

# **FinTech: Shaping the Financial World**

**April 1, 2020**

# Class 2: Readings

- *'Artificial intelligence and machine learning in financial services'*  
Financial Stability Board (Executive Summary & Sections 1 - 3)
- *'The Growing Impact of AI in Financial Services: Six Examples'* Arthur Bachinskiy, Medium

# Class 2: Study Questions

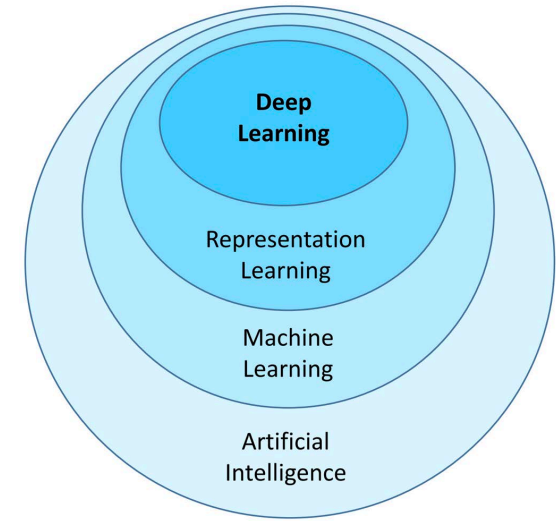
- What are artificial intelligence, machine learning and deep learning? How do these enhanced tools of pattern recognition and decision making relate to financial services?
- What is natural language processing? How has it already enhanced user interfaces (UI) and user experiences (UX) in finance? How might chatbots, conversational interfaces and voice assistants transform UI & UX in the future?
- What sectors within the financial services sector has seen the most adoption of AI & machine learning? How can it be used to enhance compliance systems, customer interfaces, risk management, underwriting and investment strategies?

# Class 2: Overview

- AI, Machine Learning, & Deep Learning
- Natural Language Processing
- AI within FinTech History
- AI & Machine Learning – Finance
- Natural Language Processing - Finance

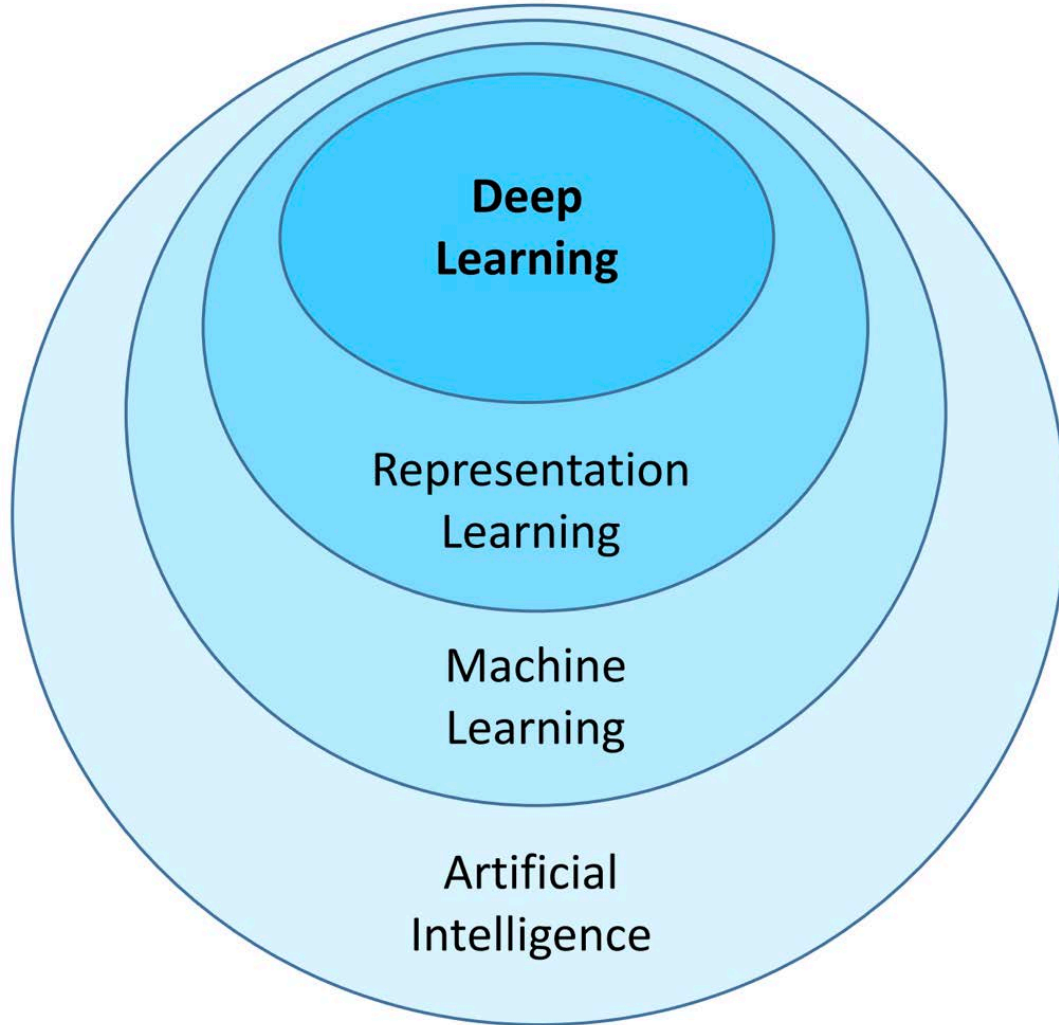
# AI and Machine Learning

## Deep Learning in One Slide



- **What is it:**  
Extract useful patterns from data.
- **How:**  
Neural network + optimization
- **How (Practical):**  
Python + TensorFlow & friends
- **Hard Part:**  
Good Questions + Good Data
- **Why now:**  
Data, hardware, community, tools, investment
- **Where do we stand?**  
Most big questions of intelligence have not been answered nor properly formulated

# AI and Machine Learning



DL - => 2010's => ML with Multi-layer Neural Networks

RL – ML Extracting Features of Data Sets

ML – 1980's => Machines Improve with Experience

AI – 1950's => Computers Mimic Human Intelligence

# Alternative Data

- Bank, Checking, Employment, Income, Insurance, Tenant, Utilities
- Cash Flow Underwriting
- Consumption and Purchase Transactional Data
- App Usage, Browsing History, Email Receipt, Geolocation, Social Media Data,
- Educational Background, Employer, Occupation, Work History

# Natural Language Processing

- Computer Input, Interpretation and Output of Human Language
- Natural Language Understanding and Natural Language Generation
- Audio, Image, Text and Video including Spoken, Written or Gestured
- Content Generation, Content Summarization, Information Retrieval, Intent Parsing, Sentiment Analysis, Speech Generation, Speech Recognition and Translation
- Chatbots, Conversational Interfaces and Voice Assistants



# AI, Big Data and Machine Learning

## Financial Stability Board

- ‘The application of computational tools to address tasks traditionally requiring human sophistication is broadly termed ‘artificial intelligence’’
- “‘Big data’ is a term for which there is no single, consistent definition, but the term is used broadly to describe the storage and analysis of large and/or complicated data sets using a variety of techniques including AI.’
- ‘Machine learning’ may be defined as a method of designing a sequence of actions to solve a problem, known as algorithms, which optimise automatically through experience and with limited or no human intervention.’

# Customer Interface

Chatbots, CI & Voice Assistants (2010s)

Open APIs (2000s) & Open Banking (2015)

Contactless & Cardless Systems (2000s) >

Mobile Payments (2000s) & Wallets (2008) >

Internet (1990s) & On-line Banking (1990s - 2000s) >

Automatic Teller Machines (1970s) >

Credit Cards (1940 – 50s) & Point of Sale Systems (1980s) >

Mortgage Brokerage (1890s) & Automobile Indirect Lenders (1910s) >

Electronic Payments (1870s), Wires (1910s), ACH (1970s) & Direct Deposits (1970s) >

Checks (800s), Negotiable Checks (1500s), & Preprinted Checks (1760s) >

Banking - Tents, Temples, Bricks & Mortar (4<sup>th</sup> – 1<sup>st</sup> millennium BCE) >

# Funding & Risk Management

ML Based Underwriting (2010s) >

Peer to Peer Lending (2005) >

Credit Default Swaps (1990s) >

Asset Backed Securitizations (1970s – 90s) >

Interest Rate Futures (1970s) & Interest Rate Swaps (1980s) >

Consumer Credit Scoring (1960s) & FICO Scores (1990s) >

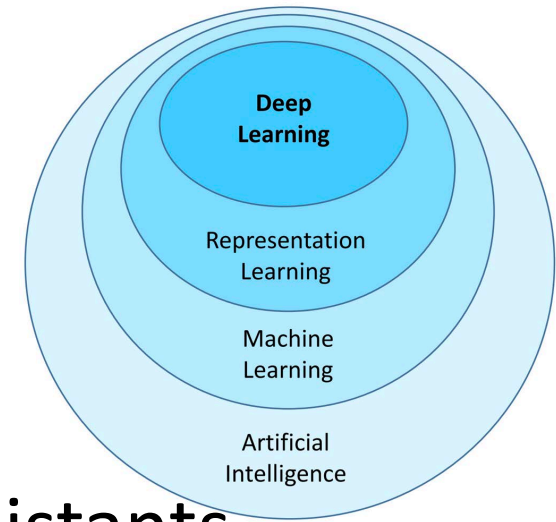
Consumer Finance Companies & Warehouse Lines of Credit (1920s) >

Private (1880s, 1950s), Government (1930s) & GSEs (1930s) Mortgage Insurance >

Bankruptcy & Secured Lending Laws, Loan Servicing & Collection Agents (Days of old) >

Bank Deposits - (Antiquity) >

# AI and Machine Learning - Finance



- Asset Management
- Call Centers, Chatbots, Robo-Advising & Virtual Assistants
- Credit & Insurance - Allocation, Extension, Pricing & Scoring
- Fraud Detection & Prevention
- Regulatory – Anti Money Laundering, Anti Manipulation
- Risk Management & Underwriting
- Robotic Process Automation
- Trading

# Natural Language Processing - Finance

- Customer Services
  - Chatbots, Conversational Interfaces and Voice Assistants
- Process Automation
- Sentiment Analysis

# Bank of America Erica

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