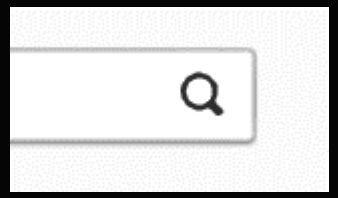
# Introduction to Machine Learning


Mohamad Al Mdfaa

Lecture 0

01, Mar, 2018

# Machine Learning?



Search Engines

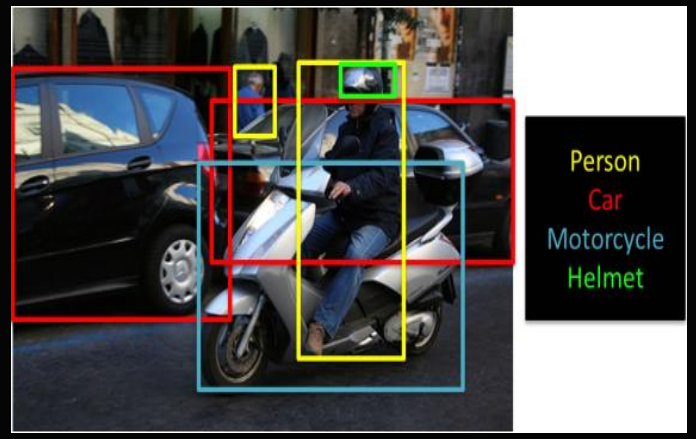
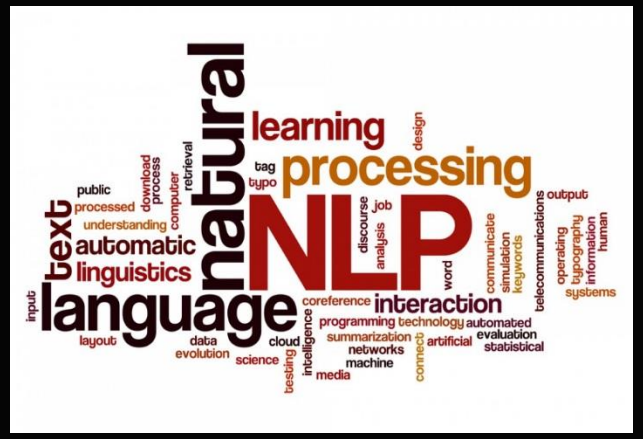



Image Recognition


Spam Filter




Natural Language Processing

# CROWD MANAGEMENT SYSTEM

M. Al Hindi

H. Noufal

Kh. Said

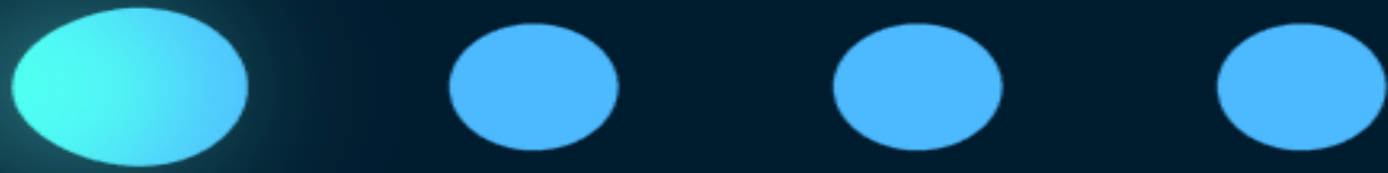
M. H. Alganadi

A. Al-Shalabi

M. Al Mdfaa

MACHINE LEARNING IS A METHOD OF TEACHING COMPUTERS TO MAKE PREDICTIONS BASED ON SOME DATA.

Video Link




YouTube

# Introduction to Machine Learning

**Mohamad Al Mdfaa**

Lecture 0

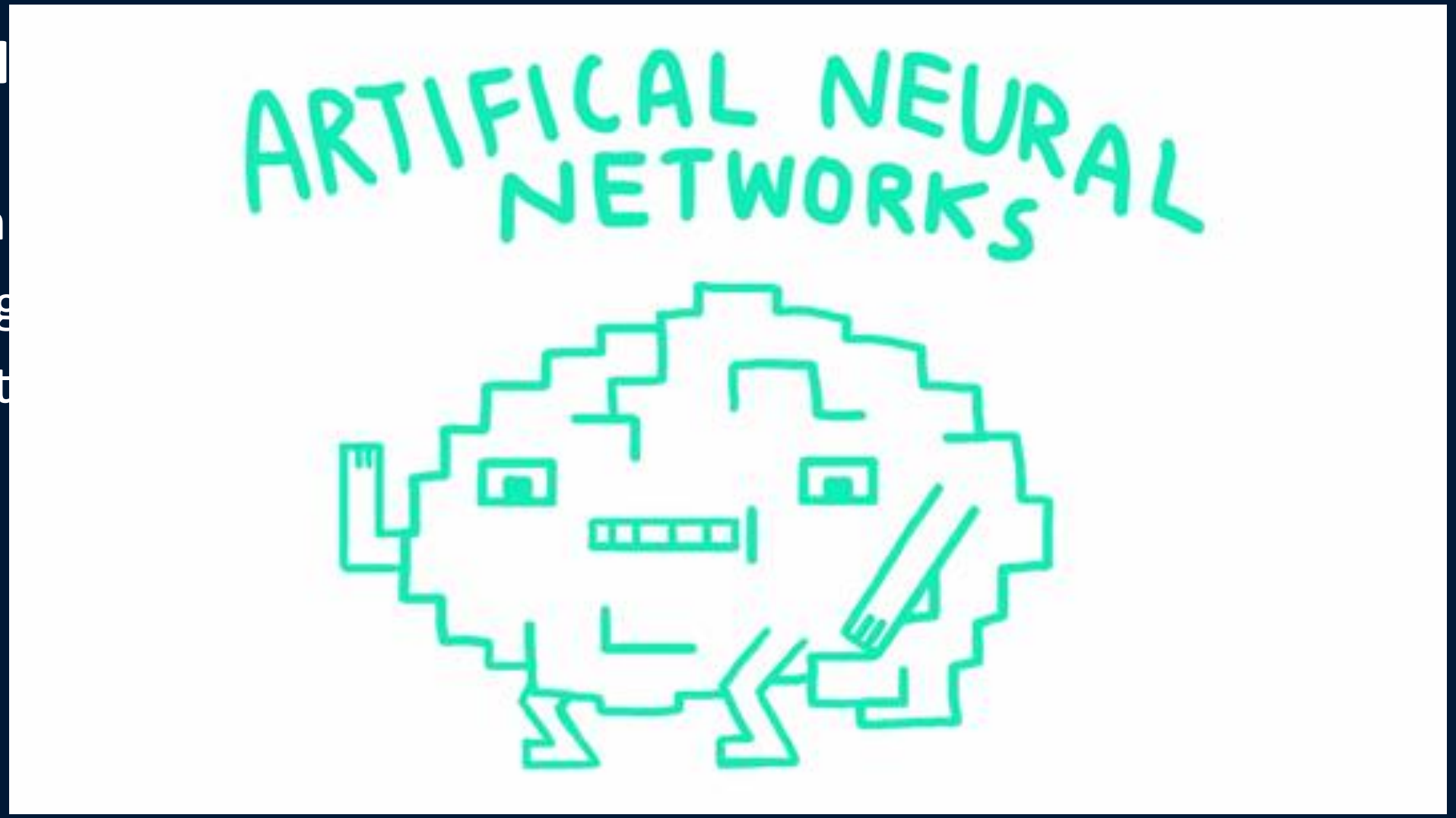
01, Mar, 2018

# Outlines

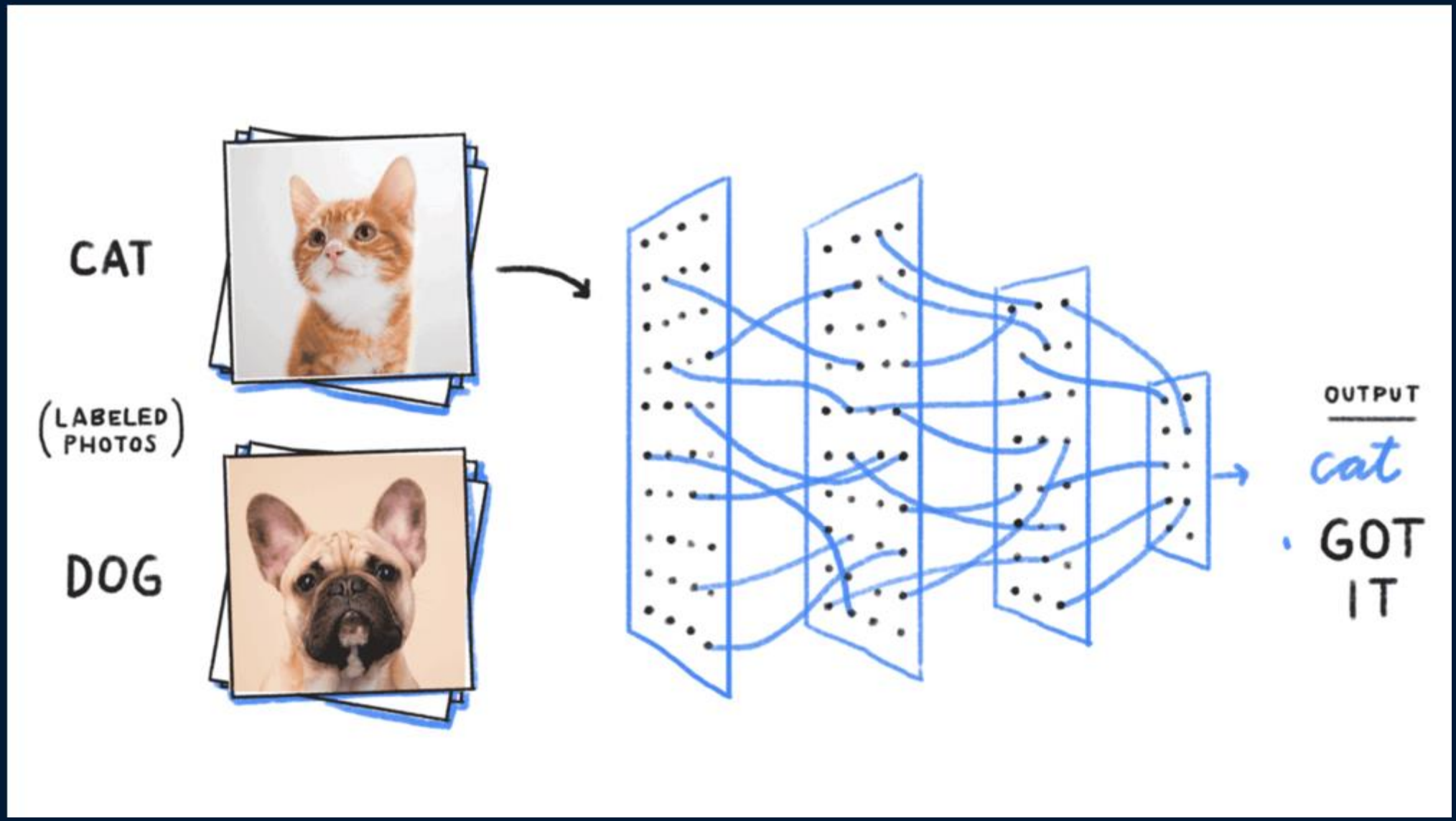
- Linear Regression
- Logistic Regression
- Artificial Neural Networks

# Ou

- Lin
- Log
- Art

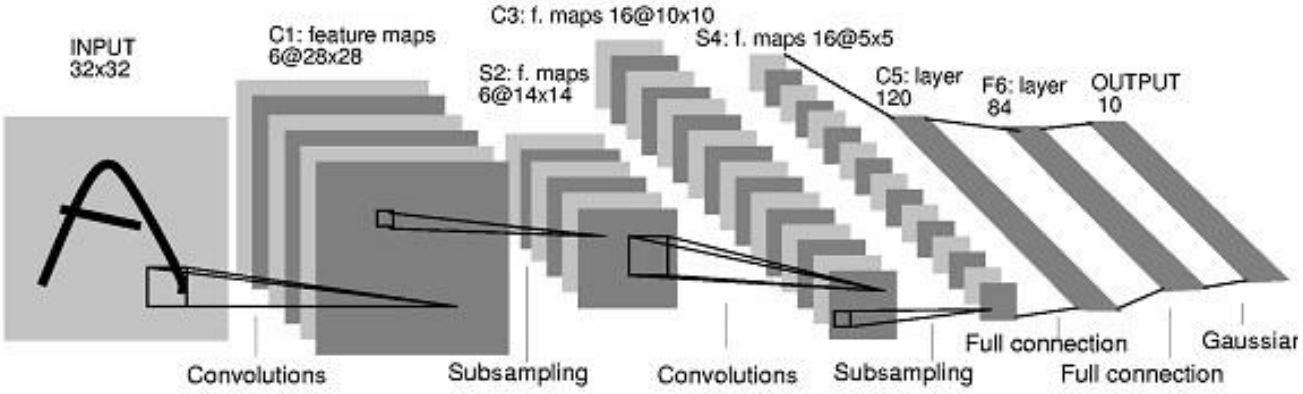


# Neural Networks practitioner


CAT
(LABELED PHOTOS)
DOG
OUTPUT
cat
GOT IT

# 1998

LeCun et al.




# of transistors


$10^6$

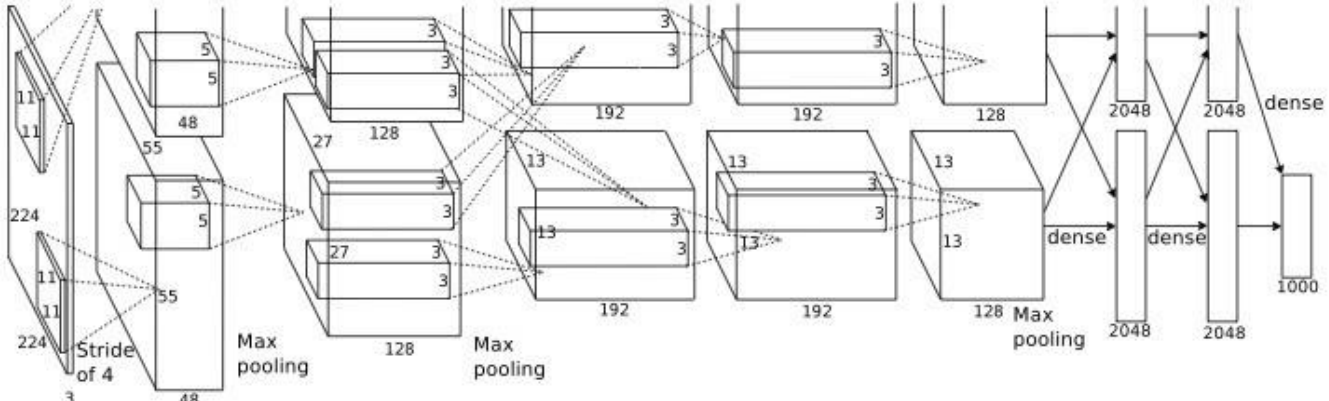
# of pixels used in training

$10^7$ NIST

---

# 2012

Krizhevsky et al.




# of transistors


$10^9$

GPUs

# of pixels used in training

$10^{14}$ IMAGENET

# Outlines

- Linear Regression
- Logistic Regression
- Artificial Neural Networks
- Support Vector Machine
- Kernels
- Clustering
- Dimensionality Reduction
- Recommendation Systems

# Machine Learning

what society thinks I do

what my friends think I do

what my parents think I do

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

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

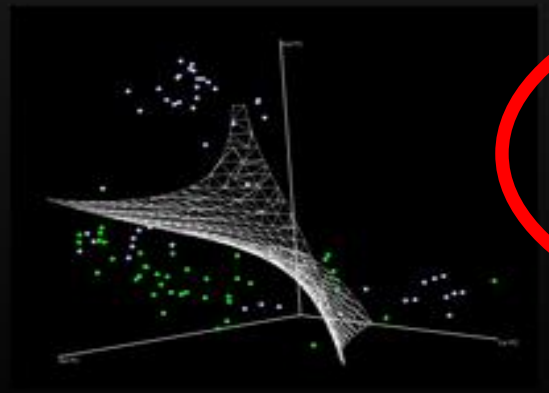
$$\mathbf{w} = \sum_{i=1}^{l} \alpha_i y_i \mathbf{x}_i, \sum_{i=1}^{l} \alpha_i y_i = 0$$

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

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

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

what other programmers think I do



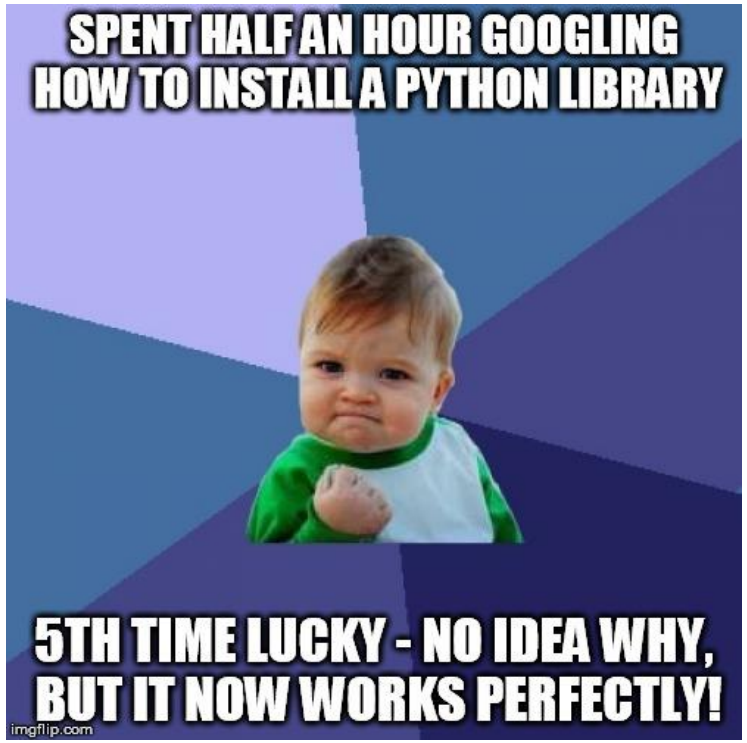
what I think I do

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

what I really do

"You can't just copy- **Paste** pseudocode into a program and expect it to work"


FOLLOW ME BRO!


SPENT HALF AN HOUR GOOGLING
HOW TO INSTALL A PYTHON LIBRARY
5TH TIME LUCKY - NO IDEA WHY,
BUT IT NOW WORKS PERFECTLY!
imgflip.com

ANACONDA®

StatsModels
Statistics in Python

Seaborn

pandas

$$y_{it} = \beta' x_{it} + \mu_i + \epsilon_{it}$$

xarray

scikit learn

scikit-image
image processing in python

NumPy

SciPy

matplotlib

jupyter

python™

IP[y]:
IPython