My Background

➢ Who Am I

➢ What I plan to do

➢ AI Inspire Platform

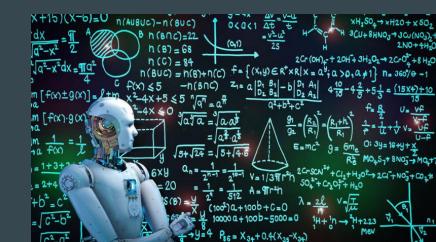 ○ ai-inspire.com

Introduction to Artificial Intelligence

What is AI?

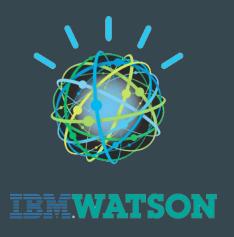➤ Is this completely NEW?

➤ Field of study : Branch of computer science & math

➤ Objective : create intelligence machines

  ○ Training machines

  ○ Identifying patterns & making models

  ○ Discrete Math : Algorithm analysis
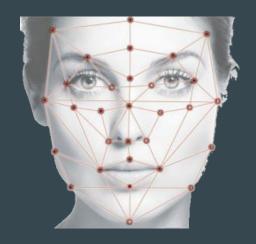
➤ End goal : extend human capabilities

AI Around Us

- Assistants
  - Siri
  - Alexa
  - Watson
  - Galaxy
  - Cortana
- Gmail spam folder
- Snapchat filters
- Fake news filters
- Face Recognition

Importance

➢ Broadly used in all diverse fields of study
  ○ Real world applications
➢ Achieve more
  ○ Friendly user interface
  ○ Optimizing pre-existing models
  ○ Analyzing data + predicting future
➢ Motivates R&D
  ○ Innovation

Learning AI

➢ Learn Java
➢ Learn algos & data structures
➢ Learn core AI concepts
➢ Learn 1 statistical-based language : Python or R
  ○ Learn some stats
★ Take part in competitions
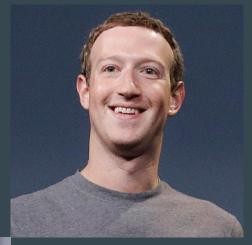 ○ Kaggle - D.S.
★ Make own AI chatbot with NLP!!!!

Entrepreneurs

➢ PRO
  ○ Bill Gates
  ○ Jeff Bezos
  ○ Sundar Pichai
  ○ Mark Zuckerberg
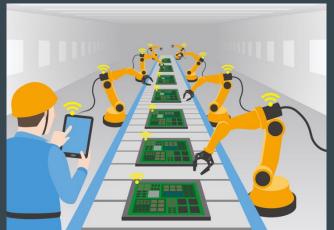➢ CON
  ○ Elon Musk
  ○ Stephen Hawking

Some Branches of AI

- ➤ Machine Learning
  - ○ Pattern recognition models
- ➤ Natural Language Processing (NLP)
- ➤ Game Playing
- ➤ Robotics + Automation
- ➤ Computer Vision
  - ○ Image recognition
- ➤ Smart computer aids for humans

Types of AI

➢ Reactive machines
  ○ Don't store memory, only REACT
  ○ Ex : IBM's Deep Blue & Alpha Go
➢ Limited memory
  ○ Ability to observe from past experiences
  ○ Not full representations
➢ Theory of mind
  ○ Ability to make observations + representations
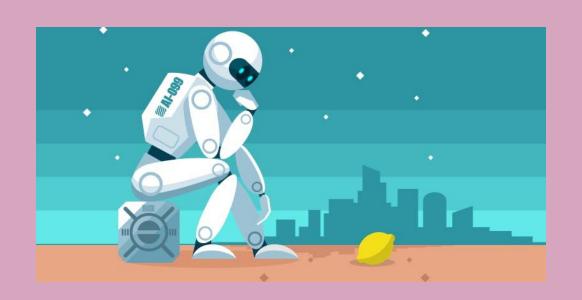➢ Self awareness
  ○ Form representations of themselves

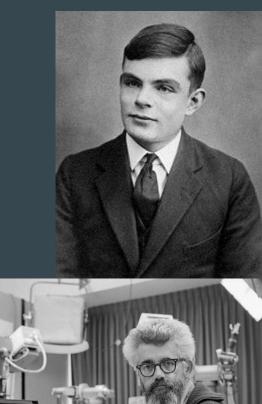# Let's Go Back In Time!

COINED IN 1956!!!!

Broad Term

➢ Various definitions
- Methods and approaches
- Plant, Animal Intelligence

➢ Science Fiction
- Isaac Asimov
  - I, Robot - 1950
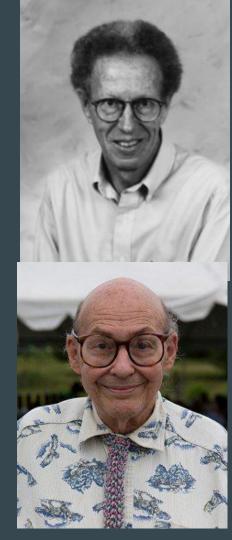
➢ Robots for home
- Roomba

GodFathers & Pioneers

➢ Alan Turing
- ○ Computing Machinery & Intelligence
- ○ Introduced in 1950

➢ John McCarthy
- ○ Ultimate father of AI
- ○ SAIL director
- ○ Organizer of 1st Dartmouth AI conference
- ○ Developed many techniques used today
  - ■ Primarily specialized in math
  - ■ Lisp & garbage collection

GodFathers & Pioneers (cont.)

- ➤ Ross Quillian
  - ○ Semantic Network
    - ■ Represents relationships in network
- ➤ Edward Feigenbaum (FROM NJ!!!)
  - ○ Expert systems
    - ■ DENDRAL : determining structure of organic molecules
    - ■ MYCIN : diagnosing blood infections
  - ○ Merged med/lab with AI
- ➤ Marvin Minsky
  - ○ 2 main books : commonsense reasoning
  - ○ SNARC : 1st neural net simulator
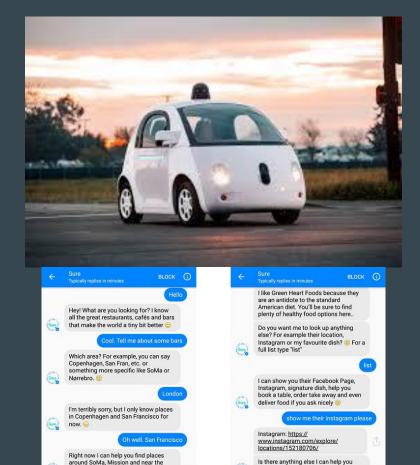 - ○ Mechanical arms, robotic devices

ML Fundamentals

What is ML?

➢ Major branch of AI

➢ Statistical oriented

➢ Objective
  ○ TRAIN with data
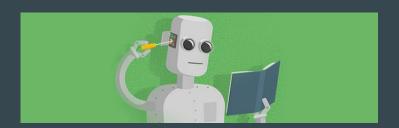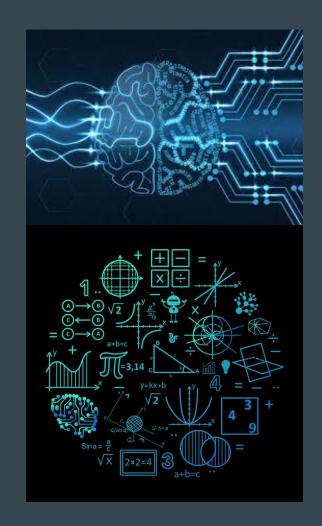   ■ Models + representing patterns
    ■ Not explicitly hard coded

Supervised, Unsupervised, Semi-Supervised Learning

➢ Supervised learning
   ○ Both input & output are provided
   ○ Algorithm's goal : analyze given input & output
➢ Unsupervised learning
   ○ Goal : observe and analyze input
   ○ Without knowing output
➢ Semi supervised learning
   ○ Labeled + unlabelled data
      ■ Regression, modeling, classification, etc.

How to Start Creating With ML

➢ Learn Python/R
  ○ Learn Stats
➢ Learn Java
➢ Graph Theory
➢ ML Algos
➢ Integrate Core ML in app dev
➢ Understand ML concepts
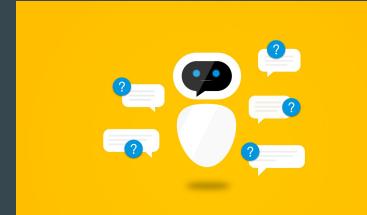➢ Amazon Web Services (AWS)
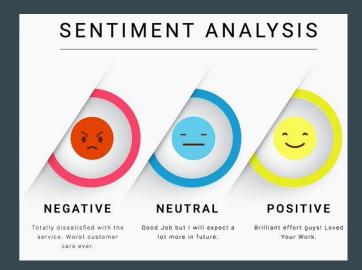 ○ Amazon Machine Learning Model

NLP Fundamentals

What is NLP?

➤ Analyze + interpret human language
- Fake news
- Gmail spam filters
- Word tokenization
  - Siri, Cortana, Watson, etc.

➤ APIs for slang language + jargon
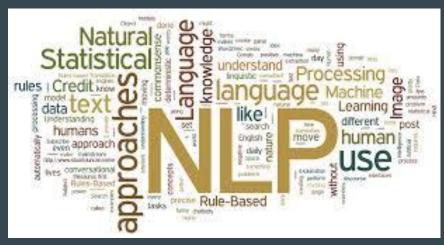- Specific slang language for teens vs. adults

NLP Tasks

➢ POS Identifier
➢ Machine translation
➢ NERD
  ○ Named Entity Recognition & Disambiguation
➢ Language Identification
➢ Semantic Parsing
➢ Text Segmentation
➢ Text Summarization
➢ Open Information Extraction
➢ Phrase chunking
➢ Lemmatization
➢ Textual Entailment
➢ Linguistic empathy
➢ Sentiment analyzer
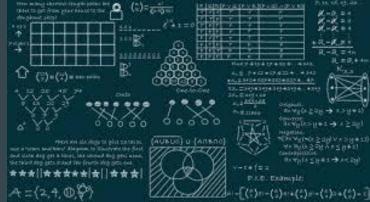➢ Parsing
➢ Argumentation Mining

How to Start Creating With NLP

➢ NLP Toolkits & Libraries
  ○ Apache OpenNLP
  ○ Stanford Core NLP
➢ Learn Python
➢ Learn Java
➢ Learn different NLP algos
➢ Learn statistics + probability

Learning Java

OOP Concepts

➢ Software design
  ○ Several advantages over procedural programming
➢ AP Computer Science A
➢ Objective : create relationships between various objects
  ○ Abstraction
  ○ Encapsulation
  ○ Information Hiding
  ○ Polymorphism
  ○ Inheritance

OOPS

OBJECT ORIENTED PROGRAMMING CONCEPTS

OBJECT ORIENTED PROGRAMMING

Python

- ➢ Procedural Programming
- ➢ Statistical Language
- ➢ IDEs
  - ○ PyCharm
  - ○ Idle
  - ○ Jupyter
- ➢ Data Science & Statistics
  - ○ Stats packages & libraries
  - ○ Regressions
  - ○ Data churning

RESOURCES

Resources (Not Complete List)

➢ APIs & Libraries
  ○ Stanford Core NLP
  ○ Apache Open NLP
  ○ TENSOR FLOW!!!! -C++ or Python
  ○ Python Libraries for DS, AI, and ML
    ■ NLTK
    ■ Keras
    ■ Sci-Kit Learn
  ○ Microsoft CNTK
  ○ Theano
  ○ Spark MLlib
  ○ ML Pack

Resources (Not Complete List)

➢ Platforms & IDEs for dev.
  ○ Java : Eclipse, IntelliJ, BlueJ for learning
  ○ Python : PyCharms, IDLE, Jupyter
  ○ C++ : Visual Studio
  ○ Use command prompt → installing packages
➢ Competitions
  ○ USACO
  ○ Kaggle
  ○ Hackathons (MLH)

Future Workshops

Future Workshops

Week 2 : Natural Language Processing

Week 3 : Graph Theory

Week 4 : Statistics for Machine Learning

★ Speakers in AI research + domain in future workshops

https://www.youtube.com/watch?v=z-EtmaFJieY