Workshop on Machine Learning

by

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Agenda

ML Overview
- ML applications
- Understand the basic ML pipeline

Python Fundamentals

Digit recognition on MNIST data

ML is everywhere..

Email filtering: Spam/ Not Spam

Object recognition

- Google lens
- Traffic cameras & Video surveillance
- Google Photos
- Smart lock

Healthcare

- Survival analysis
- Tumour identification from mammograms

Speech Recognition

- Alexa/ Siri/ Google Assistant
- Voice activated banking

Business Analytics

- Churn Prediction
- Detecting Fraud

Recommendation systems

- Amazon product recommendation
- Movie
- Articles recommendation on Medium

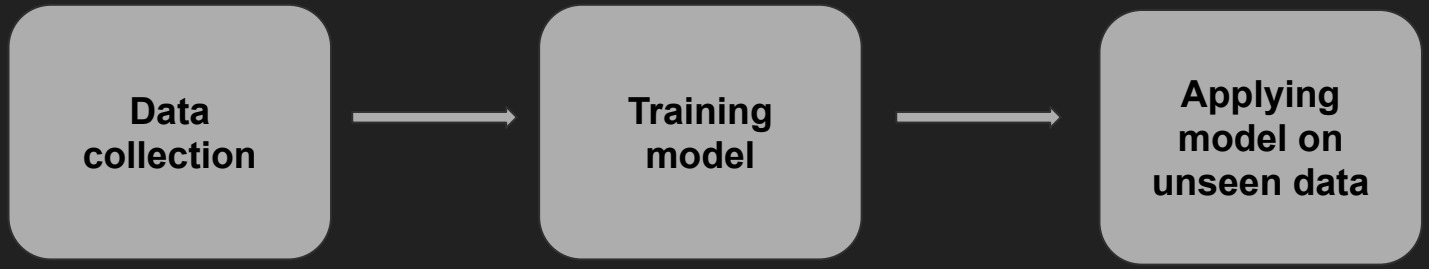
Self driving cars

Biometric

Weather forecast

What is Machine Learning?

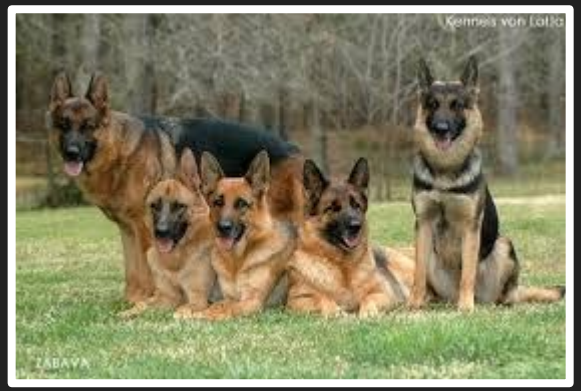
- Making prediction on new unseen data based on previous/ past data



Why ML is booming now?

- Computing Power
- Data Availability
- Better Algorithms

Let’s build a Pug/ German Shepherd Classifier



- Measured the height and weight of pugs and GS in your street
- Let’s plot it on a graph
- If machine thinks the new test data is pug, it outputs 0 else it outputs 1 (which means machine thinks it’s a GS)

Key ML Terminology

1. **Features**
   - A feature is an Input variable: x
   - An ML project can be univariate, have just one feature or it could be multivariate, having multiple features denoted by x_1, x_2, x_3, x_4,.....x_n
   - Training data features: x_train
   - Test data features: x_test

2. **Label**
   - It is the thing we are predicting: y

3. Examples

- An example is a particular instance in data, **x**
- Also known as sample point or data point
- Examples can be of 2 types:
    - Labeled example: {features, label}: (x, y)
    - Unlabeled example: {features, ?}: (x, ?)
- We train our model with labeled examples, then we use trained model to predict the label on unlabeled examples

4. Model

- Defines the relationship b/w features and labels
- It is the function that relates features to labels: $y = f(x)$

5. Regression vs Classification

- A regression model outputs continuous value. Like:
  - Price of a house in Boston
  - Probability that a user will click on an ad
- A classification model outputs discrete value. Like:
  - Is a given email spam or not?
  - Is the image is of a dog or a cat or a human?

Digit Recognition on MNIST Data

- What is MNIST data?
- How are images stored in your computer?
- Image classification

Code Availability

https://github.com/princeyyadav/CB_Workshops

Links to Telegram Groups

https://telegram.me/CodingBlocksIN

https://telegram.me/CodingBlocksFAANG

Thank You