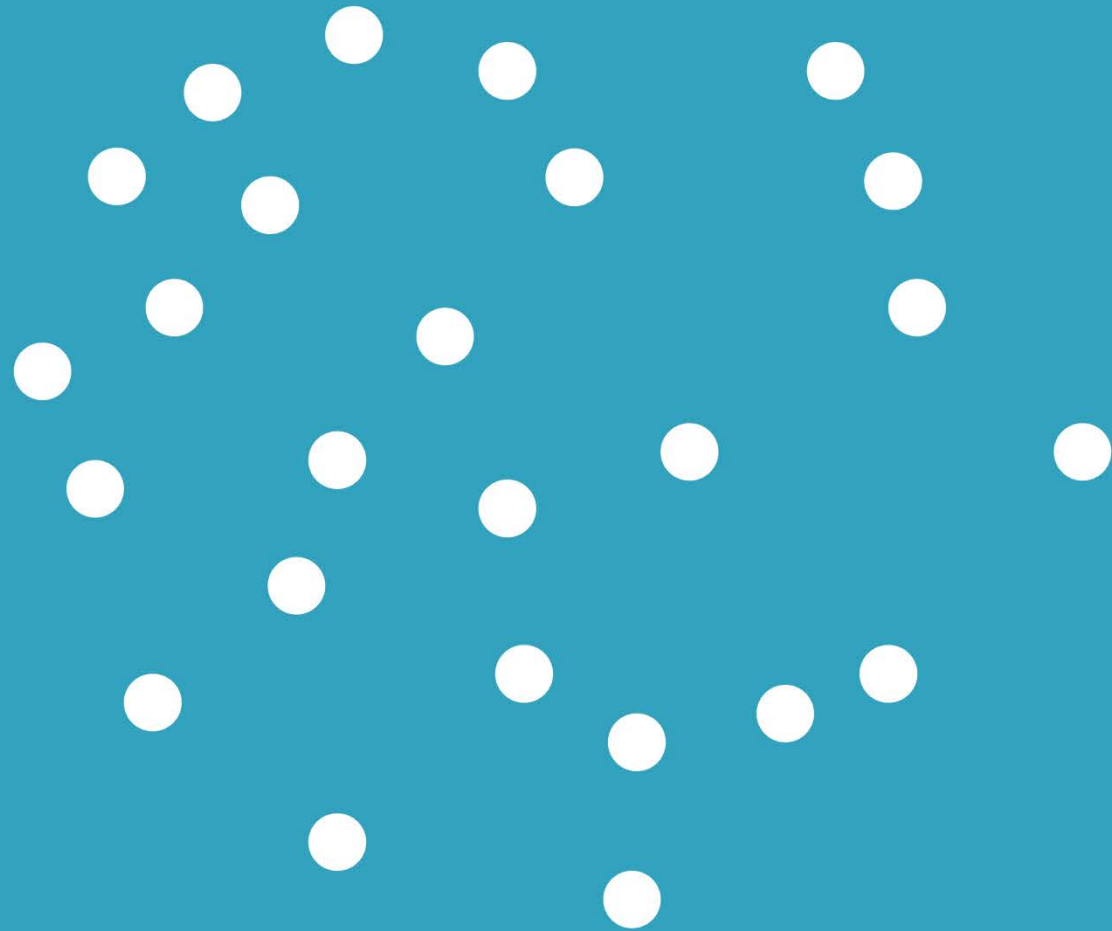


Train

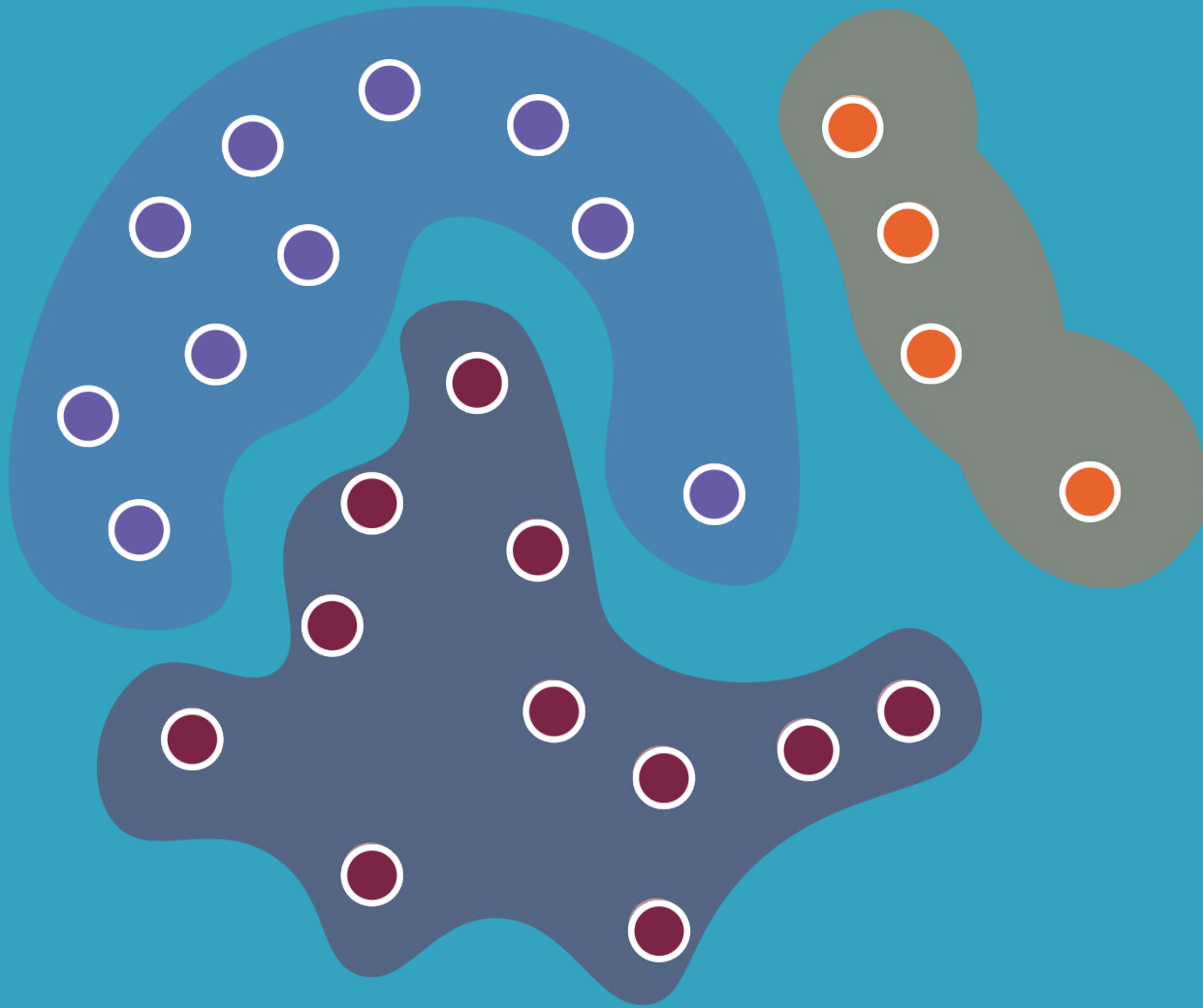


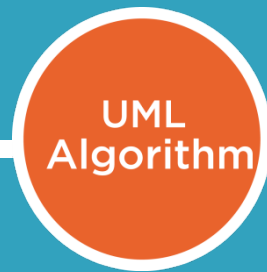
# Supervised Machine Learning

# Unsupervised Machine Learning

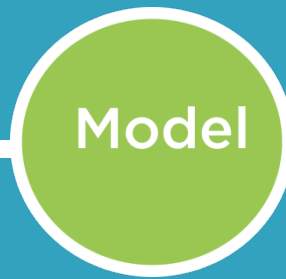


# Unsupervised Machine Learning





Classify



Voice of



# Unsupervised Machine Learning



# Machine Learning Technique Comparison

## Supervised

Value prediction

Needs training data containing value being predicted

Trained model predicts value in new data

Subject of this course

## Unsupervised

Identify clusters of like data

Data does not contain cluster membership

Model provides access to data by cluster

Not in this course

# Course Overview



**Machine Learning Workflow**

**Applying the Workflow Steps**

**Summary**

# Your Skills

## Not Required

Experience in Python

Experience with Jupyter Notebook

Advanced statistics or math

## Required

Software development experience

Experience with data in tables

Basic math and statistics skills

Passion to understand

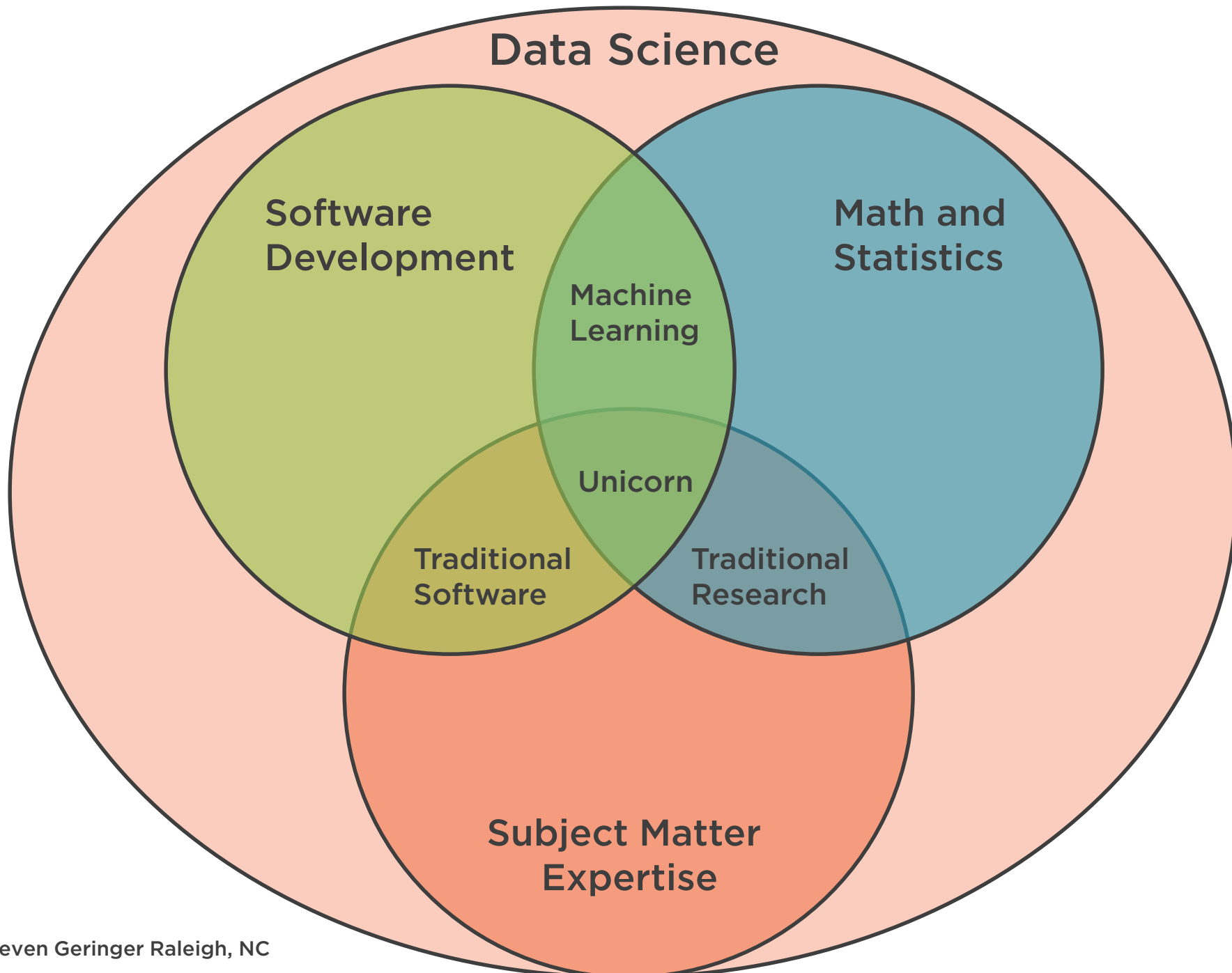
# Why This Course?



**Add Machine Learning skills**

**Learn something new**

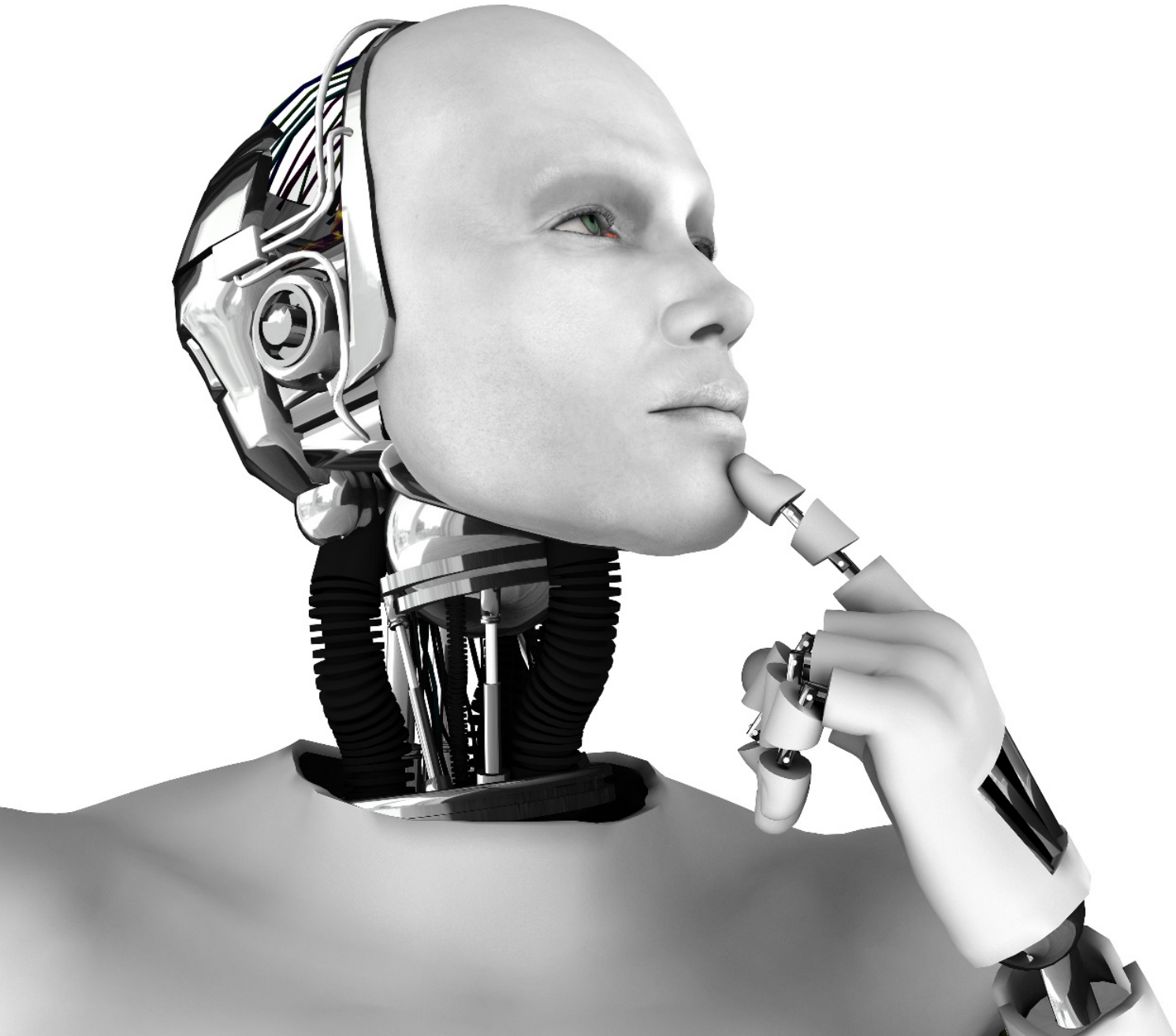
**Learn about Data Science**



A company's success can  
be effected by  
Machine Learning

“Unicorn Data Scientists (upgraded from “sexy data scientists”) are hard to find and are paid more than \$200,000 per year.”

**Gil Press. (2015). *Forbes***

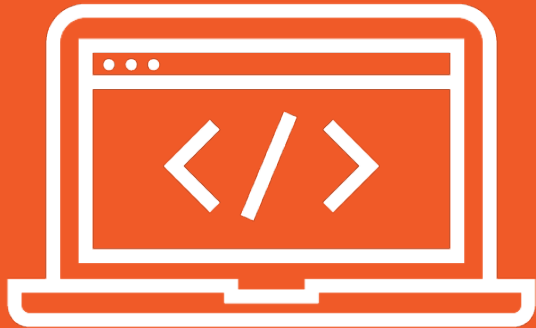


Your next project?



# Getting started with Python and Jupyter Notebook

# Python



Easy to learn

Powerful, object-oriented

Elegant syntax, easy to read

Standard libraries for most common tasks

# Python Versions

## **Python 2.7 and 3.x**

- Both used
- Some incompatibilities

## **Python 3**

- Future of Python
- Introduced in 2010

## **Python 2.7**

- Last version of Python 2
- Static since 2012

## **Python 3.5 used in this course**

# Python Libraries For Machine Learning

**numpy** - scientific computing

**pandas** - data frames

**matplotlib** - 2D plotting

**scikit-learn**

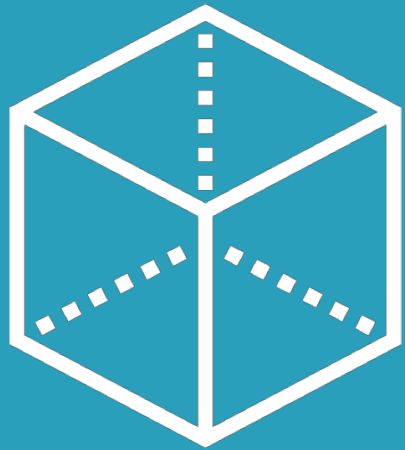
Algorithms

Pre-processing

Performance evaluation

And more ...

# Jupyter Notebook



*Formerly IPython Notebook*

Notebooks contain code and text

Perfect for iterable work like Machine Learning

Sharable

Supports multiple languages

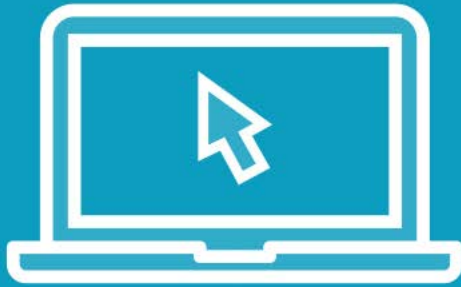
# Installation

## **Anaconda Distribution**

<https://www.continuum.io/downloads>

**conda – package and environment manager**

Demo



**Jupyter Notebook**

**Python 3.5**