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Application of AI, Insurtech and Real Estate Technology

Background of AI

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Background and Definition of Fintech-AI

- Artificial Intelligence - the sense of a sentient machine was first expressed as a theoretical concept by computer scientist Alan Turing in the 1940s
- Turing conceived of a machine that could self-program and learn from experience to convincingly simulate a real human
- Turing Test - the standard he set for a sentient machine intelligence
  - If an evaluator could not tell the difference between two unseen parties, one human and one a computer, in a natural language conversation, then the machine could be considered to be displaying intelligent behavior

Background and Definition of Fintech-AI

- Whether such an artificial intelligence is self-aware, has a soul, etc., involves philosophical issues and is beyond the scope of this module
- Science fiction authors such as Arthur C. Clarke in 2001: A Space Odyssey, have thoroughly explored both the potential and risks of artificial intelligence.* What was once only imaginable is now becoming reality

*The sentient computer HAL 9000 in 2001: A Space Odyssey is a trusted companion to the astronauts on spaceship Discovery, but eventually tries to kill them

Background and Definition of Fintech-AI

- Financial firms have always been at the forefront of computer technology
- The stock ticker was invented in 1867, although four years later Thomas Edison developed his own model, which became the Wall Street standard, and was sold to Western Union, the high-tech real-time communications company of the day
- Financial firms were early adopters of mainframe computers and relational databases*
- Today, the computational arms race in finance is hotter than ever, and Artificial Intelligence, neural networks and Big Data analytics are all in the front lines
- 25 years ago interfacing with a finance database required a dedicated terminal and a seat license costing in the tens of thousands of dollars
- Today, smartphone apps are ubiquitous and can do just about anything the hardware format can handle

* Maruti Techlabs, “How Can Artificial Intelligence Help FinTech Companies?”

Background and Definition of Fintech-AI

- Many areas of finance remained human-centric and dependent on trust relationships, even as computers became ubiquitous
- Today, computers can usefully simulate human beings, especially in routine tasks such as account onboarding

Definitions of Artificial Intelligence

"The theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages."

- English Oxford Living Dictionary

"1. A branch of computer science dealing with the simulation of intelligent behavior in computers.

2. The capability of a machine to imitate intelligent human behavior."

- Merriam-Webster Dictionary

> “The goal of AI is to understand tasks and apply solutions that involve self-directed learning, reasoning, perception, and problem-solving, just like how humans are able to. The areas that AI intersects with involve a cross-disciplinary approach that is based on mathematics, computer science, linguistics, psychology, and other behavioural disciplines.”

—“FINTECH & ARTIFICIAL INTELLIGENCE: FICTION OR BECOMING FACT?” TECHQUARTELYASIA, JULY 9, 2017

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AI Market Size

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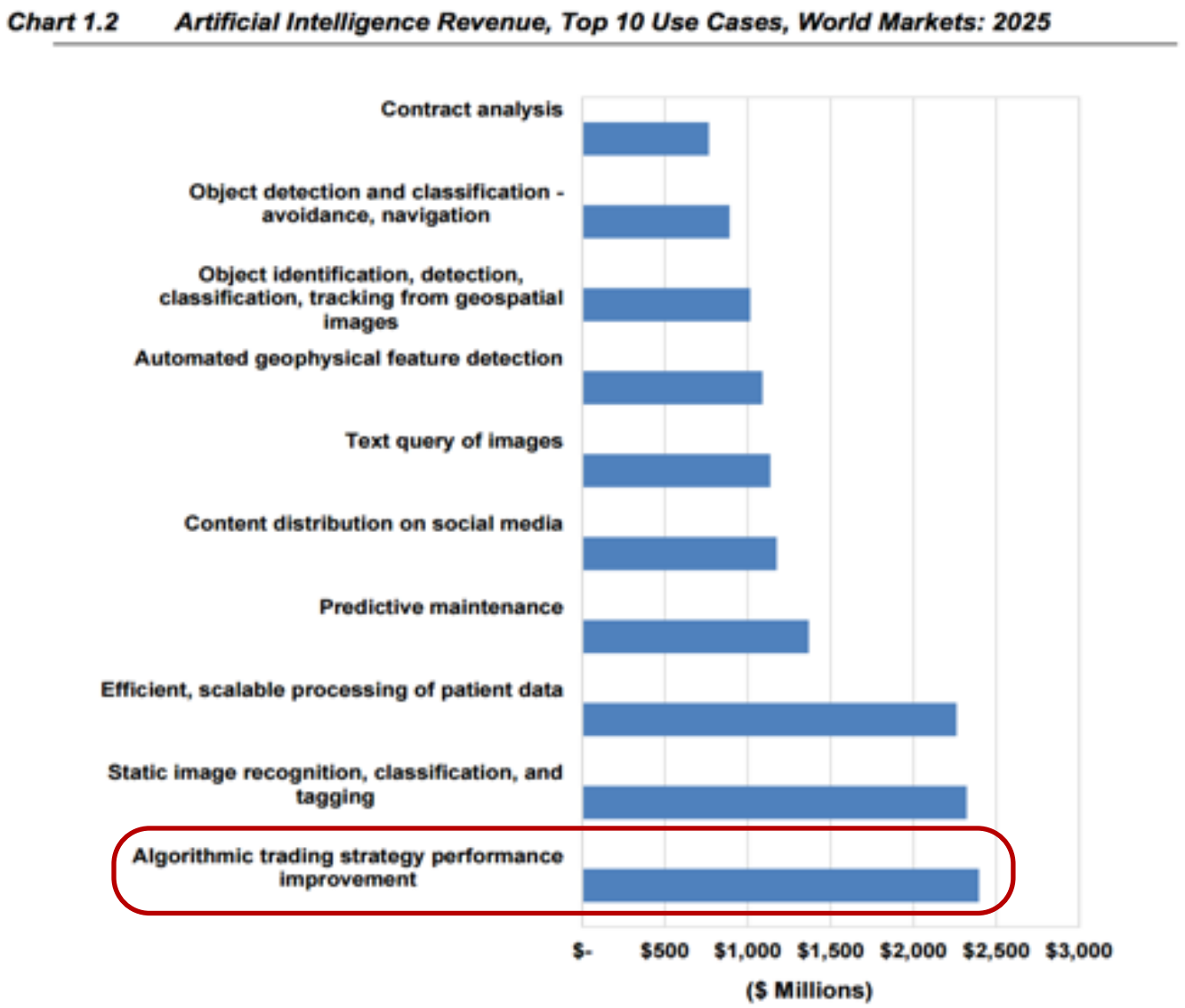
Market Size of AI, Overall

- Estimates/forecasts of market size for AI (overall, not just Fintech) differ wildly:
  - Forrester Research (2017): $1.2 trillion worldwide invested in “cognitive computing technologies by 2020”
  - Tractica Research: $36.8 billion by 2025
  - Accenture: $8.3 trillion in Artificial Intelligence market value (U.S.) by 2035
  - Bank of America Merrill Lynch: “Artificial Intelligence based systems $70 billion market value by 2025”
- AI can be applied in every arena - entertainment, finance, manufacturing, etc.

Financial Trading AI Algos Forecast as Top Use Case for AI, 2025



(Source: Tractica)

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Applications and Companies

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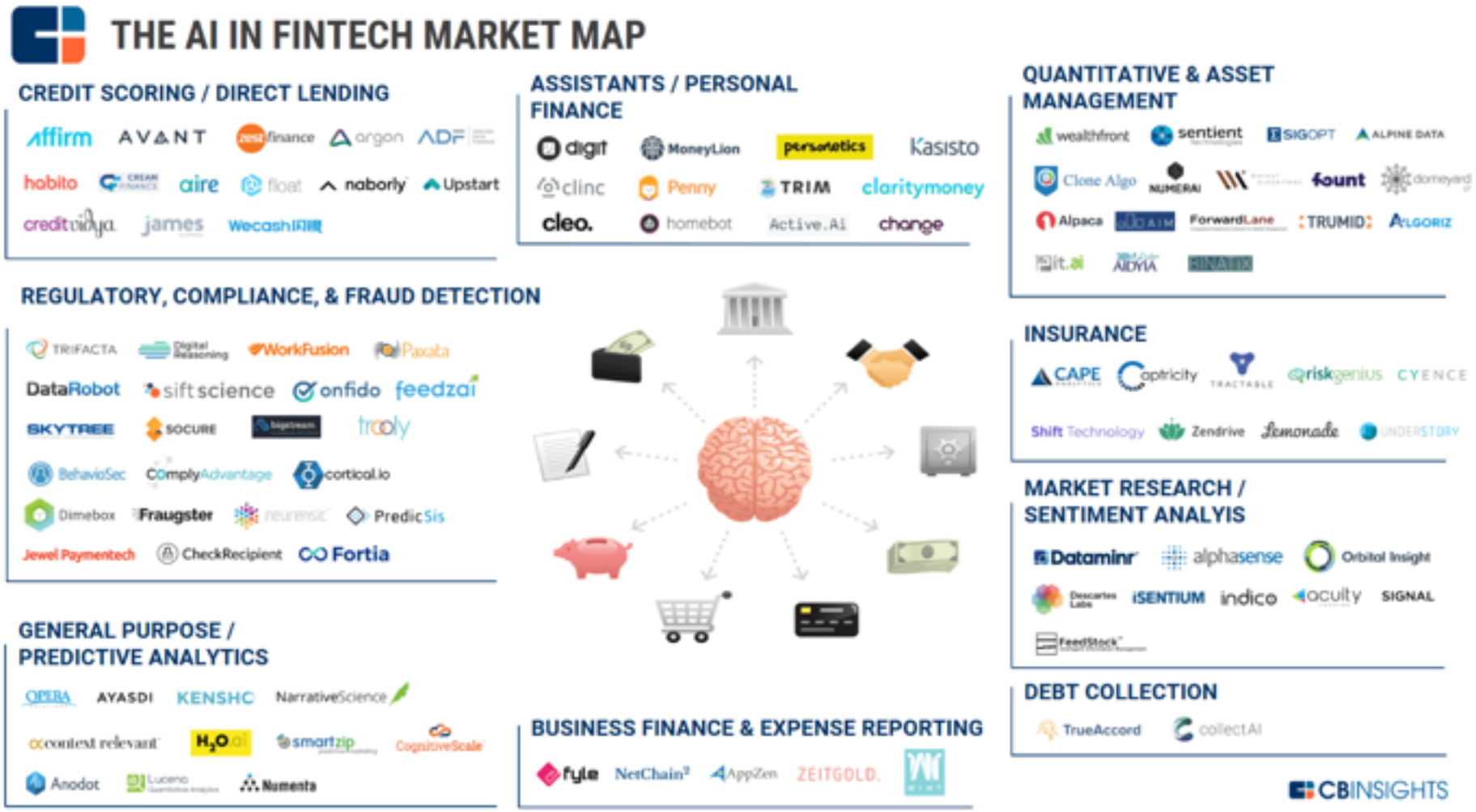
A Cornucopia of Applications and Companies



Caveat: “AI” has been a sexy marketing buzzword for some years; accordingly, some firms dubiously claim AI-centricity, just to bamboozle investors

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Use Cases for AI in Fintech

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Some Use Cases for AI in Fintech

- Superhuman accuracy in decision-making
  - Lower cost, ability to operate at scale, efficiency
  - Human biases can affect decision making including order effects, time of day or mood, and the impact of individual experience
  - Machines are not only less error-prone than humans in making decisions, but are much faster

Some Use Cases for AI in Fintech

- Automated customer support
  - AI chatbots can provide a simulation of a convo with a human
    - the “personal touch” if programmed capably can improve access through real-time translation and learning from customer input

AI in Fintech: Wealth Management

- There's clearly a role for AI in financial robo-advisory, but nobody is quite sure what it is
- The original vision of investment advisory with humans completely disintermediated, hasn't panned out (yet)
  - Partly due to legal/compliance issues
    - Can a computer be held to a fiduciary standard; and can a human advisor fulfill fiduciary duties if the substantive decision-making is completely entrusted to algos/AI?

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The Future of AI in Robo-Advice

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The Future of AI in Robo-Advice

Some Speculations:

- The definition of robo-advisory has become fuzzy, but remember what it originally meant:
  - Business models that reduce costs of client service by disintermediating humans
- Today, a financial advisory firm, or practice, that uses an algorithm to build a customer allocation, based on automated (online) inputs

The Future of AI in Robo-Advice

- Usually provide:
  - Automated capture of client financial info, goals, and risk tolerance
  - Output of a recommended portfolio allocation (or set of allocation options)
  - Automated rebalancing and tax loss harvesting
  - Automated reporting
- Since AI algos and bots learn from experience, theoretically they can provide an increasingly “personal” and “human” simulation of a human advisor, and possibly make more responsible decisions
- Recent market experience indicates most clients aren’t comfortable without a human somewhere in the loop

The Future of Robo-Advice

- Two largest robot-advisors - Wealthfront and Betterment
    - Both have “client service representatives”
    - The “pure” vision of robo-advice hasn’t yet been achieved
- The robo model is useful because it makes clients with relatively modest investable assets more economically viable to service

The Future of Robo-Advice

- Vanguard Personal Advisor Services rebranded as a robo in May 2015
    - By June, had $21.2 billion AUM[1], and hit $100 billion in January of 2018
  - Wealthfront has $11.4 billion AUM
  - (Betterment overtook Wealthfront's AUM in July 2015[2], and has $16.4 billion now)
      - 90% of Wealthfront AUM is in Vanguard funds[3]
  - Betterment lapped Wealthfront by pivoting its business model to emphasize DC plan sales to small companies
  - Various large brokerages or asset managers have acquired or built robos or robo-like offerings (e.g., Schwab, Merrill Lynch); and Fidelity

1 Lisa Shidler blog post, www.riabiz.com, July 16, 2015.

2 "Betterment catches up to Wealthfront in AUM as robo competition reaches boiling point," Investment News, July 30, 2015.

3 "It's Vanguard vs. Fidelity in the robo-advice game," Investment News, June 19, 2015.

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Machine Learning

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AI Leveraged by Insurtech Companies

Machine Learning

- Another type of AI is machine learning, a subcategory of AI.
- It enables computers to "learn" over time, using algorithms and mathematical models to simulate neural networks in the human brain.
- Machine learning allows computers to acquire knowledge by extracting patterns from raw data rather than following specific instructions.

AI Leveraged by Insurtech Companies

- While only a few insurers are currently using machine learning, more could benefit from the technology. Insurance companies amass large amounts of data.
- Yet, according to the National Association of Insurance Commissioners, most insurers use only 10 to 15% of the data they collect.
- Machine learning could allow insurers to mine their data more effectively and extract valuable information.

AI Leveraged by Insurtech Companies

- Risk modeling: Insurers analyze claims data in order to predict the risk of future losses.
- Demand modeling: Insurers can use mathematical models to predict demand for their products in the future and to estimate premiums.
- Detecting fraud: Machine learning helps insurers identify patterns of behavior that aren't obvious to human adjusters.
- Processing claims: Insurers can use machine learning to automate claim reporting and processing. Policyholders are more satisfied when claims are processed promptly.
- Underwriting: Insurers use machine learning to help underwriters analyze data collected from applicants. Computers can flag errors or inconsistencies in data that underwriters might not be able to see. Computers can also check external sources such as social media to verify the accuracy of the data.

AI Leveraged by Hedge Funds/Market Makers

- A survey by BarclayHedge last year indicated more than half of hedge funds are currently using AI or machine learning to help make investment decisions, and a quarter of the money managers are using it for trade execution.
- It's unclear how strict the definition of "AI" was in the survey. Simply using algos is not necessarily exploiting artificial intelligence. Also, the actual investment processes of most hedge funds are kept secret, even from investors, especially those used by High Frequency Traders, an area where humans can simply not act fast enough to be part of the decisionmaking loop.
- Renaissance Technologies, Bridgewater and DE Shaw are large hedge funds most often mentioned as innovators in AI/machine learning, but details are sparse.

AI Leveraged by Hedge Funds/Market Makers

- Another use for AI is textual analysis of news stories and financial releases, to generate positive or negative trading signals.
- In 2015-2016, several hedge funds were launched specifically to exploit this tech and strategy,* but little has been heard about it for the last three years ("data mining" was one of the "flavors of the month" in hedge fund investing several years ago). Several academic papers showed promising results. But AI-based textual analysis has not been validated as a profitable real-world standalone investment strategy, as far as we can tell.

* "How Traders Are Using text and Data Mining to Beat the Market, TheStreet.com, Feb. 12, 2015.

AI: IBM Watson

- The most famous brand name in FinTech-AI, hands down, is IBM Watson.
- “Watson,” named after legendary IBM CEO Thomas J. Watson, began as a supercomputer which crushed human opponents on the TV game show Jeopardy in 2011.
- Afterwards, IBM scientists swiped the name for a strong AI system capable of answering questions asked in natural language.
  - That is, it was software designed to beat a Turing test.
- IBM has deployed the associated products for various business uses, with mixed results.

AI: IBM Watson

- The first use was helping make health care payment authorization decisions in lung cancer treatment (2013), for client company Wellpoint.
- Besides healthcare, target industries include consumer retail, tax prep, academia, and other areas of finance.

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Conclusion

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Conclusions

Artificial Intelligence clearly has some role to play in Fintech's growth, potentially a major role, but the scope and utility of its application remain obscure.

- Despite the sci-fi appeal of AI technology, the business case is often more mundane: Compared to human customer service reps, AI chatbots don't call in sick, work 24/7 without complaint, and don't care about low wages.
- It is possible to predict incremental advances in existing tech, but usually quite difficult to forecast breakthrough tech such as robust AI – at least, difficult to achieve a confidence level suitable for guiding investment.

Conclusions

- AI has been overhyped (especially by tech consultancies) and some of its FinTech backers will be disappointed.
- Some AI tech will reduce barriers to entry in various financial industry markets.
- Some AI tech will give current market leaders an insurmountable lead.
- Regulation will strongly influence adoption of AI (and all FinTech).

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