Class 1- Welcome to the world of Machine Learning

This is me!

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Department(s):

Economics and Finance

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Personal Website

Curriculum Vitae

Education

PhD, Economics, Arizona State University, 2017

Master, Economics, Simon Fraser University, 2013

MBA, Sharif University, 2012

Industrial Engineering, IUST, 2009

Biography

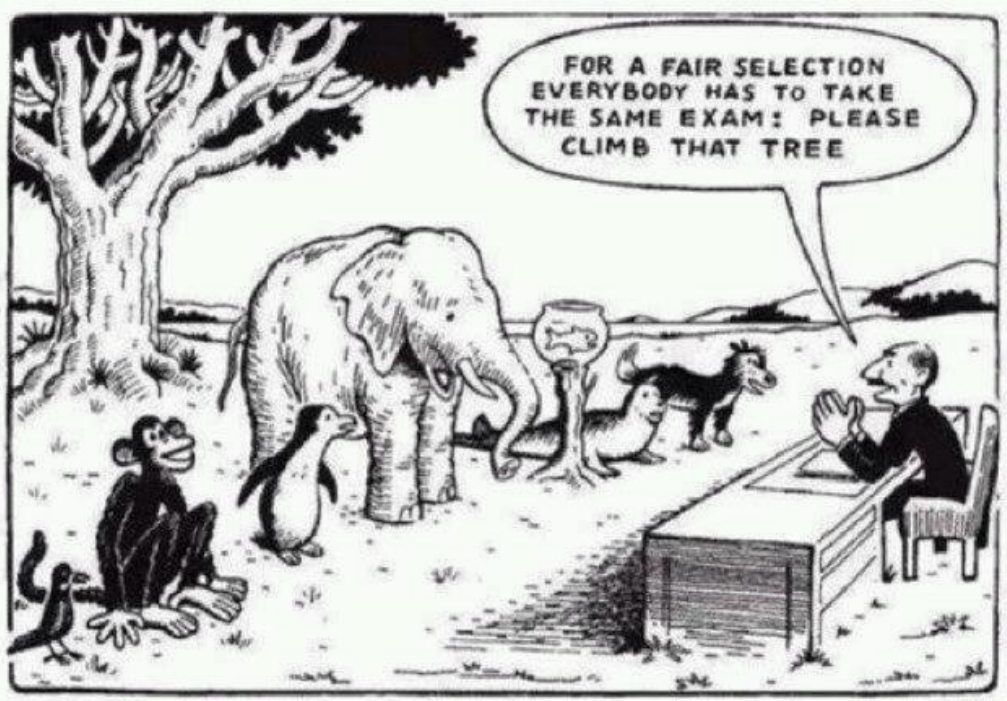
Pedram Jahangiry, PhD, CFA, is an assistant professor in the Economics and Finance Department of the Jon M. Huntsman School of Business at Utah State University. Prior to joining the Huntsman School in 2018, Pedram was a research associate within Financial Modeling Group at BlackRock NYC. His research is involved in machine learning applications in finance, empirical asset pricing, and factor models.

Meet the TAs!

Abraham Alhomadi

Austin Francis

My Teaching Philosophy



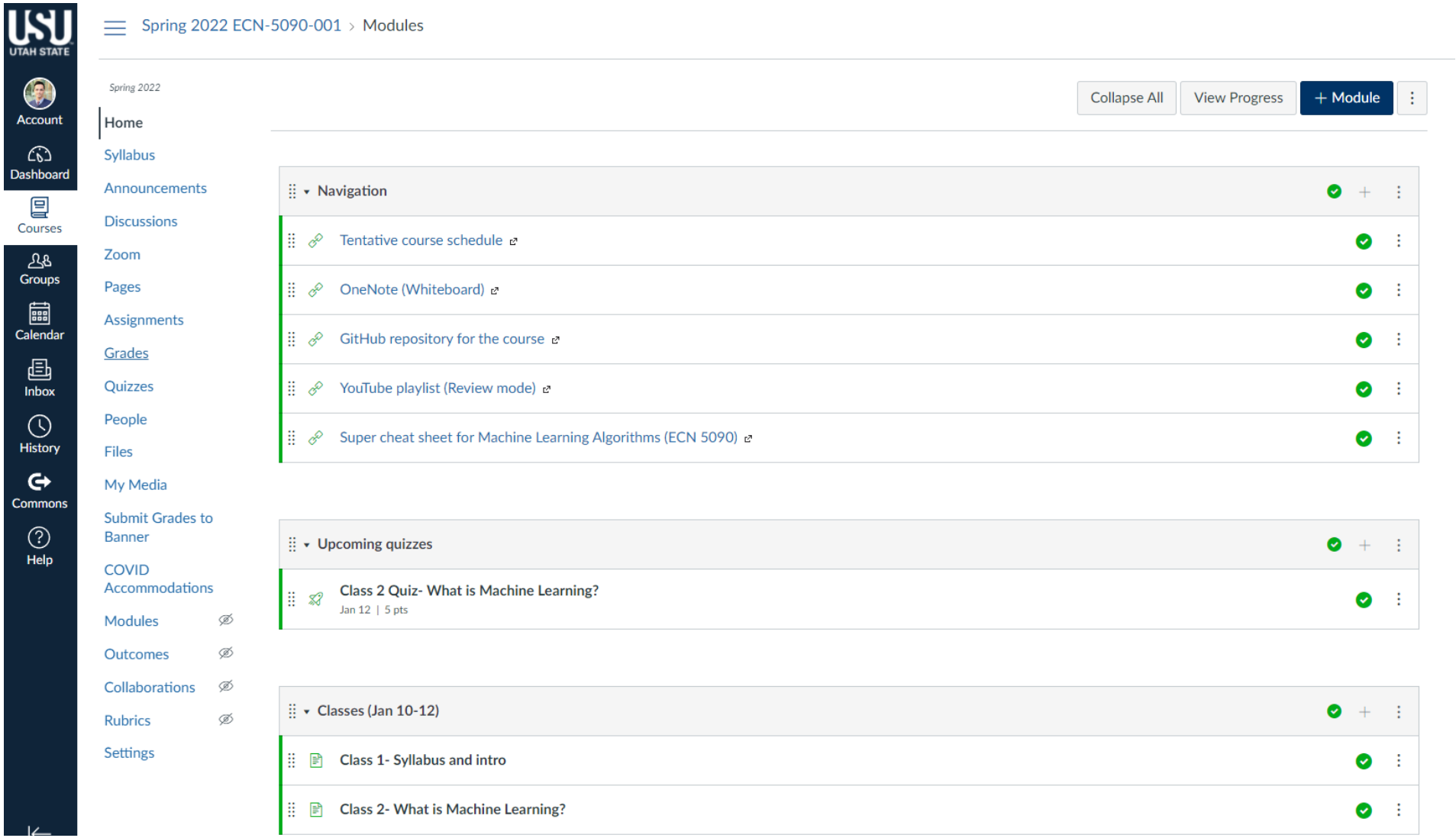
My Teaching style!

More focus on interaction and application in class while putting more lecture-like material online

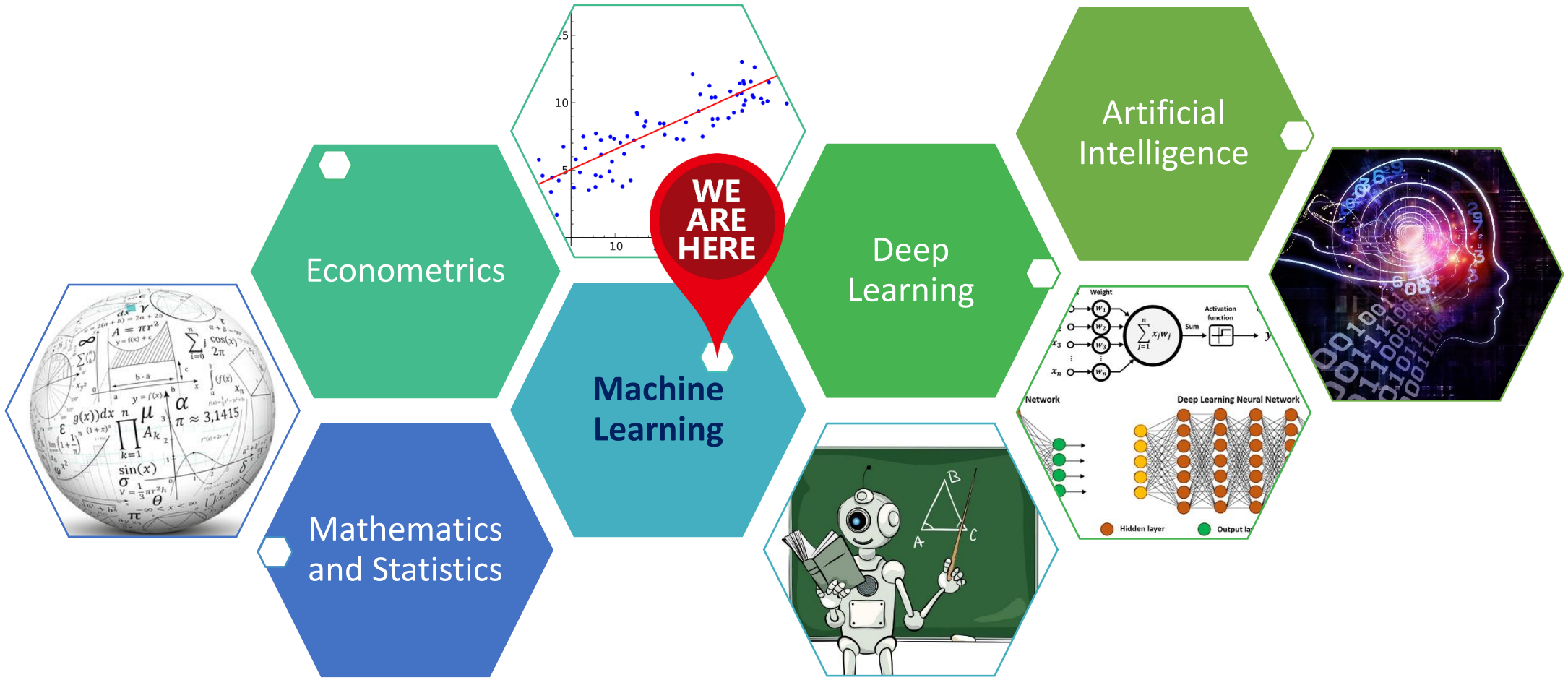
Classroom time will be used more to make mistakes in a safe environment

Balancing learning-by-studying with learning-by-doing

What's on Canvas?



Where we are?


Econometrics
WE ARE HERE
Machine Learning
Deep Learning
Artificial Intelligence
Mathematics and Statistics
Weight
Activation function
Sum
Network
Deep Learning Neural Network
Hidden layer

Big picture: Econometrics vs Machine Learning

What are we trying to do as a researcher?

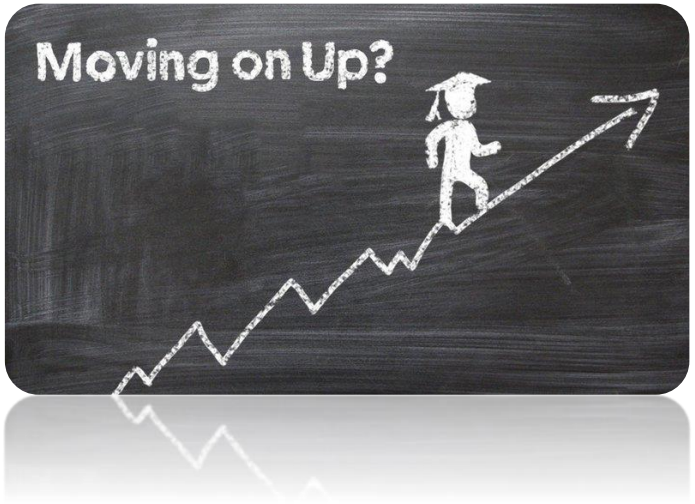
Solve real world problems, right?

Is there a theory?

What is the relationship between

- Sales and advertisement / R&D expenditure / seasonality / industry / … ?
- Quantity demanded and price / income / technology / price of competitors / … ?
- Wage and education/ age/ gender/ experience/ …?

A simple example



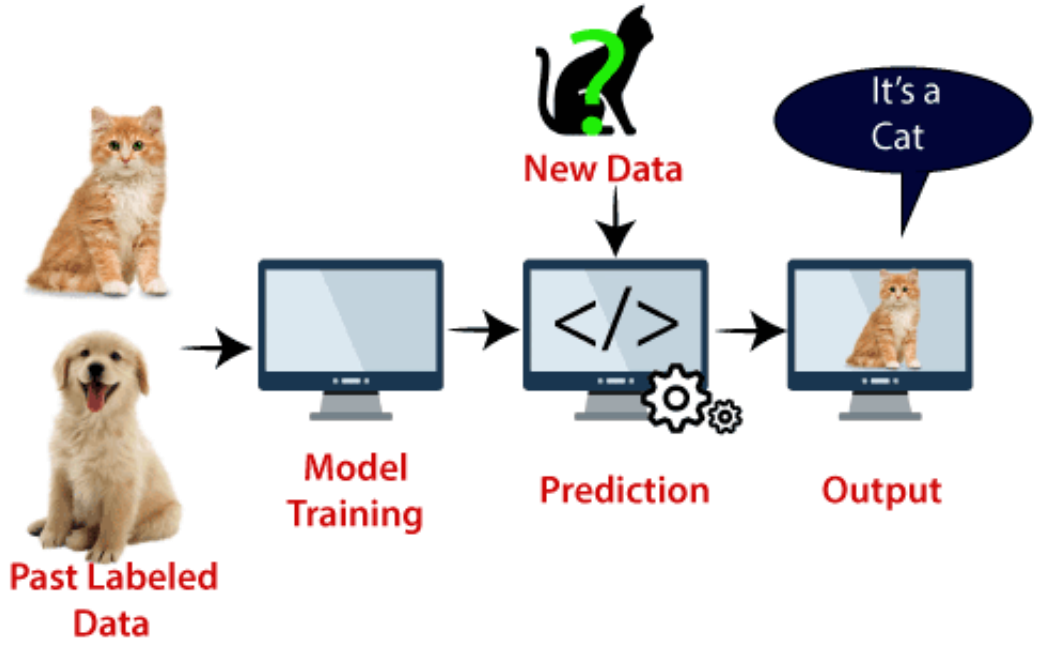
- Let's see if we can predict your future salary! (is there a theory?)
- What are the drivers:
  - Education, age, experience, IQ, …
  - Ethnicity, race, gender, …
  - Industry, location, working hours, …
- Let's build a model (assuming a linear functional form!)

$$wage = \beta_0 + \beta_1 educ + \beta_2 age + \beta_3 exper + \beta_4 IQ + \cdots + \beta_k hours + u$$

- Can you **interpret** this model? Do you care about the interpretability?
- Can you make **predictions** using your model?
- Can you make this functional form more flexible? What are the caveats?

A different example

- Cat vs dog classification problem (image recognition)



- Do you really care about interpretability of the model here?
- What about accuracy of your predictions?

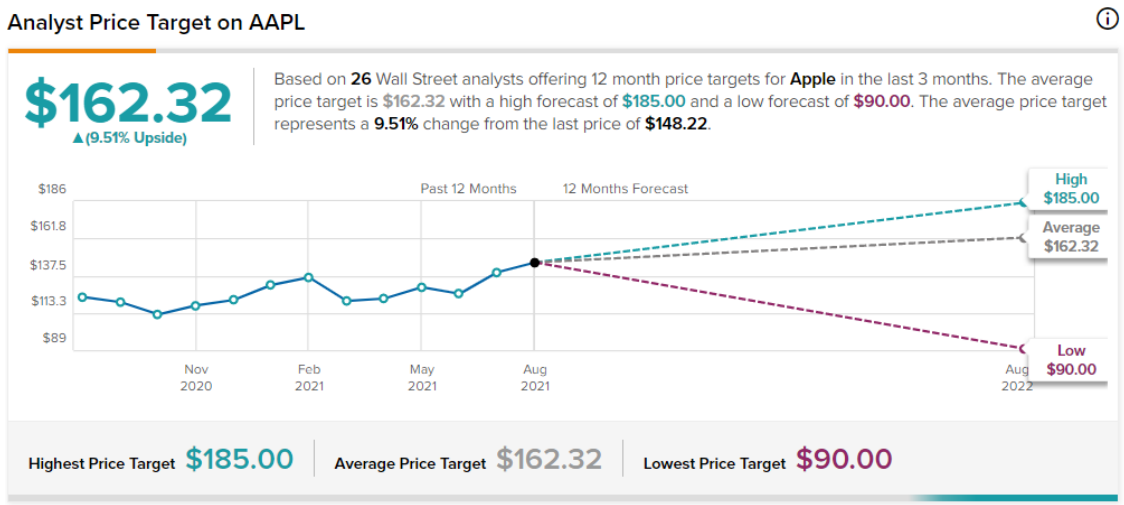
Statistical learning vs machine learning

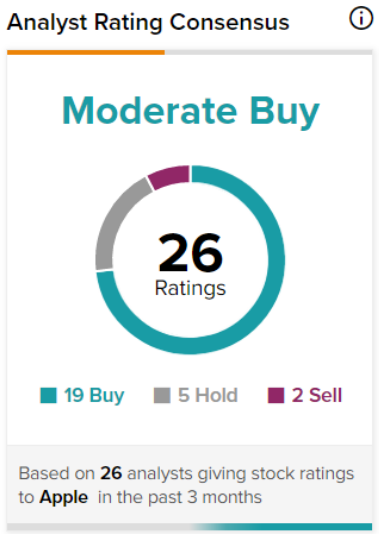
	Statistical Learning	**Machine Learning**
Focus	Hypothesis testing & interpretability	Predictive accuracy
Driver	Math, theory, hypothesis	Fitting data
Data size	Any reasonable set	Big data
Data type	Structured	Structured, unstructured, semi-structured
Dimensions / scalability	Mostly low dimensional data	High dimensional data
Model choice	Parameter significance & in-sample goodness of fit	Cross-validation of predictive accuracy on partitions of data
Interpretability	High	Low
Strength	Understand **causal** relationship & behavior	Prediction (forecasting and nowcasting)

A more complex example

Apple stock price prediction

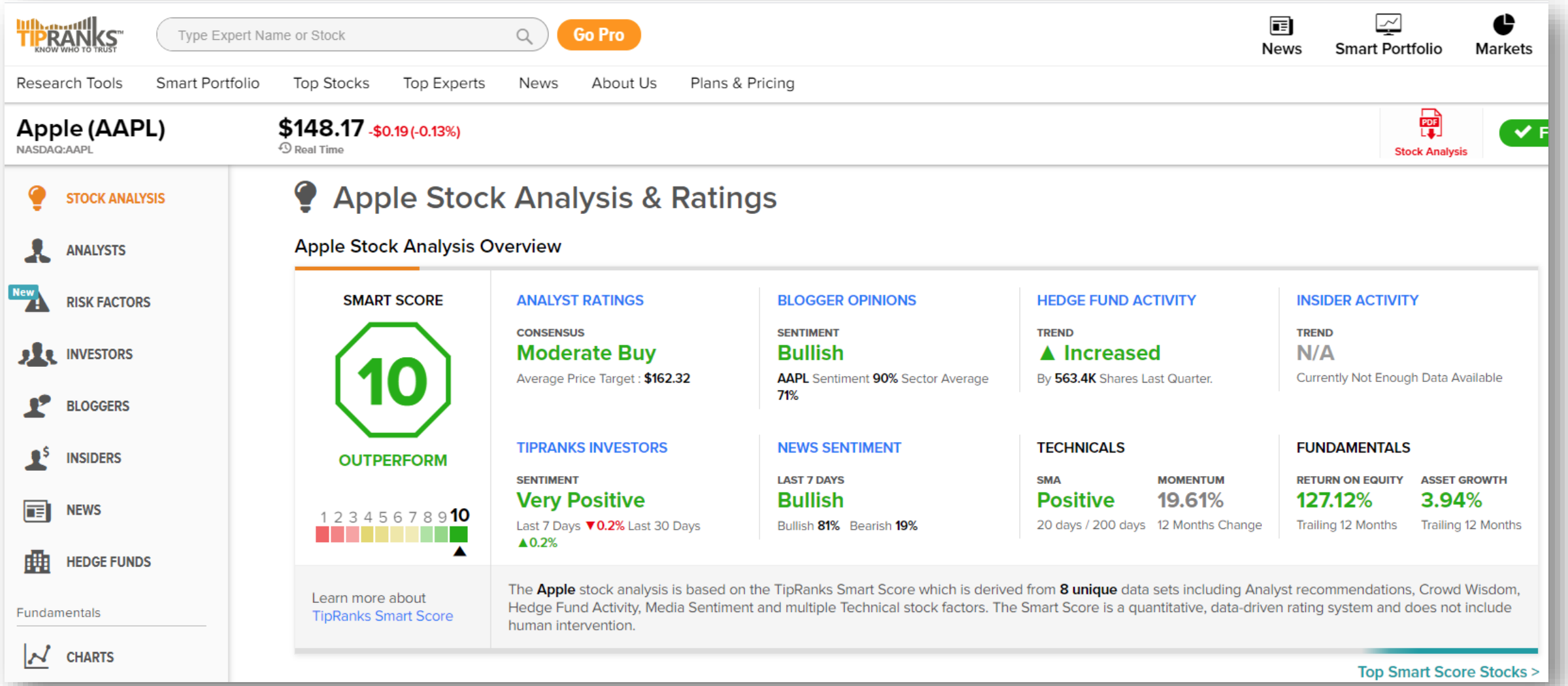
- What are the classical drivers:
  - Company's fundamentals (balance sheet, income statement, cash flow statement)
  - Competitors (comparing multiples)
  - Technical analysis!
  - Seasonality (holidays, months, days, …)





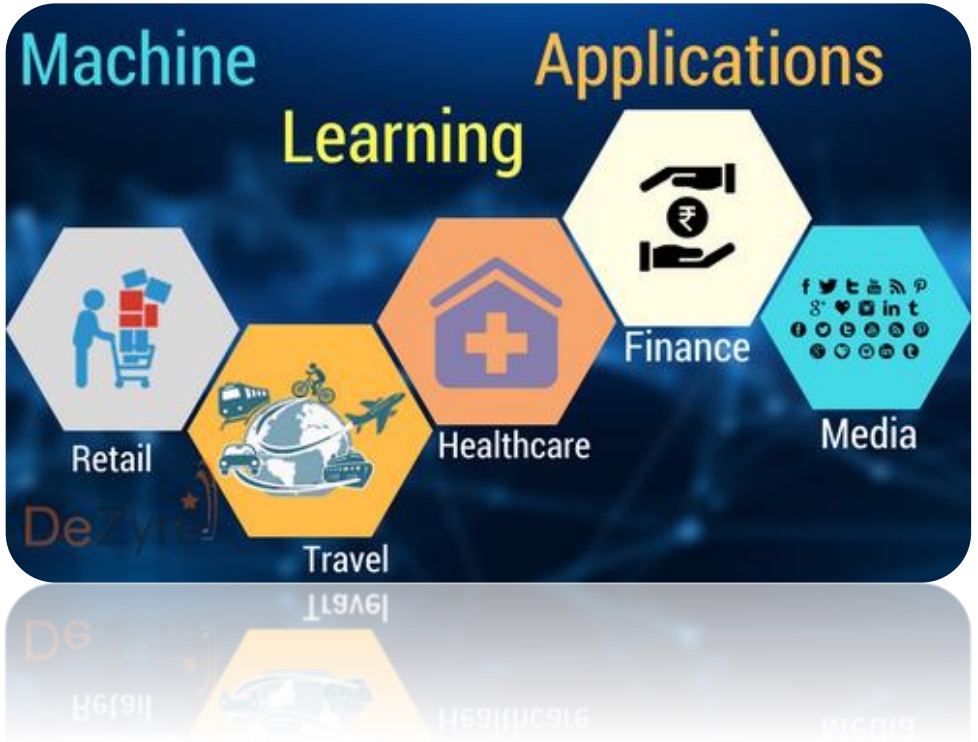
What else?

- Market sentiment (news, tweets, blogger opinions, conference calls, …)
- Satellite images from Apple store parking lots!

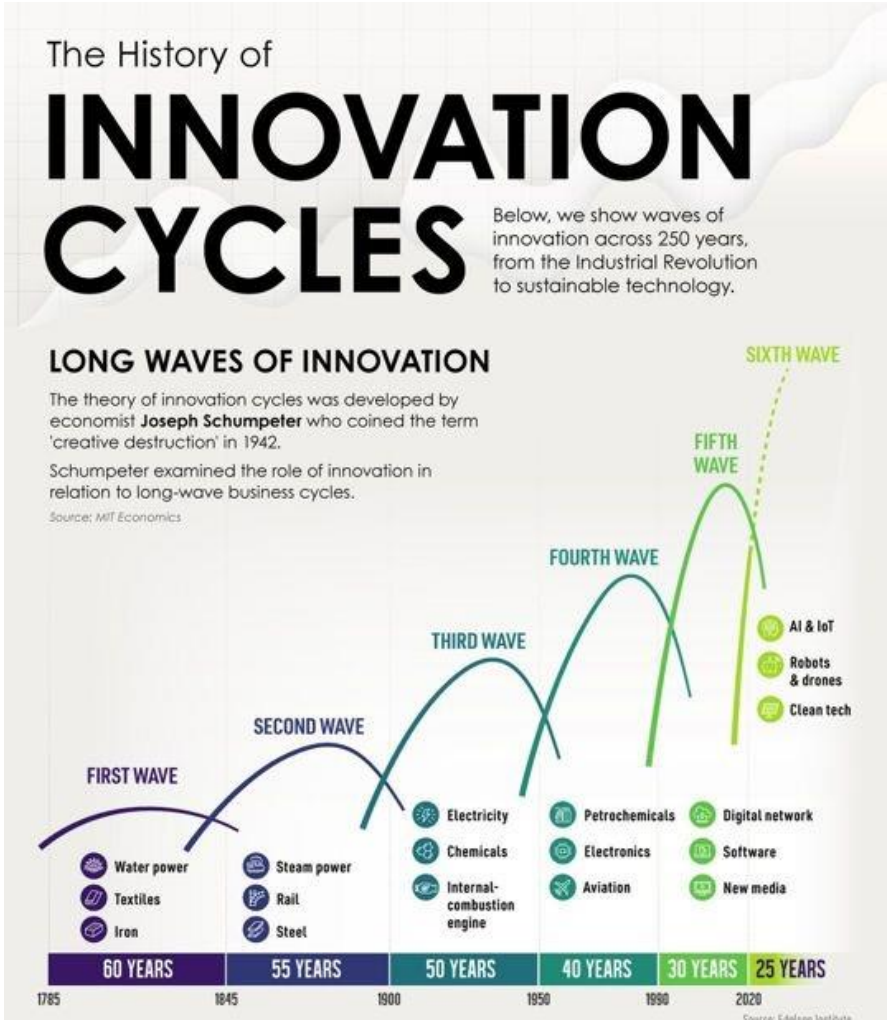

TIPRANKS
KNOW WHO TO TRUST
Type Expert Name or Stock
Go Pro
News
Smart Portfolio
Markets
Research Tools
Smart Portfolio
Top Stocks
Top Experts
News
About Us
Plans & Pricing
Apple (AAPL)
NASDAQ:AAPL
$148.17 -$0.19 (-0.13%)
Real Time
Stock Analysis
STOCK ANALYSIS
ANALYSTS
New
RISK FACTORS
INVESTORS
BLOGGERS
INSIDERS
NEWS
HEDGE FUNDS
Fundamentals
CHARTS
Apple Stock Analysis & Ratings
Apple Stock Analysis Overview
SMART SCORE
10
OUTPERFORM
1 2 3 4 5 6 7 8 9 10
ANALYST RATINGS
CONSENSUS
Moderate Buy
Average Price Target : $162.32
BLOGGER OPINIONS
SENTIMENT
Bullish
AAPL Sentiment 90% Sector Average 71%
HEDGE FUND ACTIVITY
TREND
▲ Increased
By 563.4K Shares Last Quarter.
INSIDER ACTIVITY
TREND
N/A
Currently Not Enough Data Available
TIPRANKS INVESTORS
SENTIMENT
Very Positive
Last 7 Days ▼0.2% Last 30 Days ▲0.2%
NEWS SENTIMENT
LAST 7 DAYS
Bullish
Bullish 81% Bearish 19%
TECHNICALS
SMA
Positive
20 days / 200 days
MOMENTUM
19.61%
12 Months Change
FUNDAMENTALS
RETURN ON EQUITY
127.12%
Trailing 12 Months
ASSET GROWTH
3.94%
Trailing 12 Months
Learn more about TipRanks Smart Score
The Apple stock analysis is based on the TipRanks Smart Score which is derived from 8 unique data sets including Analyst recommendations, Crowd Wisdom, Hedge Fund Activity, Media Sentiment and multiple Technical stock factors. The Smart Score is a quantitative, data-driven rating system and does not include human intervention.
Top Smart Score Stocks >

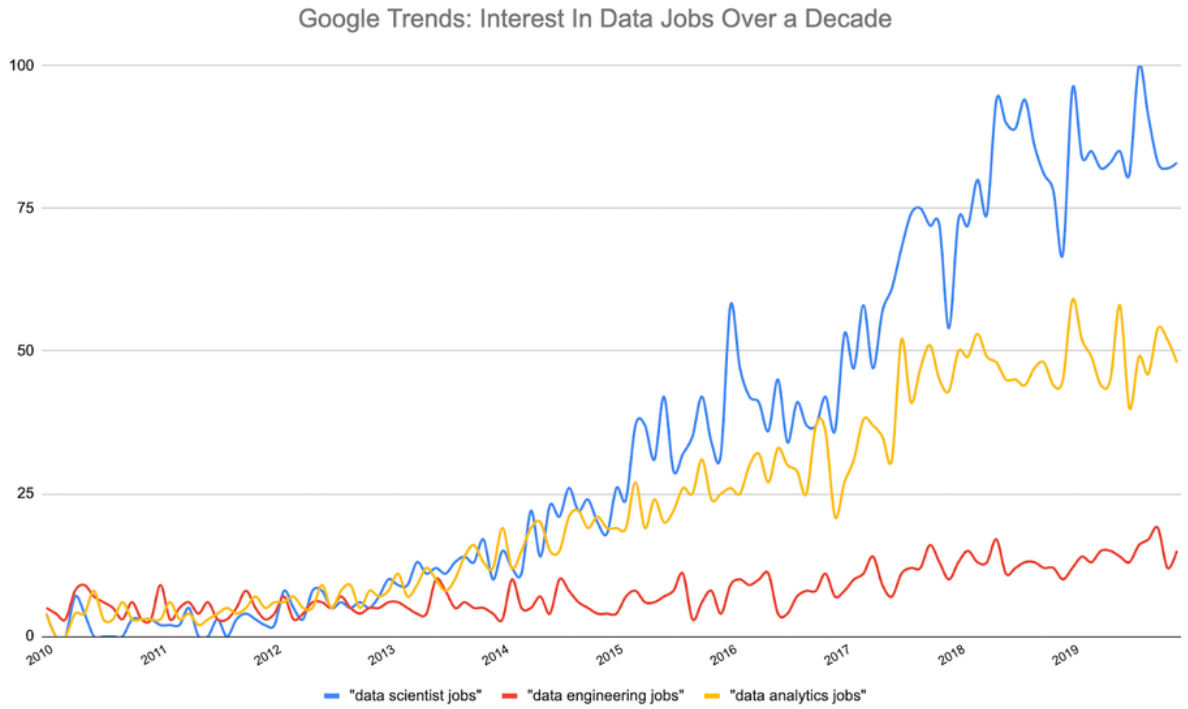
Why should I learn it?

- It’s a bid deal
- ML is closely linked to data science
- Better Career Opportunities
- Better salaries
- Hedge against next recession



Why should I learn it?





You will be surprised to see what you can do when someone is counting on you!

I am counting on YOU