Class 1- Welcome to the world of Machine Learning

This is me!

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Department(s):

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Curriculum Vitae

Education

PhD, Economics, Arizona State University, 2017

Master, Economics, Simon Fraser University, 2013

MBA, Sharif University, 2012

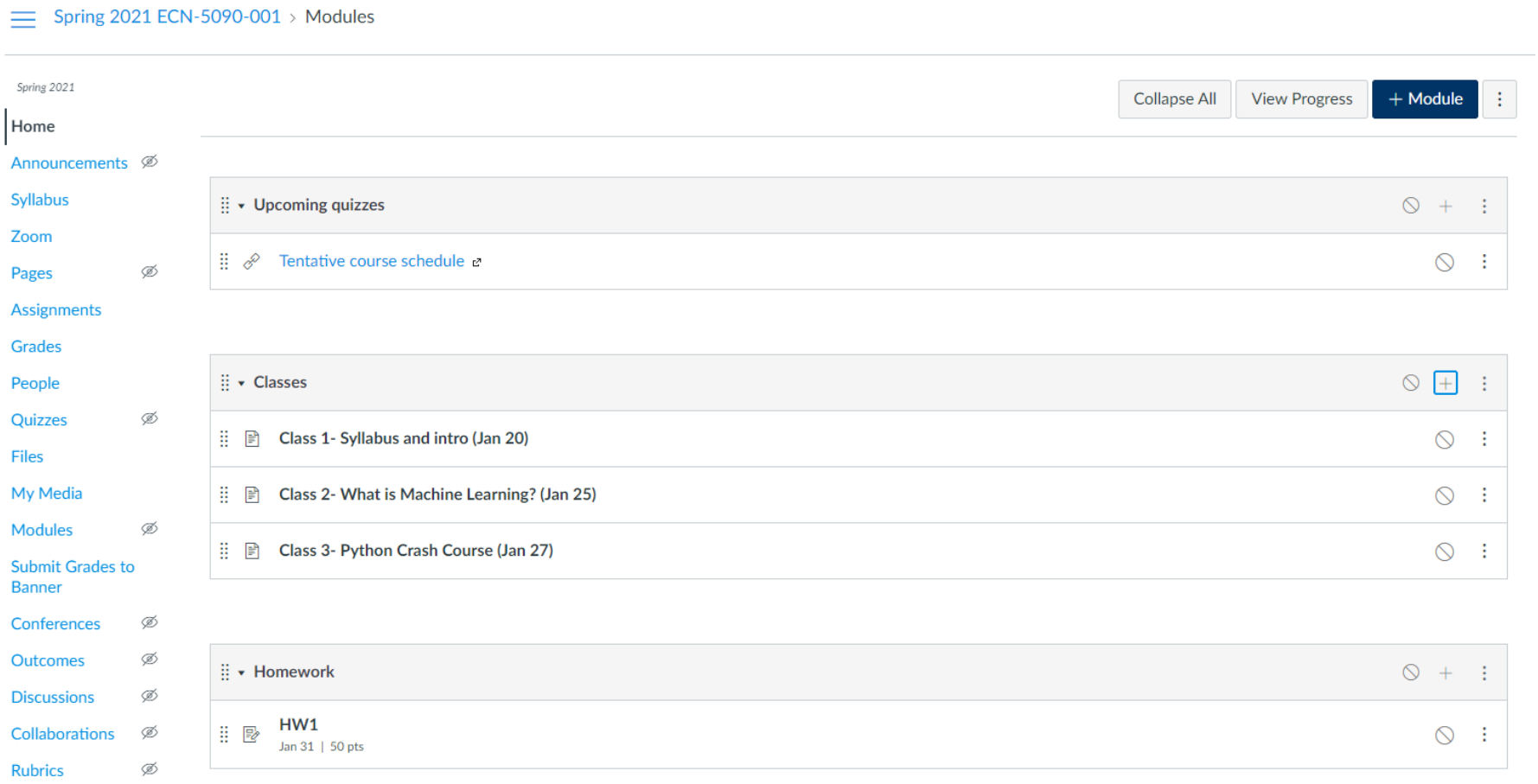
Industrial Engineering, IUST, 2009

Biography

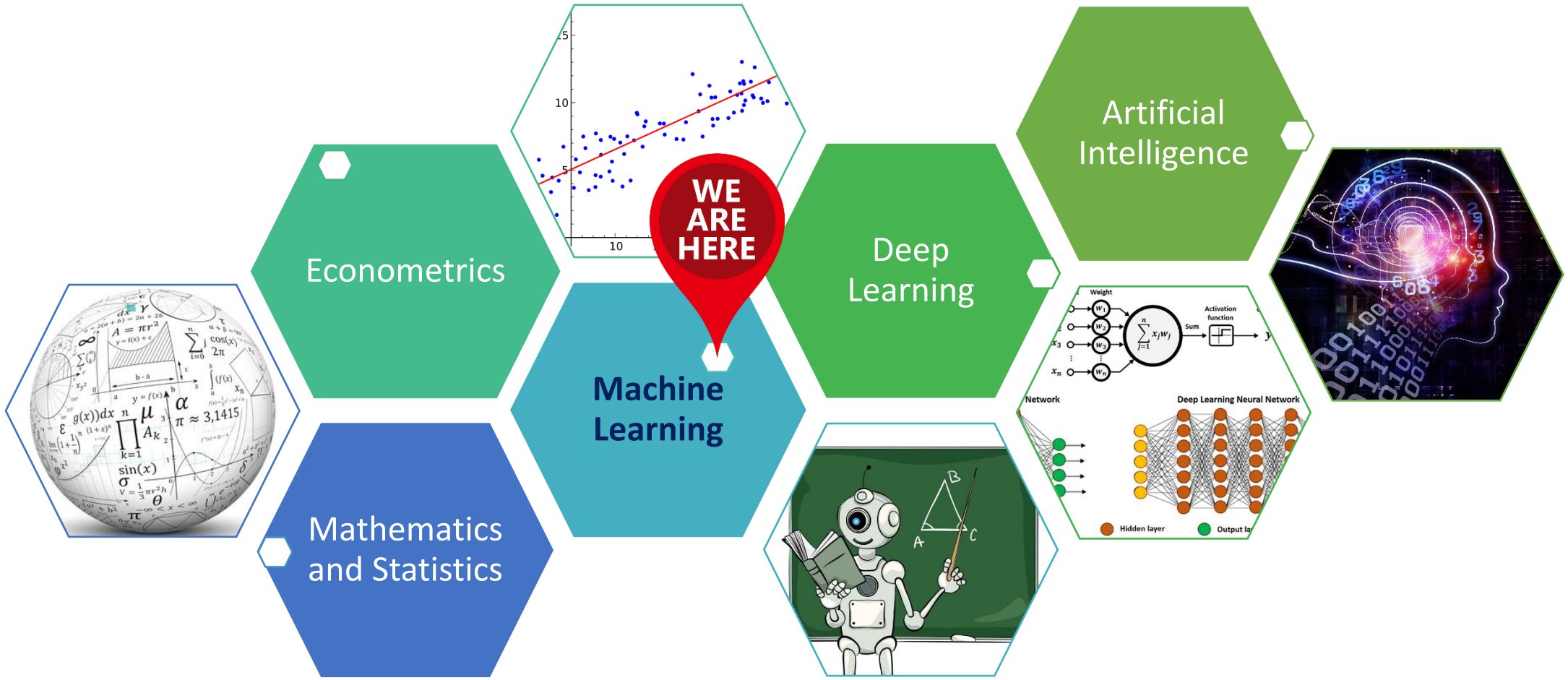
Pedram Jahangiry, PhD, CFA, is an assistant professor in the Economics and Finance Department of the Jon M. Huntsman School of Business at Utah State University. Prior to joining the Huntsman School in 2018, Pedram was a research associate within Financial Modeling Group at BlackRock NYC. His research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

Who are you?

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

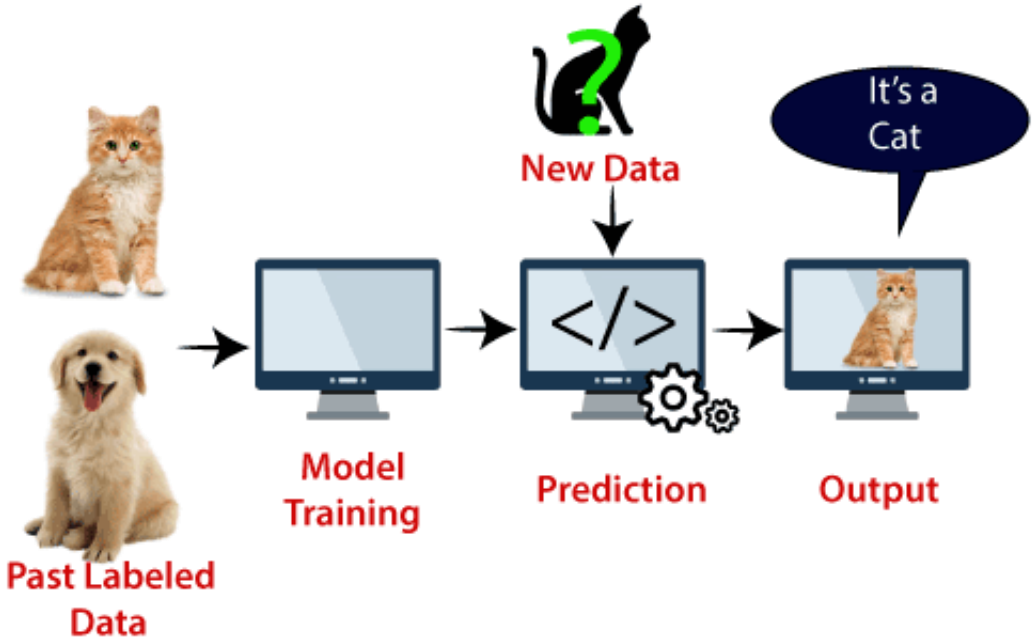
- Let's see if we can predict your future salary! (is there a theory?)
- What are the drivers:
  - Education, age, experience, IQ, …
  - Ethnicity, race, gender, …
  - Industry, location, working hours, …
- Let's build a model (assuming a linear functional form!)

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

- 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)

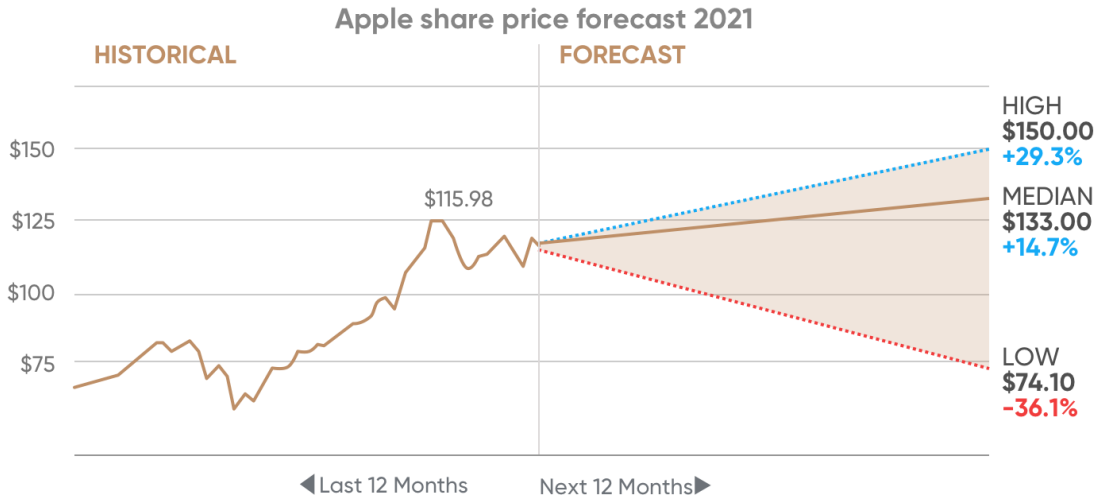


- Do you really care about interpretability of the model here?
- What about accuracy of your predictions?

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)

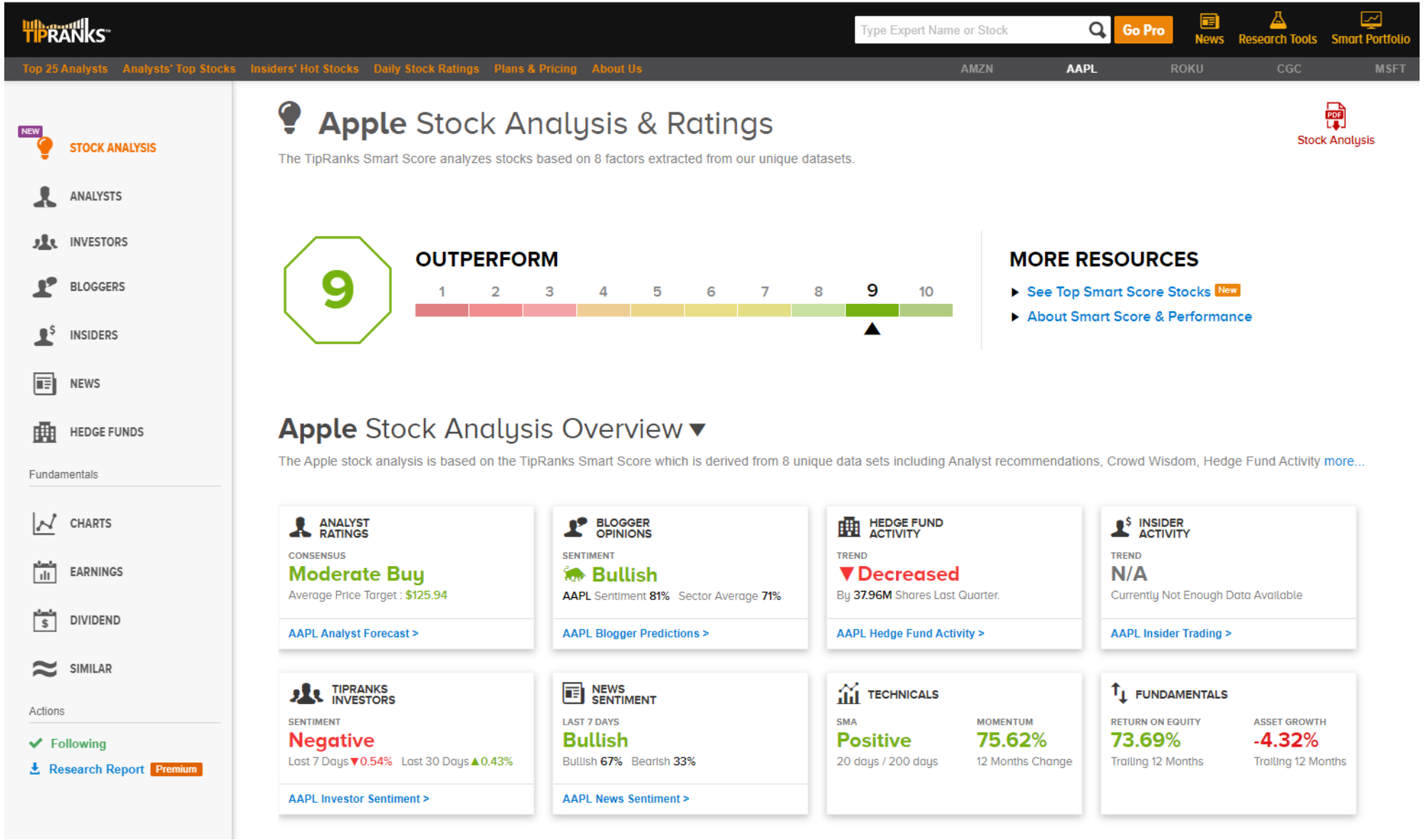
A more complex example



Apple stock price prediction

- What are the 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!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Fundamentals
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Research Report
Premium
Apple Stock Analysis & Ratings
The TipRanks Smart Score analyzes stocks based on 8 factors extracted from our unique datasets.
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Apple Stock Analysis Overview
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 more...
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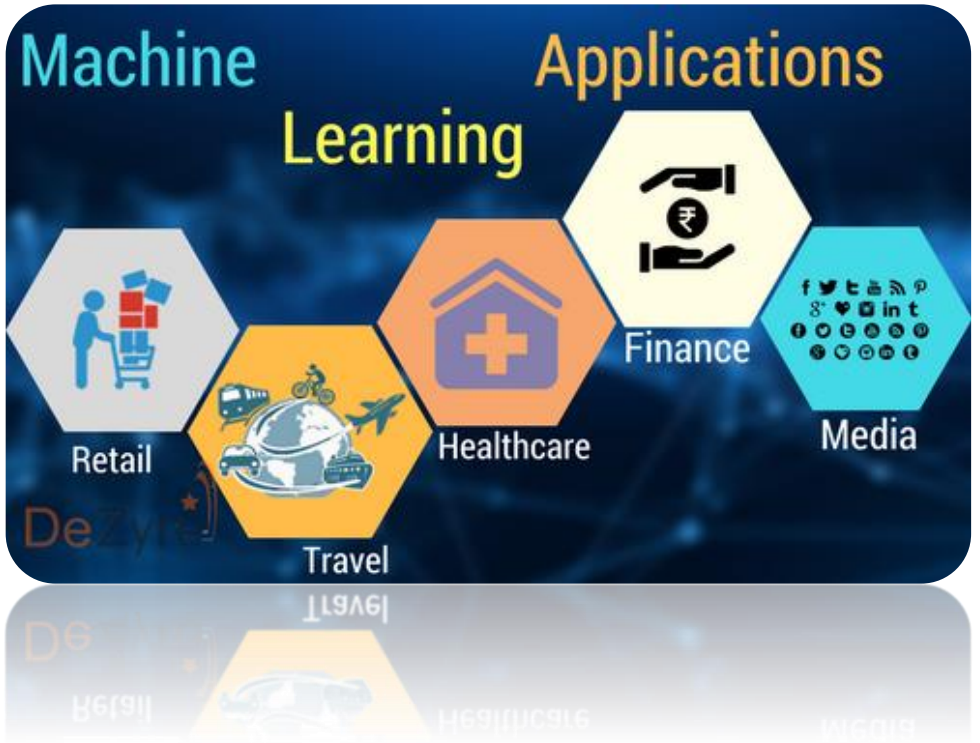
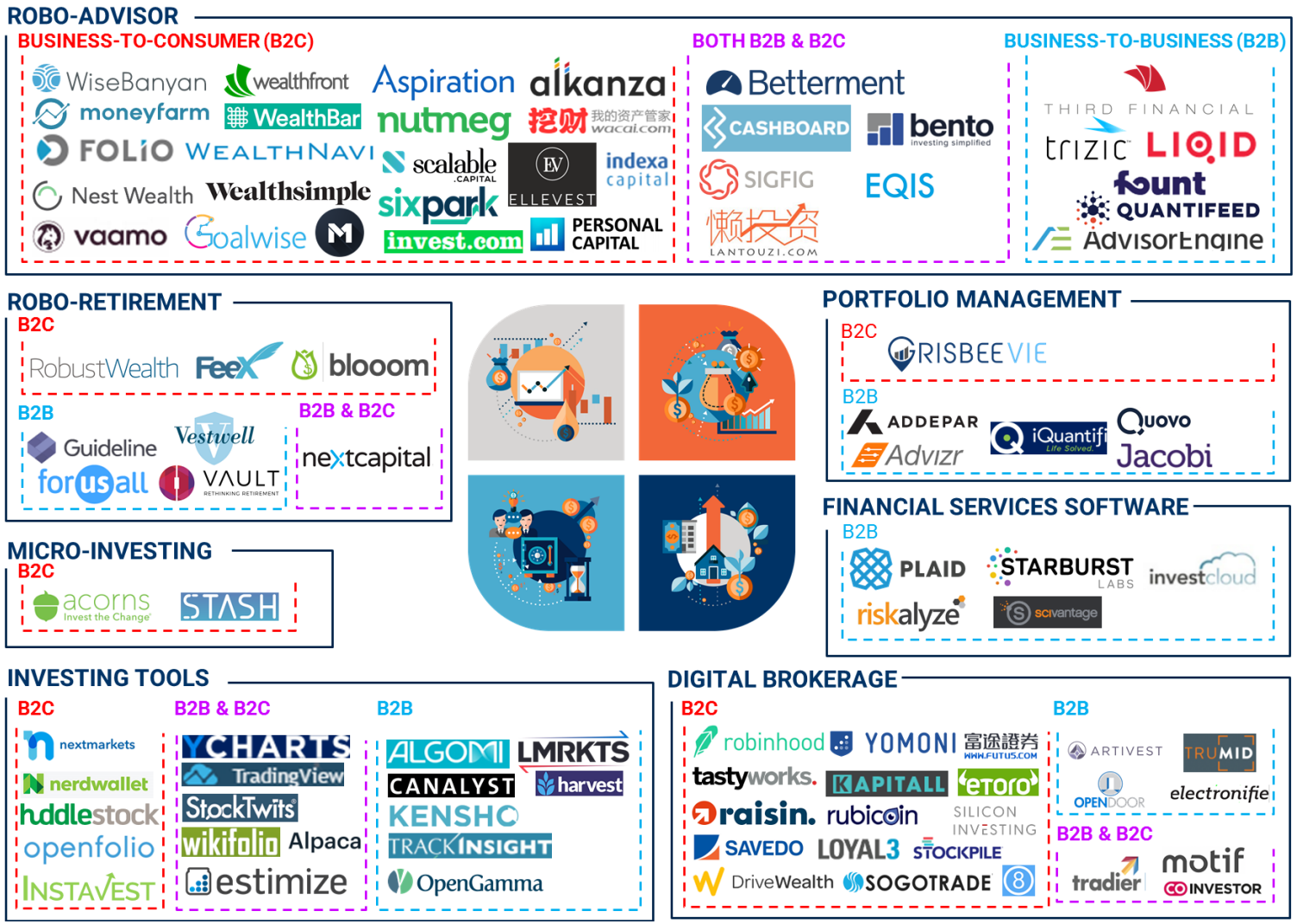
CONSENSUS
Moderate Buy
Average Price Target : $125.94
AAPL Analyst Forecast >
BLOGGER OPINIONS
SENTIMENT
Bullish
AAPL Sentiment 81% Sector Average 71%
AAPL Blogger Predictions >
HEDGE FUND ACTIVITY
TREND
Decreased
By 37.96M Shares Last Quarter.
AAPL Hedge Fund Activity >
INSIDER ACTIVITY
TREND
N/A
Currently Not Enough Data Available
AAPL Insider Trading >
TIPRANKS INVESTORS
SENTIMENT
Negative
Last 7 Days ▼0.54% Last 30 Days ▲0.43%
AAPL Investor Sentiment >
NEWS SENTIMENT
LAST 7 DAYS
Bullish
Bullish 67% Bearish 33%
AAPL News Sentiment >
TECHNICALS
SMA
Positive
20 days / 200 days
MOMENTUM
75.62%
12 Months Change
FUNDAMENTALS
RETURN ON EQUITY
73.69%
Trailing 12 Months
ASSET GROWTH
-4.32%
Trailing 12 Months

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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