Utilisation of Artificial Intelligence and Machine Learning Application in Construction Project Controls

Maisara Al Rais

Agenda

1. Project Controls Framework
2. Machine Learning Framework
3. AL/ML in Construction Industry
4. Machine Learning Applications in Project Controls

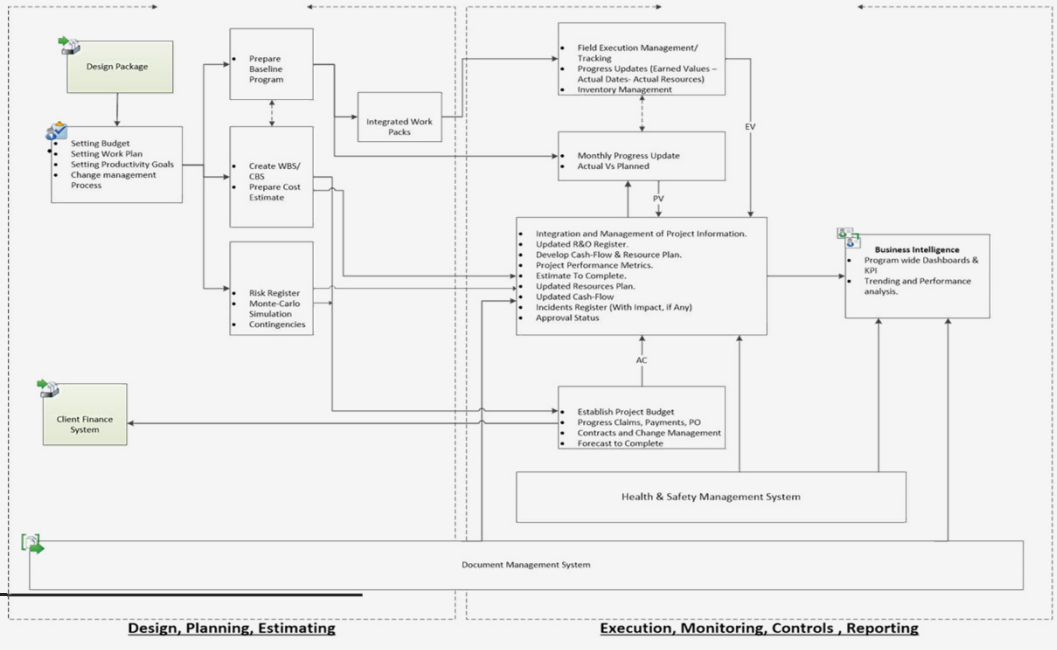
- Project Control Framework

Project controls defined as collection of information, Analyse data and build the prediction based on the status, Forecast and direct the project decisions in terms of time and cost. This is done by a implementing a process to integrate data to drive the decision.

The process of project controls required to integration between many systems from different discipline;

- Delivery progress.
- Planned and actual Duration.
- Planned and actual cost.
- Risks and control actions from risk register.

- Project Control Framework



- Project Control Framework

Problem with the current Project Controls Process

- Unavailability of real-time progress updates leads to delay in decisions.
- Project controls process done on a monthly basis with a recommendation for recovery actions and mitigations proposed for future actions.
- There is a lack in level of development between design outcome -Building Information Model- and tools and platforms used for project controls

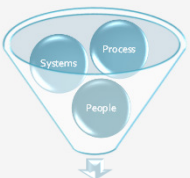
- Project Control Framework

Challenges during project controls process implementation:

For each step on the project controls process there is a different system being used to deliver the function, the main issues for this proposed integrated system are:

- Different data set required for each system.
- Required too many manual adjustments and a lot of effort at the implementation stage.
- Special skills required to be able to manage the process with understanding of different aspects related to ICT, risk management, cost management and control, planning and time control with quality control understanding.

Project Controls NOT just a software
it's a process, system and PEOPLE



Project Controls

- **Machine Learning Framework**

Artificial Intelligence

ANI

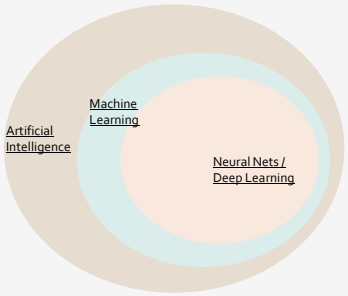
Artificial Narrow Intelligence

Do one thing such as a smart speaker or a self-driving car

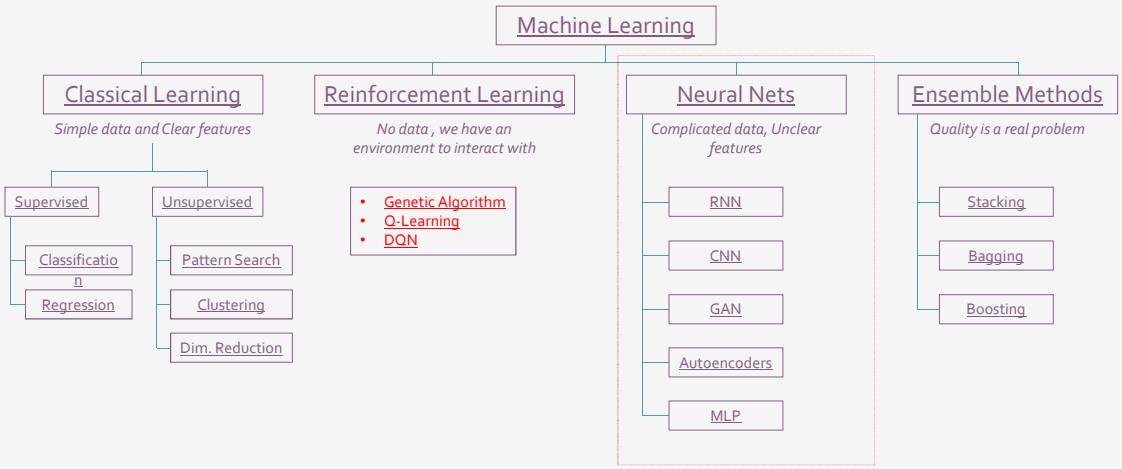
AGI

Artificial General Intelligence

Super Intelligence



- **Machine Learning Framework**



- Machine Learning Framework

Steps for Machine Learning Implementation

1. Collect Data
2. Train Model (Iterate many times until getting a good result) – A to B mapping
3. Deploy Model (get data back and maintain/update your model)

Automate Task not a Process

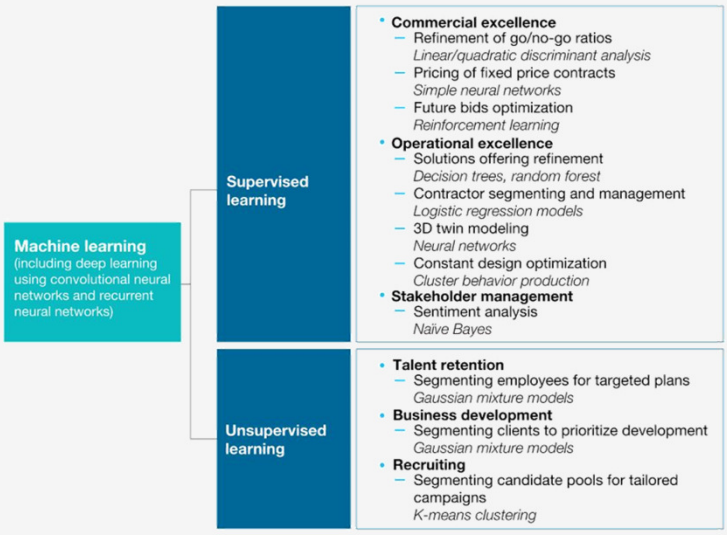
Steps for Data Science Implementation

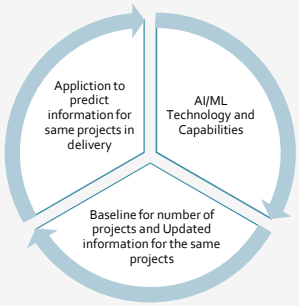
1. Collect Data
2. Analyse Data
3. Recommend Action

What is the ML Can Do and Cannot Do

Can	Cannot
Forecast	Creating new things
Re-Plan	Get smart very fast
Select from alternatives	Go beyond their tasks
Memorize	Understand your intention

- Machine Learning Framework





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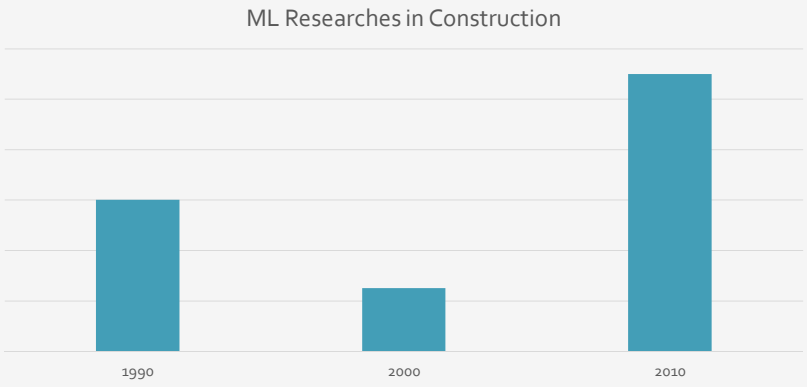
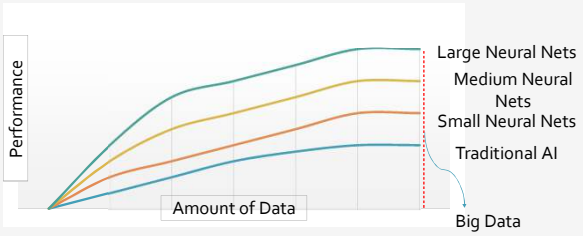
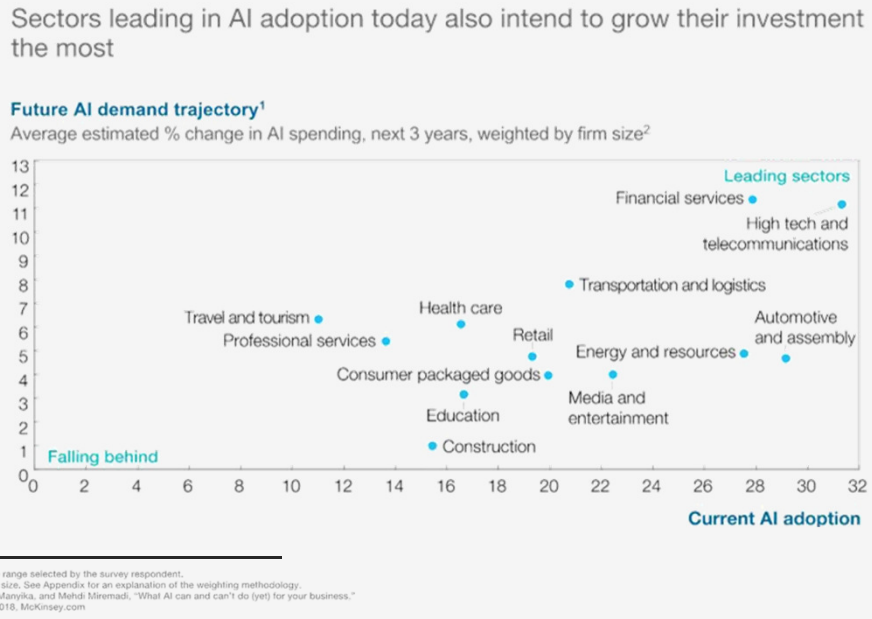
- **Machine Learning Framework**





- **Sectors leading to Artificial Intelligence adaptation**



1 Based on the midpoint of the range selected by the survey respondent.
2 Results are weighted by firm size. See Appendix for an explanation of the weighting methodology.
Source: Michael Chui, James Manyika, and Mehdi Miremadi, "What AI can and can't do (yet) for your business," *McKinsey Quarterly*, January 2018, McKinsey.com

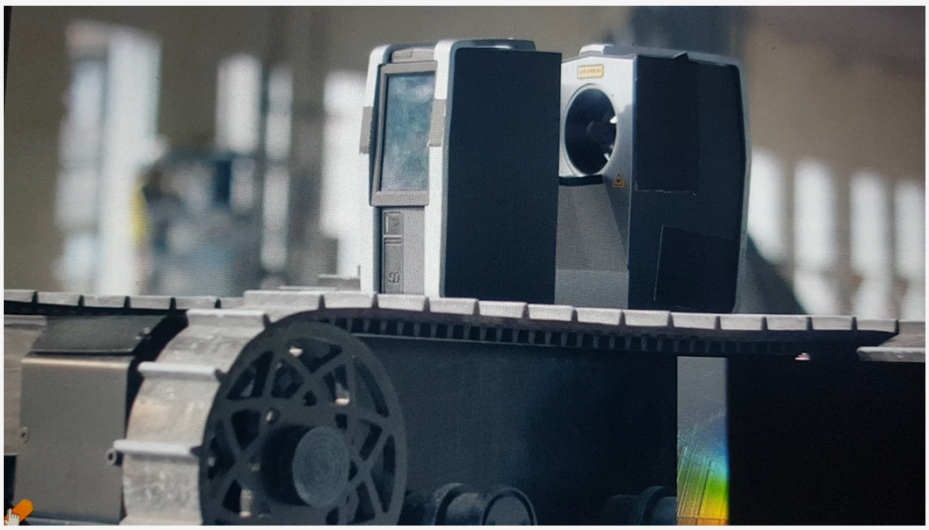
- AL/ML in Construction Industry

- AL/ML in Construction Industry

McKinsey&Company

- AI/ML in Self-Driving Car

- AI/ML Project Controls



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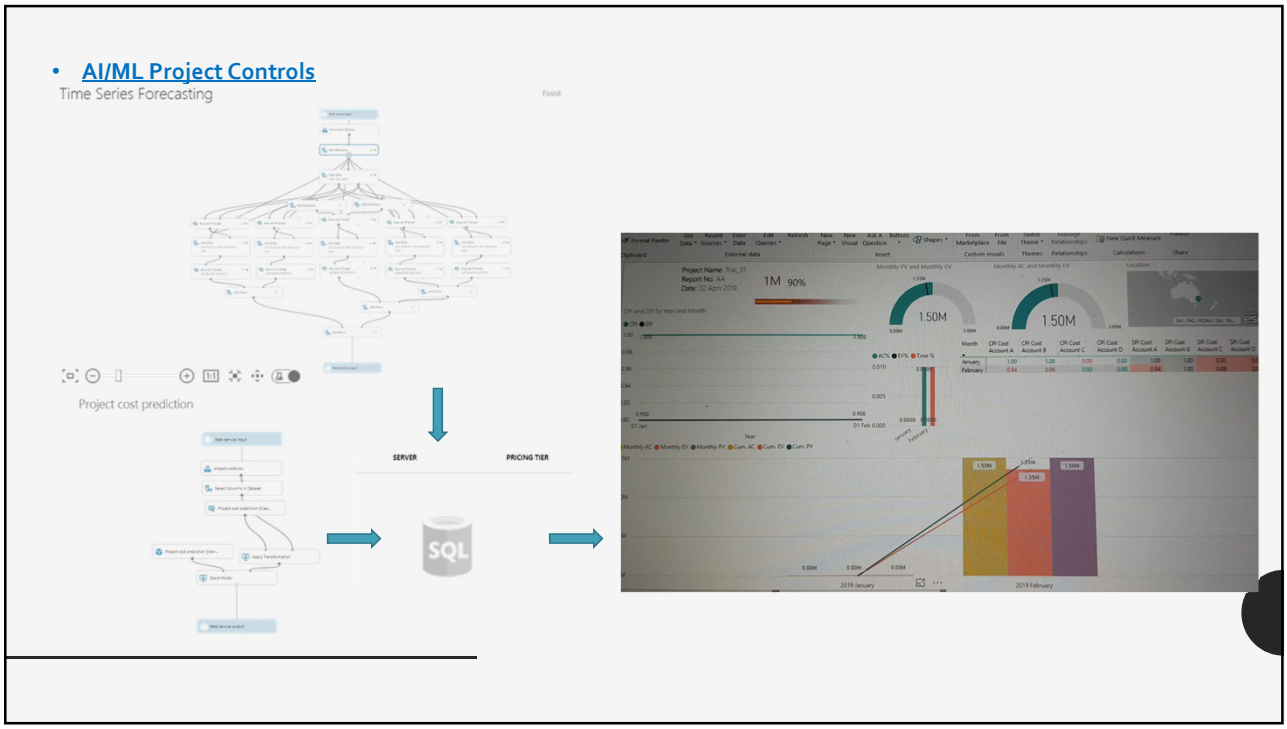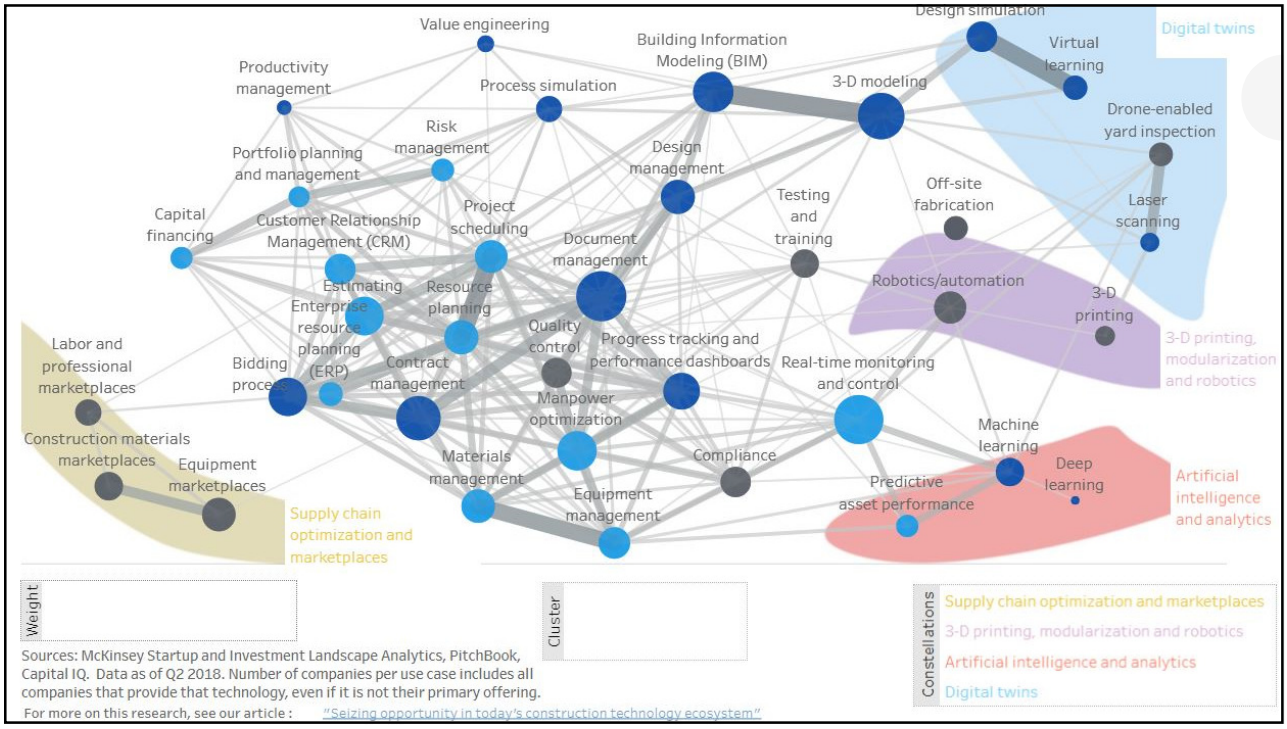
- **AI/ML Project Controls**