



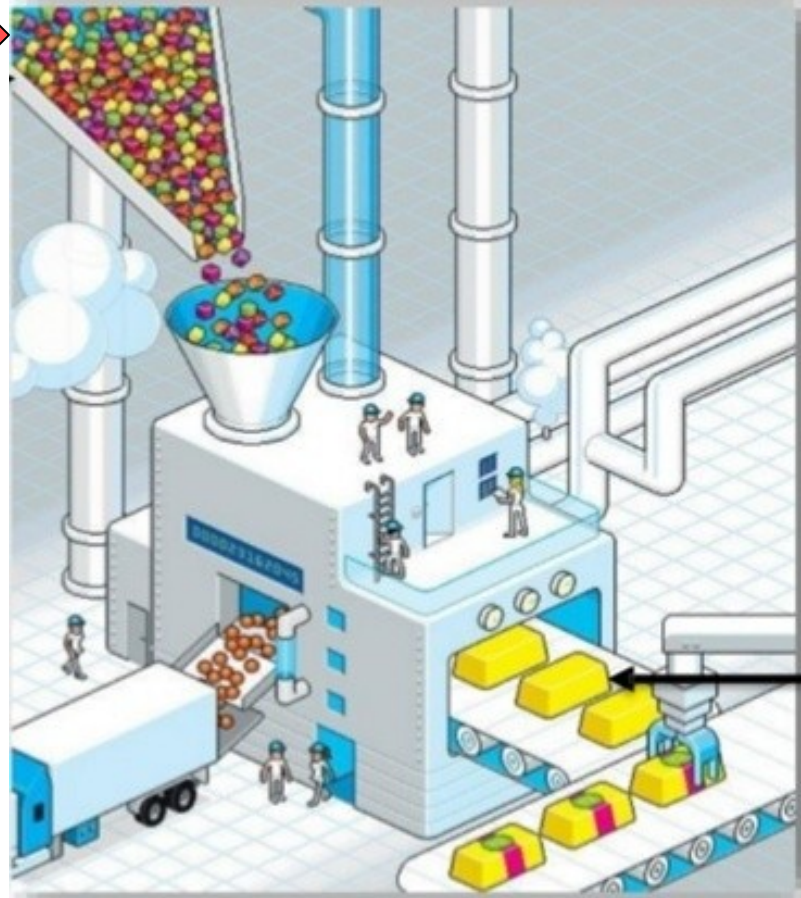
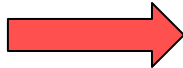
Data Science

IICT Lecture 11



What is Big Data?

Lots of
Data
(Terabytes
or
Petabytes)



Enterprises/
Companies
achieve related
amount of
information and
business insights

Big Data Scenarios



ESPN cricinfo 25 Live scores Series Teams Features Videos Stats

TOP EVENTS ▾

PAK v NZ **Lunch** NZ 153 & 249 T20 World Cup Result ENG-W 115/8 SA-W


PAK 227 & 130/4 (37.3 ov, target 176) WI-W 117/6 (19.3/20 ov, target 116) BD-W 79/5 (20 ov, Result)

1ST TEST, ABU DHABI

Lunch
1st Test, New Zealand tour of United Arab Emirates at Abu Dhabi, Nov 16-20 2018

New Zealand 153 & 249
Pakistan 227 & 130/4 (37.3 ov, target 176)

Day 4: Pakistan require another 46 runs with 6 wickets remaining



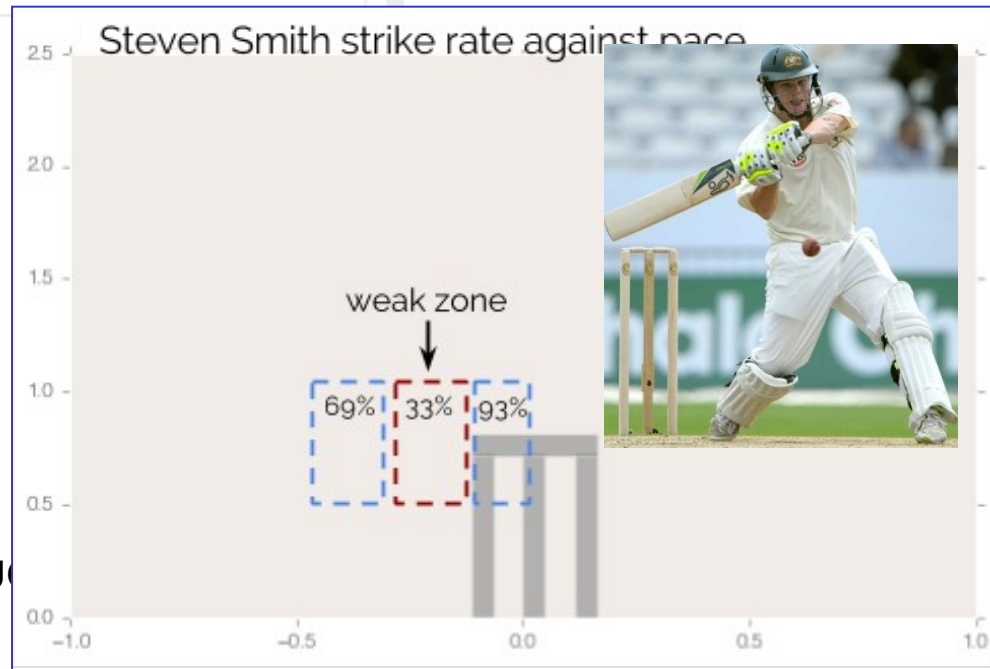
Wagner gets Shafiq as Pakistan inch closer to victory

Pakistan v New Zealand
 Australia v South Africa
 Australia v India
 Sri Lanka v England
 Bangladesh v Zimbabwe
 Bangladesh v West Indies
 Pakistan A v England Lions
 Mzansi Super League
 World Cup
 QEA Trophy
 ICC Women's Championship

Info: Sports

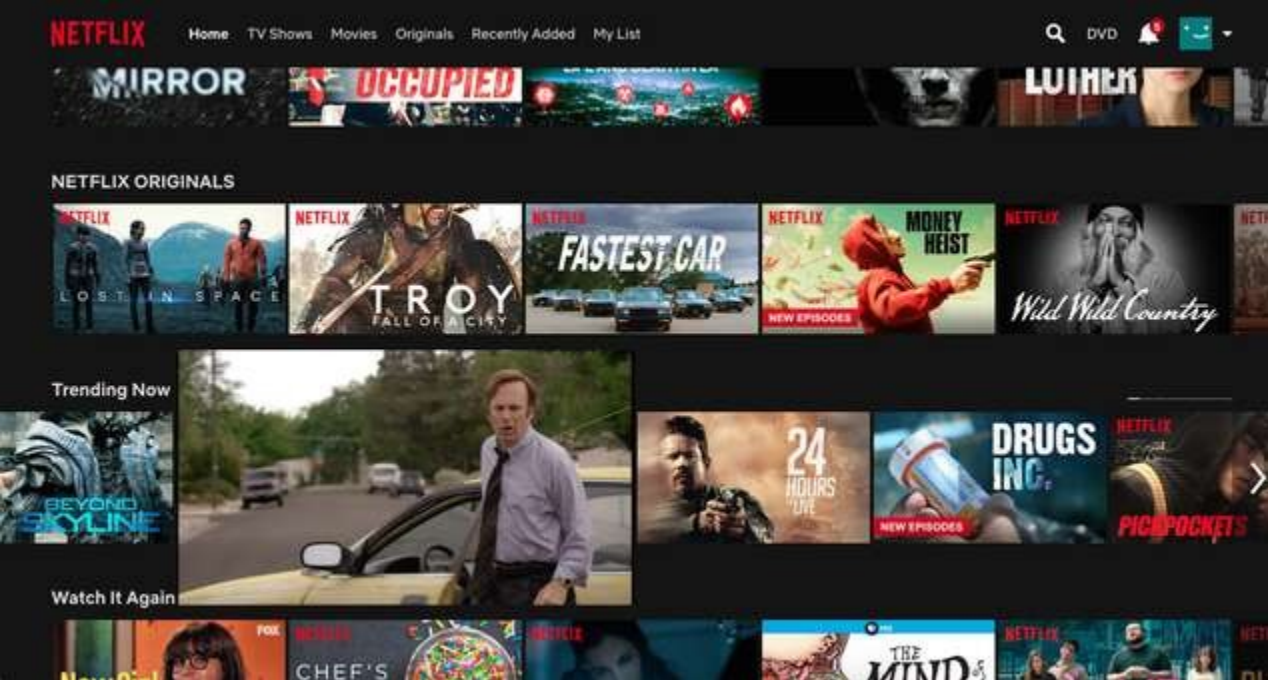
- Ticketing companies used big data to track ticket Sales
- Sports Teams are using data for tracking team strategies

FAST NU



Hospital Care

- Hospitals are analyzing medical data and patient records to predict those patients that are likely to seek readmission within a few months of discharge.
- Medical diagnostics company analyzes previous existing data to develop non-intrusive test for predicting coronary artery diseases, lung cancers, brain tumors and so on



NetFlix

- Netflix, Inc. is an American media-services provider headquartered in Los Gatos, California
- Uses 1 Petabyte to store the videos for streaming
(According to the Motion Picture Association of America, the number fluctuates, but the average seems to be around **600** movies created in the US every year)
- 1 Petabyte of average MP3-Encoded songs (for mobile, roughly one megabyte per minute), would require 2000 years to play
- Movies recommendation





Large Hadron Collider (CERN Franco-Swiss)

- The **Large Hadron Collider (LHC)** is the world's largest and most powerful **particle collider** and the largest machine in the world.
- The LHC consists of a 27-kilometre ring of superconducting magnets with a number of accelerating structures to boost the energy of the particles along the way.
- The experiments in the LHC produce about 15 petabytes of data per year, which are distributed over the Worldwide LHC Computing Grid

And many more

- Predict Traffic given a time and location
- Facebook's friends suggestions, Image automatic annotations....etc.
- Real time soccer Analytics
- ...

What can Data do?



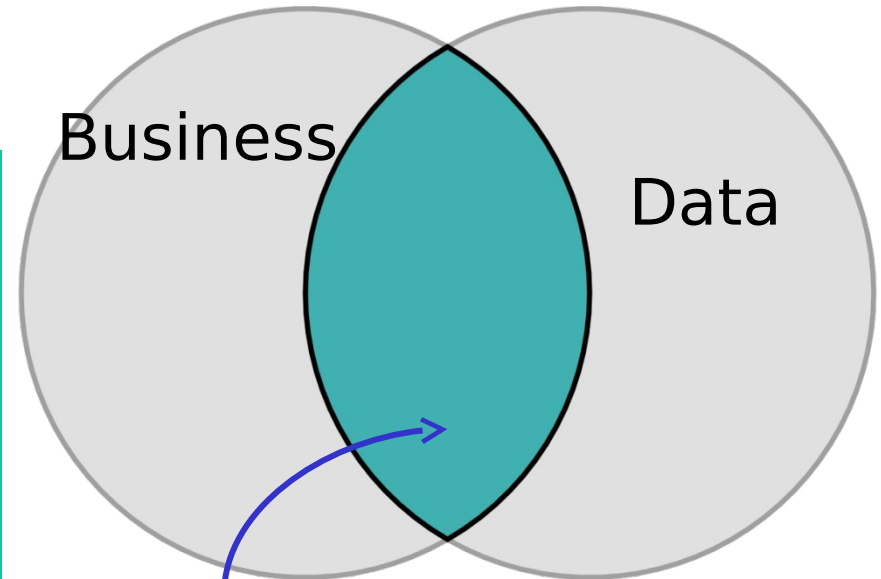


What is Data Science?

- Data science is a multifaceted field used to gain insights from complex data. [MITx]
- **Data science** is an interdisciplinary field that uses **scientific methods**, **processes**, **algorithms** and **systems** to extract **knowledge** and **insights** from **data** in various forms, both structured and unstructured. [Wikipedia]
- **Data science** is the study of where information comes from, what it represents and how it can be turned into a valuable resource in the creation of business and IT strategies

What can Data Science do for business?

Data Science! Extracting useful information and knowledge from large volumes of data in order to improve business decision-making or providing the business insights to make data-driven decisions



Other applications of Data Science

fitbit



amazon

amazon.com

Recommended for You

Amazon.com has new recommendations for you based on items you purchased or told us you own.



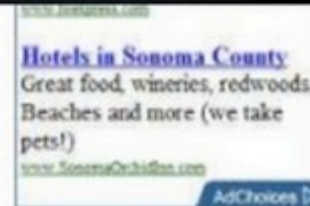
flu tracker



traffic



SIRI



ads

What Data Science Involve?

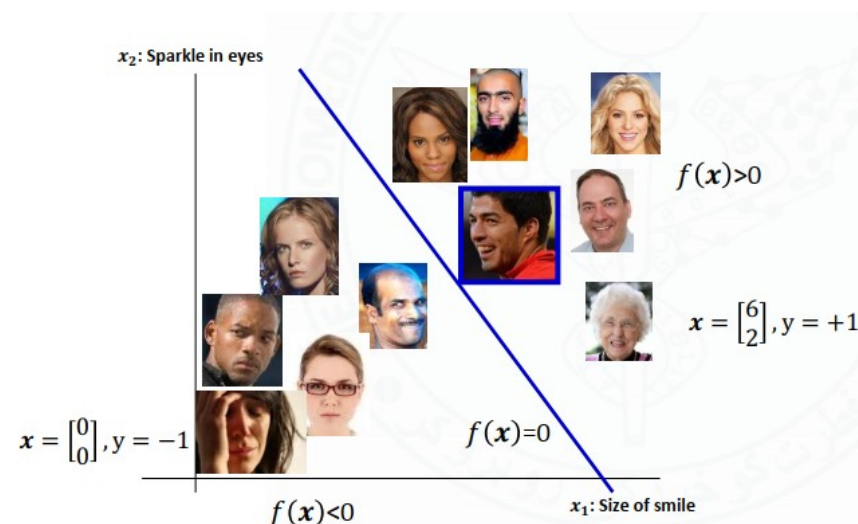
- Math and Statistics Knowledge
- Machine Learning
- Data Analysis
- Moreover, It employs techniques and theories drawn from many fields within the context of mathematics, statistics, information science, and computer science.

Machine Learning

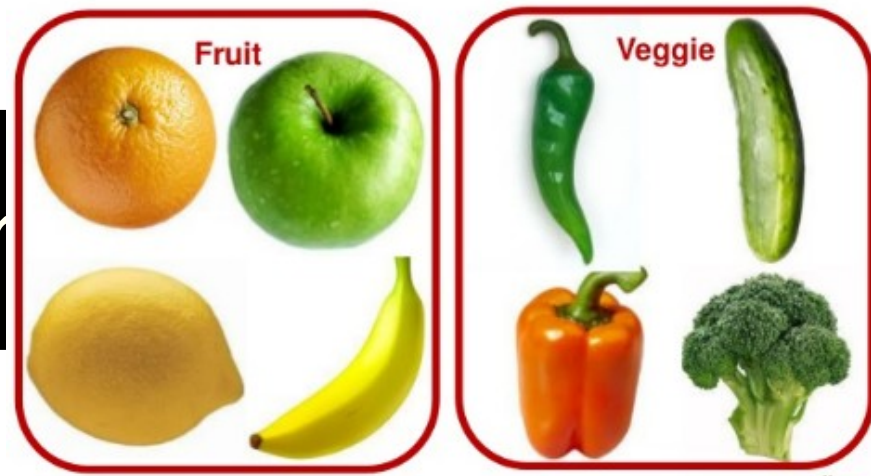
- **Machine learning** focuses on the development of computer programs that can access data and use it to learn for themselves.
- Machine Learning programs are also designed to learn and improve over time when exposed to new data

Supervised Learning

- Definition:
 - Where a program is “trained” on a pre-defined dataset. Based off its training data the program can make accurate decisions when given new data.
- Business Application
 - Classifying Twitter sentiment
 - Recommender systems



Unsupervised Learning

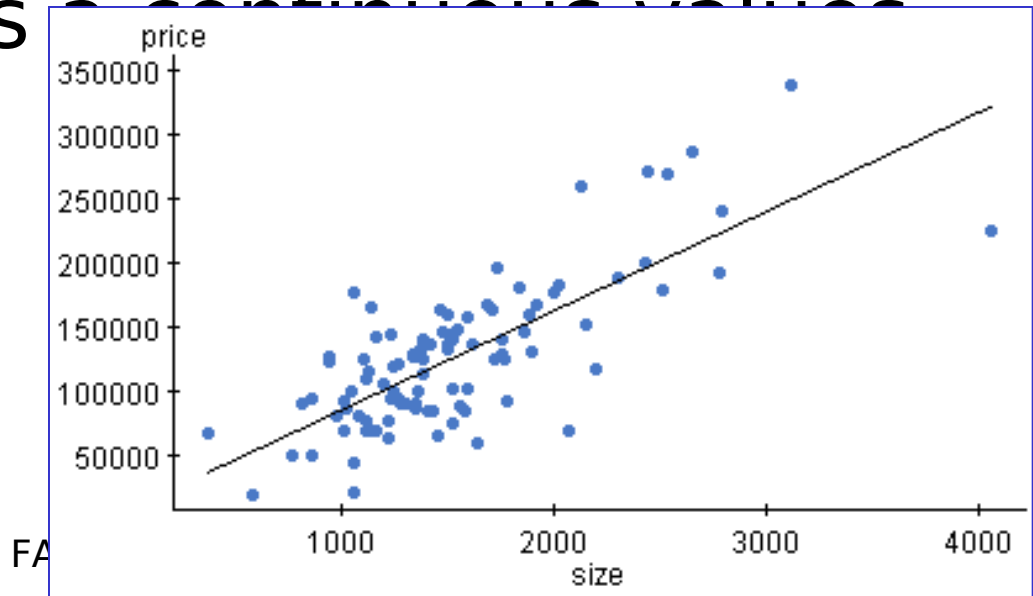


- Definition
 - Where a program, given a dataset, can automatically find patterns and relationships within the dataset.
 - Clustering or grouping of like data.
- Business Application
 - Customer segmentation
 - Understanding users and Behaviors
 - Classifying unknown and predefined images into categories

Regression

- Sub-category of Supervised Learning
- Regression is a type of algorithm that predicts continuous values

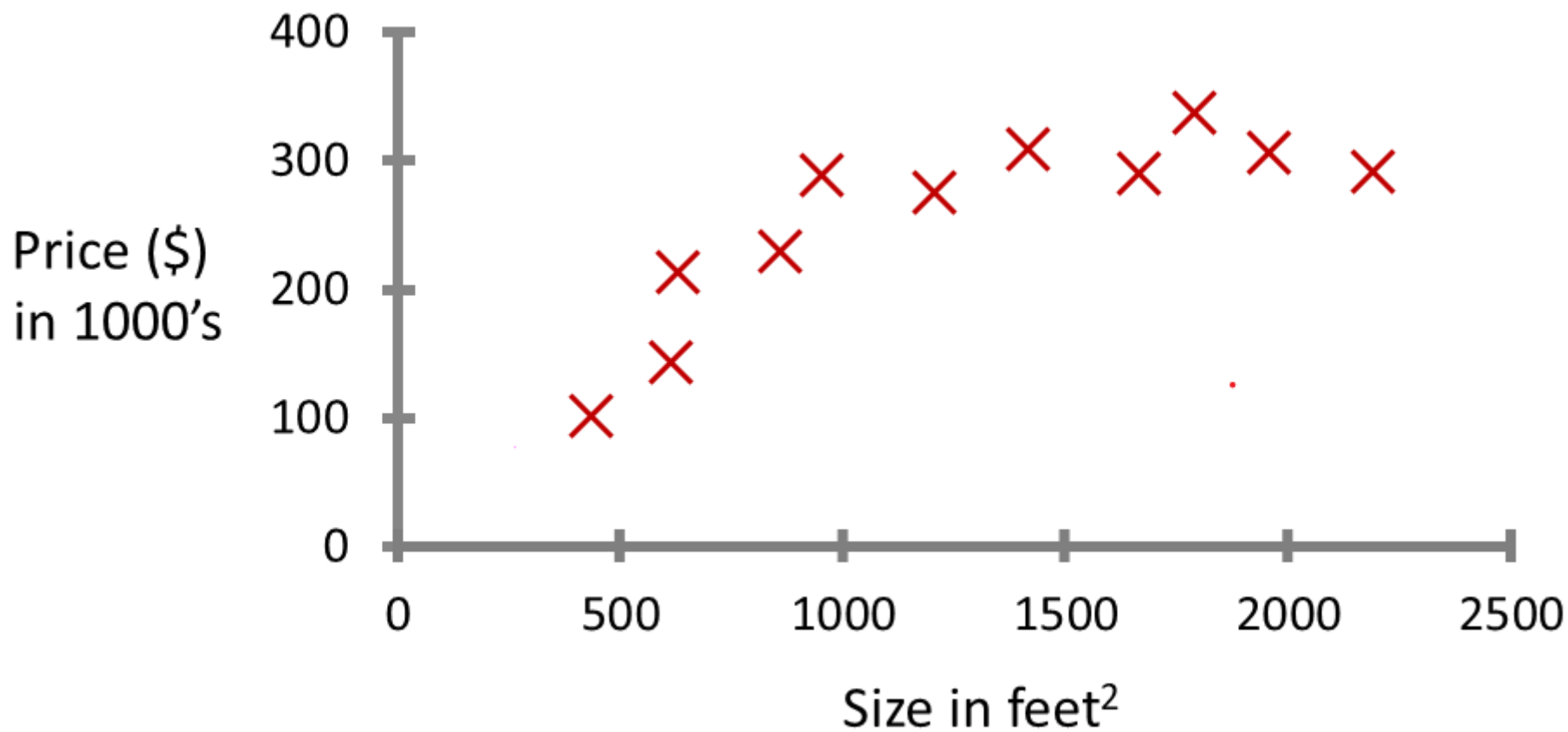
Plot prices with
relative to
increase in area



Activity 1

- Go to following link
 - <http://www.shodor.org/interactivate/activities/Regression/>
 - Plot the following data (next slide)
 - Click on display line of best fit





Activity 2

- Go to following link
 - <https://playground.tensorflow.org>
 - Click on first option under “DATA”
 - Make sure HIDDEN LAYERS value 2 (by using + and – sign)
 - Make sure at first layer value is **4 neurons** and at second layer value is **2 neurons**
 - Click on play button and wait for sometime
 - Repeat for 3rd option under “DATA”

End of the Lecture

