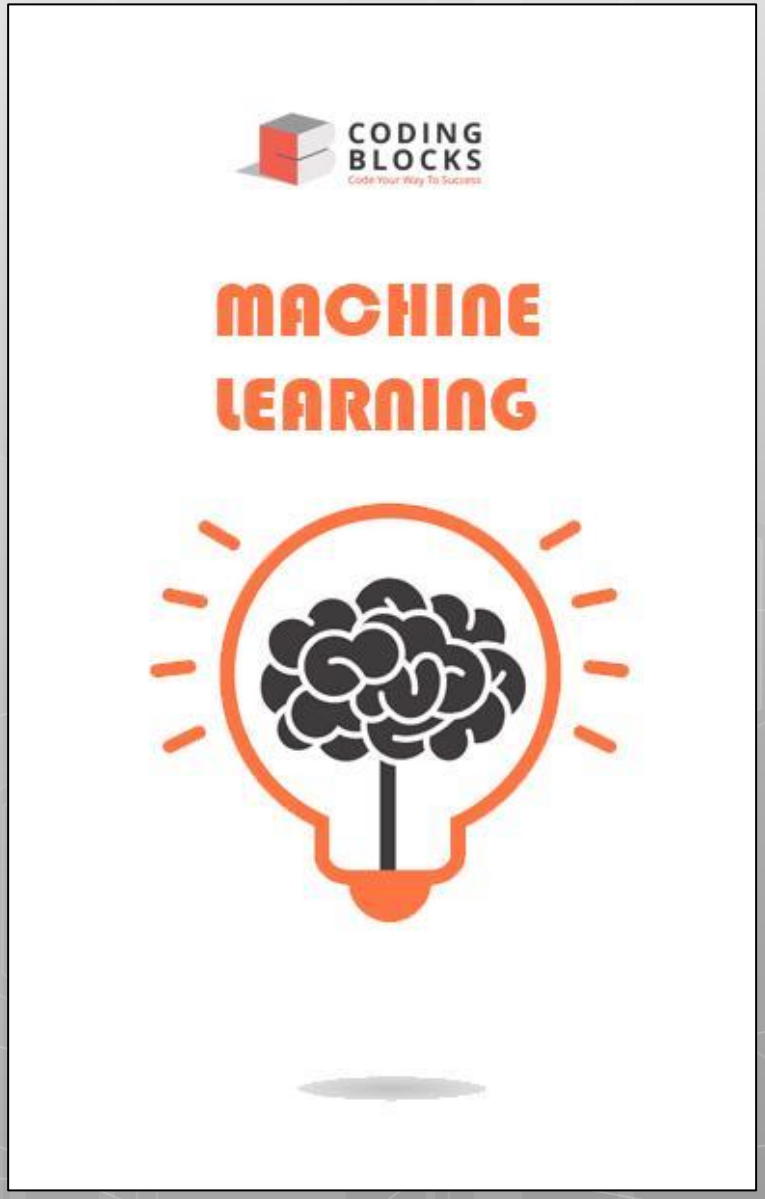


CODING BLOCKS

PERCEPTRON

Lecture-1

- Intro to Machine Learning

Ayush C | Navjot S | Vasudev S

OBJECTIVES OF THE COURSE

- Introduction to Machine Learning
- Theoretical and Conceptual Foundation
- Inducing the Thought Process of a Data Scientist
- Ability to solve Real-World problems in industry and academia

CODING BLOCKS

COURSE LOGISTICS

- Interactive Sessions
- Piazza Online Classroom
- After Class Doubts
- Regular Take Home Assignments
- Hackathons to implement your ideas
- Online Code Submission and Leaderboard

MACHINE INTELLIGENCE

Machine Learning

what society thinks I do

what my friends think I do

what my parents think I do

$$L_P = \frac{1}{2}\|\mathbf{w}\|^2 - \sum_{i=1}^{n} \alpha_i y_i (\mathbf{x}_i \cdot \mathbf{w} + b) + \sum_{i=1}^{n} \alpha_i$$

$$\alpha_i \geq 0, \forall i$$

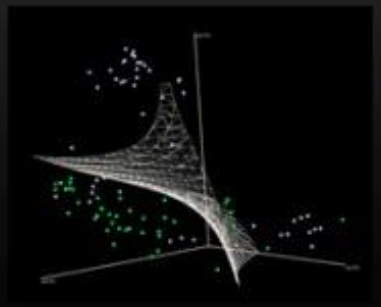
$$\mathbf{w} = \sum_{i=1}^{n} \alpha_i y_i \mathbf{x}_i, \sum_{i=1}^{n} \alpha_i y_i = 0$$

$$\nabla \hat{Q}(\theta_t) = \frac{1}{n} \sum_{i=1}^{n} \nabla \ell(x_i, y_i; \theta_t) + \nabla r(\theta_t).$$

$$\theta_{t+1} = \theta_t - \eta_t \nabla \ell(x_{\tau(t)}, y_{\tau(t)}; \theta_t) - \eta_t \cdot \nabla r(\theta_t)$$

$$\mathbb{E}_{\tau(t)}[\ell(x_{\tau(t)}, y_{\tau(t)}; \theta_t)] = \frac{1}{n} \sum_{i} \ell(x_i, y_i; \theta_t).$$

what other programmers think I do



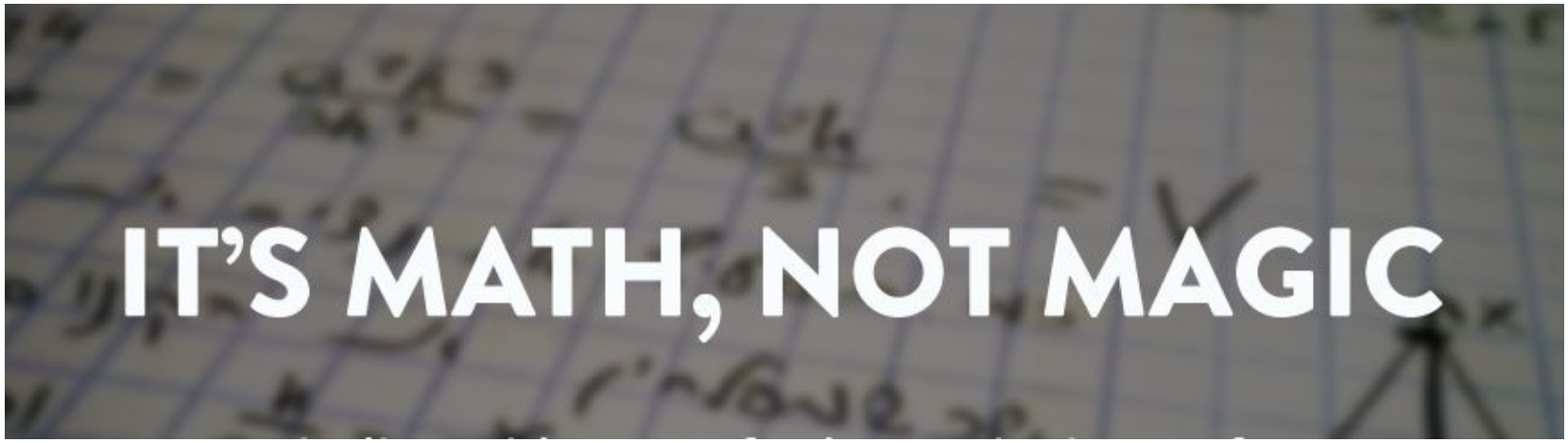
what I think I do

```
>>> from sklearn import svm
```

what I really do

CODING BLOCKS

WHAT IT IS



CODING BLOCKS

Buzz Words

- Supervised Learning, Unsupervised Learning, Reinforcement Learning
- Classification/ Regression
- Features
- Training Data
- Validation Data
- Testing Data

For later!!

- Overfitting, Underfitting
- Weights

FORMAL DEFINITION

- Machine learning is a subfield of artificial intelligence (AI) concerned with algorithms that allow computers to learn. What this means, in most cases, is that an algorithm is given a set of data and infers information about the properties of the data—and that information allows it to make predictions about other data that it might see in the future

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DRIVING FACTORS !

- Lots of Data
- Ability to process it

Machine Learning Models are essentially Statistical Machines.

SOME STATISTICS

- Every minute up to **300 hours of video** are uploaded to **YouTube**.
- Average of **31.25 million messages** and view **2.77 million videos** every minute on **Facebook**.
- More data has been created in the past two years than in the entire previous history of the human race.
- At the moment less than 0.5% of all data is ever analyzed and used, just imagine the potential here.

THE INDUSTRY IS USING IT..

- **Google** Page Ranking.
- **Netflix** Suggestions.
- **Tinder**, for you to **“chill”**
- **Tesla** Self Driving Cars

THE POTENTIAL:
FEW INTERESTING APPLICATIONS

Demystifying Prisma: Neural Art

CODING BLOCKS

The Mathematical Mozart

Image Captioning: Neural Story

CODING BLOCKS

Generated story about image
Model: Romantic Novels

"He was a shirtless man in the back of his mind, and I let out a curse as he leaned over to kiss me on the shoulder.

He wanted to strangle me, considering the beatiful boy I'd become wearing his boxers."

CODING BLOCKS

CODING BLOCKS

Generated story about image
Model: Romantic Novels

"My man was within a woman, and she gave him a questioning look. I don't know what else to say to her . For the first time in years , I had never been as beautiful as the rest of my man .

In fact, he had his hands on her hips , holding her close to his chest and looking down at her as if she were the most stunning woman I d ever seen . The man released a woman 's blood , and that was the reason for all of them.

She hoped to make an appear- ance, convincing him and the woman who was still her first ."

CODING BLOCKS

Conversational Engine

CODING BLOCKS

Pacman Champ: The Gamer

CODING BLOCKS

How easy do you think Lip Reading is ?

Lip-Reading AI

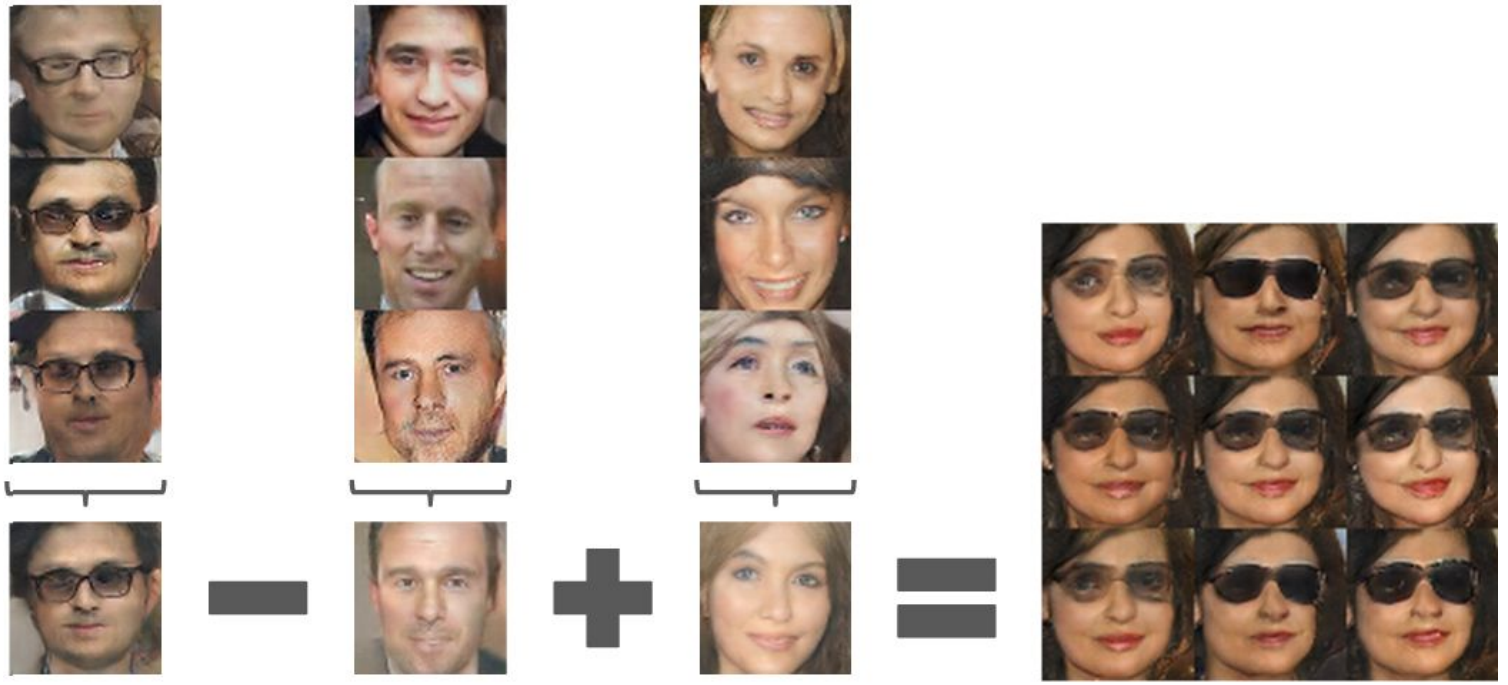
Human Accuracy : 20% to 60%

LipNet Accuracy : 93.4%

Colorizing the World:

CODING BLOCKS

Playing with Words and Image



CODING BLOCKS

A machine learning engineer is a lot like wine , gets better than time.

DEVELOPER CHECKLIST

- Python 2.7, Ipython , Jupyter
- Numpy , Scipy
- OpenCV
- Matplotlib
- Pandas
- Theano , Tensorflow

And…..

CODING BLOCKS

Passion and Perseverance !

INTRODUCTION TO PYTHON

Setting Up Jupyter Notebooks

Variable and Data Types

String, Lists and Dictionaries

Packages and Imports

Conditionals Loops and Functions

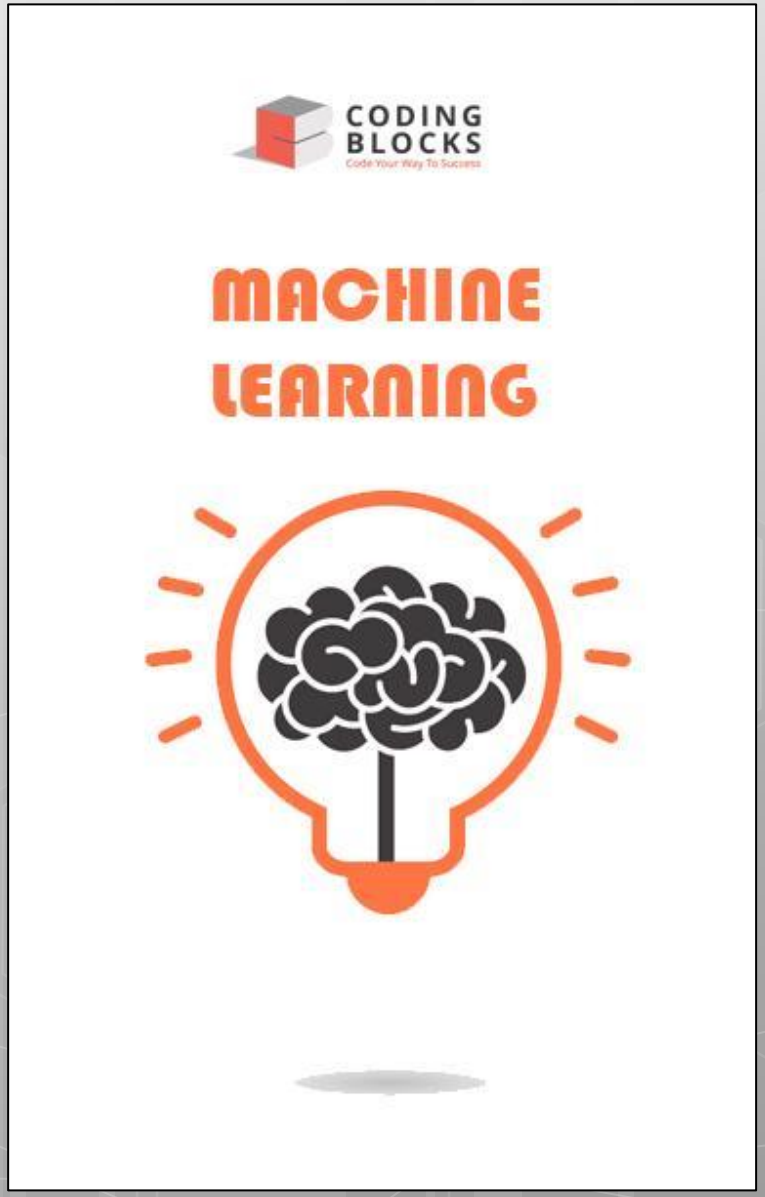
Object Oriented Paradigm

Python LIVE Assignment

File Handling

Statistical Computation with Python: Hands-on Session

Doubts and Queries?



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Thank You!

Ayush C | Navjot S | Vasudev S