UNIVERSITY OF MARYLAND 1856

FIRE: THE FIRST-YEAR
INNOVATION & RESEARCH
EXPERIENCE

Capital One
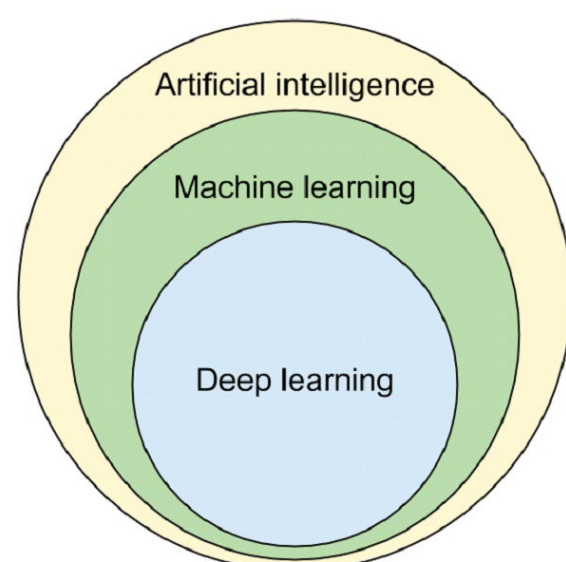Machine Learning

# What is Machine Learning?
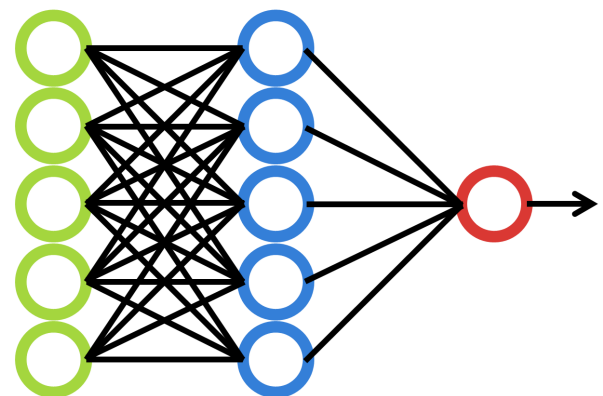


Using statistical and algorithmic techniques to give computer systems the ability to "learn" from data, without being explicitly programmed.
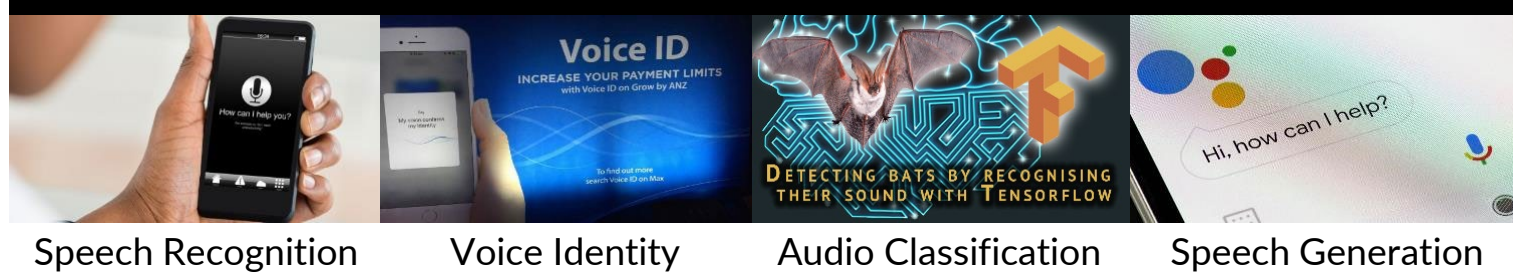
# How is it related to AI?



Machine Learning is a subfield of AI that involves the use of statistical & algorithmic techniques such as neural networks and deep learning.

# How can it be used?

## Computer Vision

Self-driving Cars | Video Surveillance | Facial Recognition | Medical Diagnosis

## Natural Language Processing

Speech Recognition | Voice Identity | Audio Classification | Speech Generation

## Data Analytics

Cybersecurity | Digital Marketing | Behavior Prediction | Data Analysis

# How is it done?

**Large Datasets**

**Open-Source Packages**

**Python Programming**

**Cloud Platforms**

**Neural Networks**

**Deep Learning Models**

# What will you do?

## Data Preprocessing

- Gathering raw data
- Restructuring the data
- Correcting data errors
- Transforming the data
- Augmenting the data
- Sampling the data



Data cleaning | Data normalization | Data transformation | Missing values imputation | Data integration | Noise identification
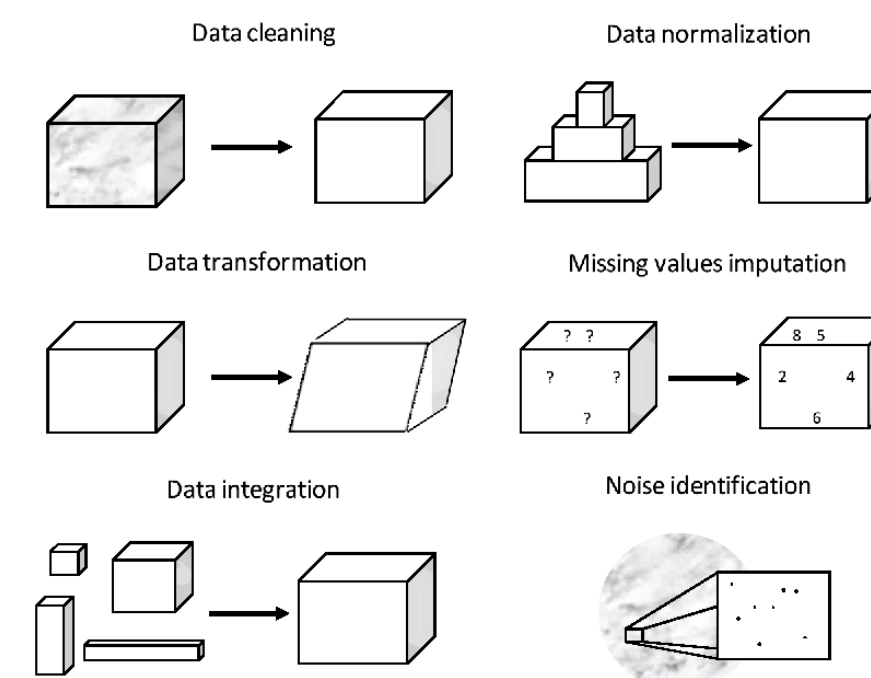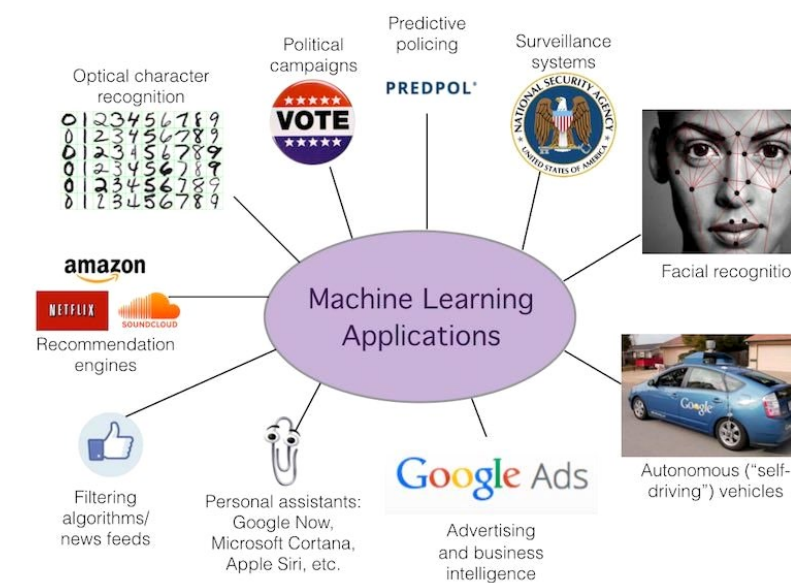
## Training & Validation

- Composing the model
- Splitting the dataset
- Run training & validation
- Analyzing training results
- Evaluating with a test set
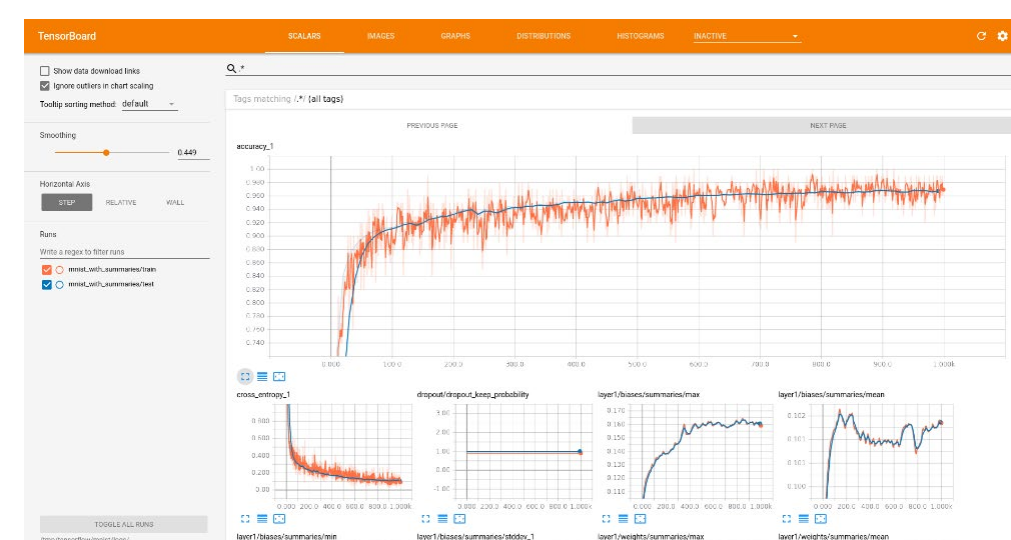
## Optimization & Application

- Refining the parameters
- Improving the performance of your model
- Applying your model to the real-world



# Our Cutting-Edge Tools

NVIDIA CUDA | Jupyter | TensorFlow | Google Cloud Platform | GitHub | kaggle | PyTorch | scikit learn | colab | Keras

# Why it matters?

- ✓ Recent growths in big data, computational tools, and state-of-the-art research.
- ✓ Machine learning applies to a wide variety of fields.
- ✓ Outcomes can lead to broad impact.
- ✓ Great career opportunities.

# What will you learn?

- ✓ Analyze state-of-the-art techniques from recent scholarly papers and open-source repositories.
- ✓ Perform data preprocessing, training, optimization, and evaluation of machine learning models using deep learning frameworks (such as Keras, Tensorflow, and PyTorch).
- ✓ Collaborate with a peer research mentor and a team of fellow students to analyze, design, implement, and apply a machine learning model for real-world usage.

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