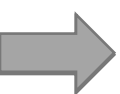


Class 1- Welcome to the world of Machine Learning





This is me!

Pedram Jahangiry

Professional Practice Assistant Professor

Department(s):

Economics and Finance



Contact Information

[!\[\]\(3211b5d1d968fc1665909b34f9f16010_img.jpg\) Eccles Business Building 507](#)

[!\[\]\(6059a5aa8b4ca7bb793408023d6c6e42_img.jpg\) 435.797.2345](#)

[!\[\]\(c50c8b7b2cc2cf9ff925edec0ee94c0d_img.jpg\) pedram.jahangiry@usu.edu](#)

[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!



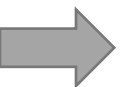
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→ Who are you?





What's on Canvas?

☰ Spring 2021 ECN-5090-001 > Modules

Spring 2021

Collapse All

View Progress

+ Module



Home

Announcements

Syllabus

Zoom

Pages

Assignments

Grades

People

Quizzes

Files

My Media

Modules

Submit Grades to Banner

Conferences

Outcomes

Discussions

Collaborations

Rubrics

▾ Upcoming quizzes



▾ Tentative course schedule



▾ Classes



▾ Class 1- Syllabus and intro (Jan 20)



▾ Class 2- What is Machine Learning? (Jan 25)



▾ Class 3- Python Crash Course (Jan 27)

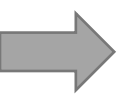


▾ Homework

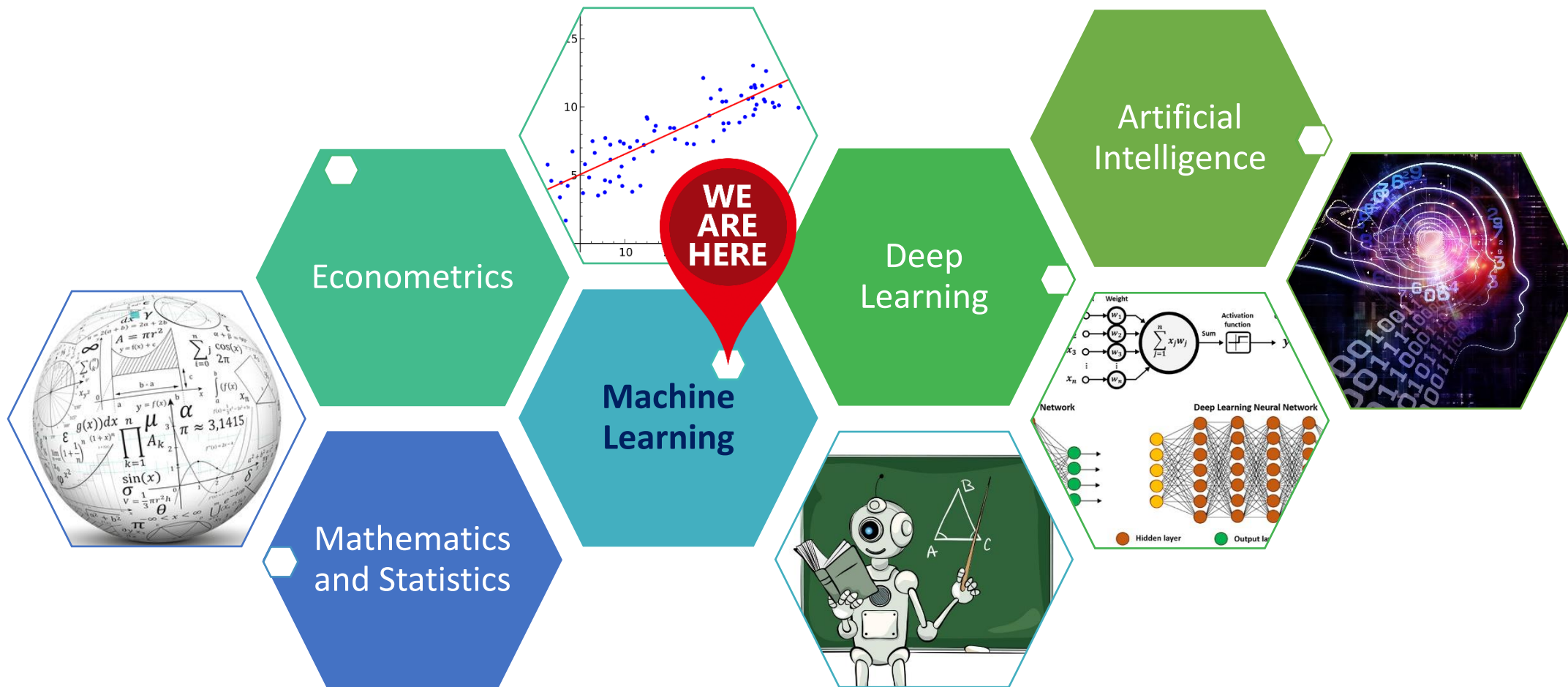


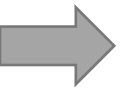
▾ HW1
Jan 31 | 50 pts





Where we are?





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

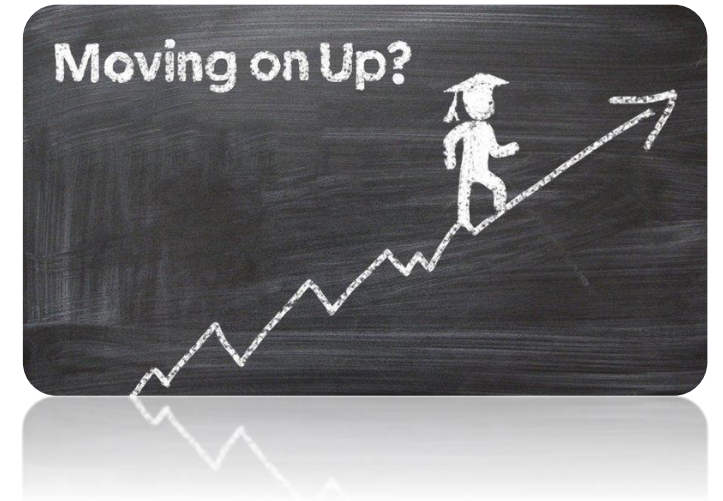
- Sales and advertisement / R&D expenditure / seasonality / industry / ... ?
- Quantity demanded and price / income / technology / price of competitors / ... ?
- Wage and education/ age/ gender/ experience/ ...?

→ 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!)

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

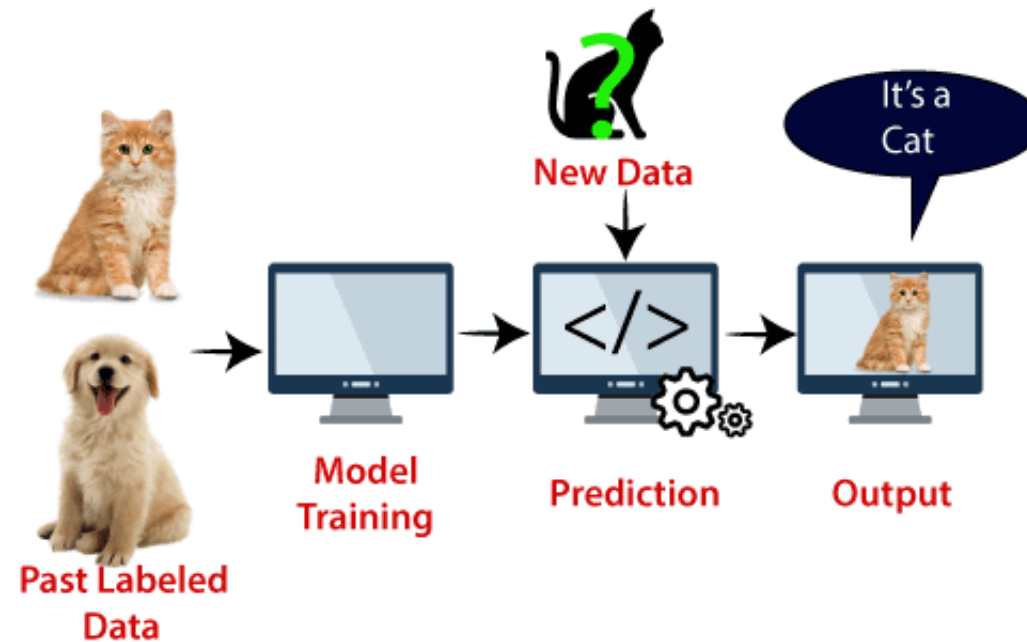
- Can you **interpret** this model? Do you care about the interpretability?
- Can you make **predictions** using your model?
- Can you make this functional form more flexible? What are the caveats?





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**?



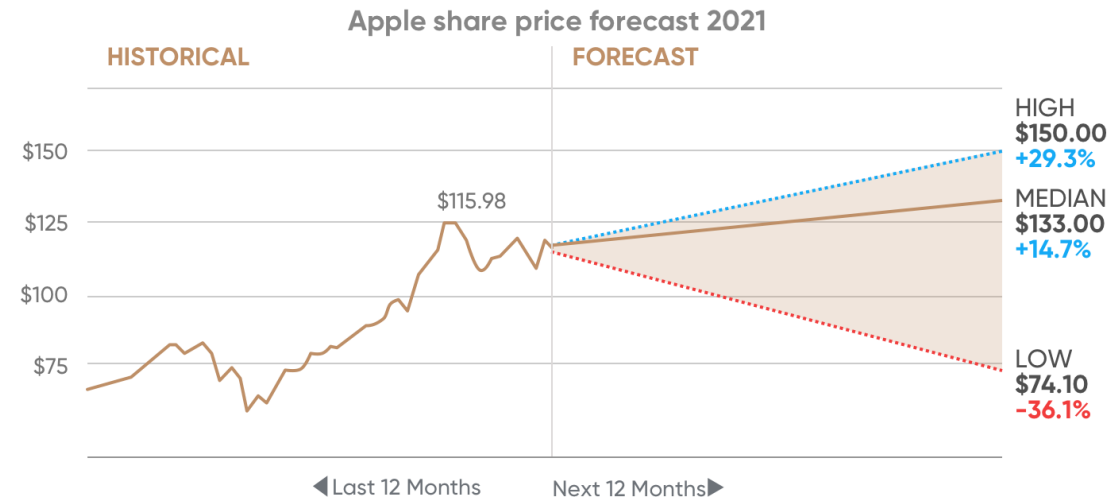
Statistical learning vs machine learning

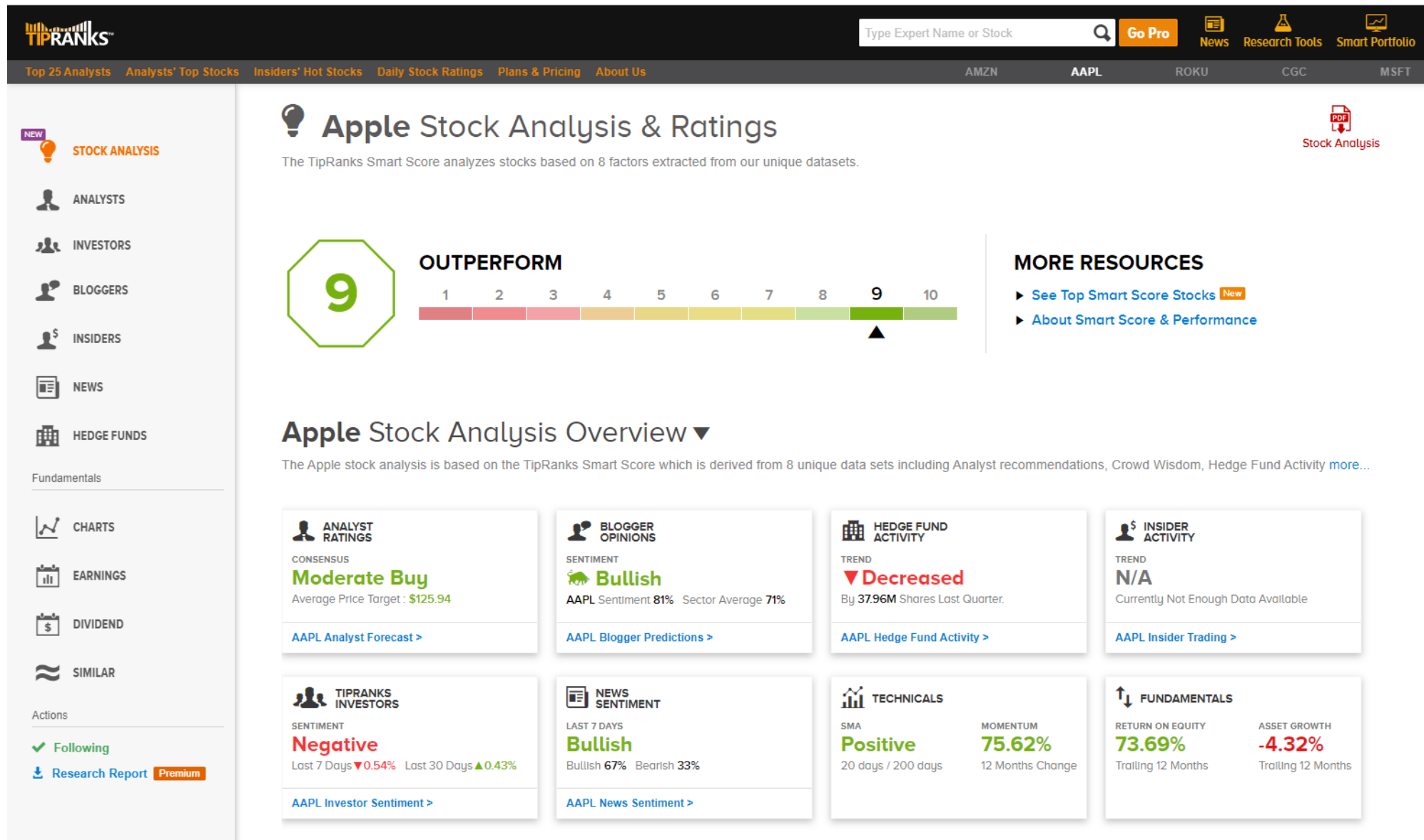
	Statistical Learning	Machine Learning
Focus	Hypothesis testing & interpretability	Predictive accuracy
Driver	Math, theory, hypothesis	Fitting data
Data size	Any reasonable set	Big data
Data type	Structured	Structured, unstructured, semi-structured
Dimensions / scalability	Mostly low dimensional data	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!





➔ 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?

ROBO-ADVISOR

BUSINESS-TO-CONSUMER (B2C)



BOTH B2B & B2C



BUSINESS-TO-BUSINESS (B2B)



ROBO-RETIREMENT

B2C



B2B



B2B & B2C



PORTFOLIO MANAGEMENT

B2C



B2B



FINANCIAL SERVICES SOFTWARE

B2B



MICRO-INVESTING

B2C



INVESTING TOOLS

B2C



B2B & B2C



B2B



DIGITAL BROKERAGE

B2C



B2B

