

HOW TO APPLY AI TECHNOLOGY TO YOUR PROJECT

Professor Paul Boudreau

Agenda

- What is AI?
- Applying AI tools to Projects
- The Value of AI
- The Importance of Project Data
- The Vendor Landscape
- Case Studies
- Getting started



What is AI?

- AI consists of software code (I use Python)
- AI “logic” is based on calculus equations
- AI “learns” by creating data models to use as reference
- Learning is supervised, unsupervised, or reinforcement

What is AI?

This is not AI !



Image courtesy of Terminator franchise

This is AI !

$$p(x) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 y)}}$$

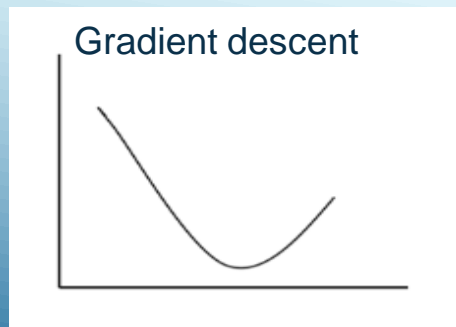
AI is about math not myth

Two AI Components for Project Management

Machine Learning

A computer program 'learns' by building a model based on data

- Supervised learning
- Unsupervised learning
- Reinforcement learning



Natural Language Processing

Software turns text into data to perform analysis

- Document analysis
- Sentiment analysis
- Virtual assistant



Machine Learning: Supervised Learning

Supervised learning

- Uses labeled datasets
- Correlates historical data
- Makes a prediction in the form of probability value

Example:



Label =

Cat

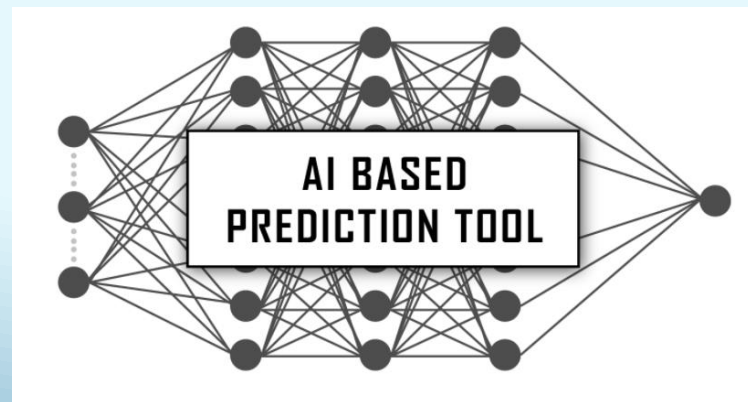


Dog

Supervised Learning: The Predictor Tool

- Three layer neural network using supervised learning
- Based on 87 factors collected for historical projects
- Model predicts success or failure of a new project

DEMO



Label =

Project success

Project fail

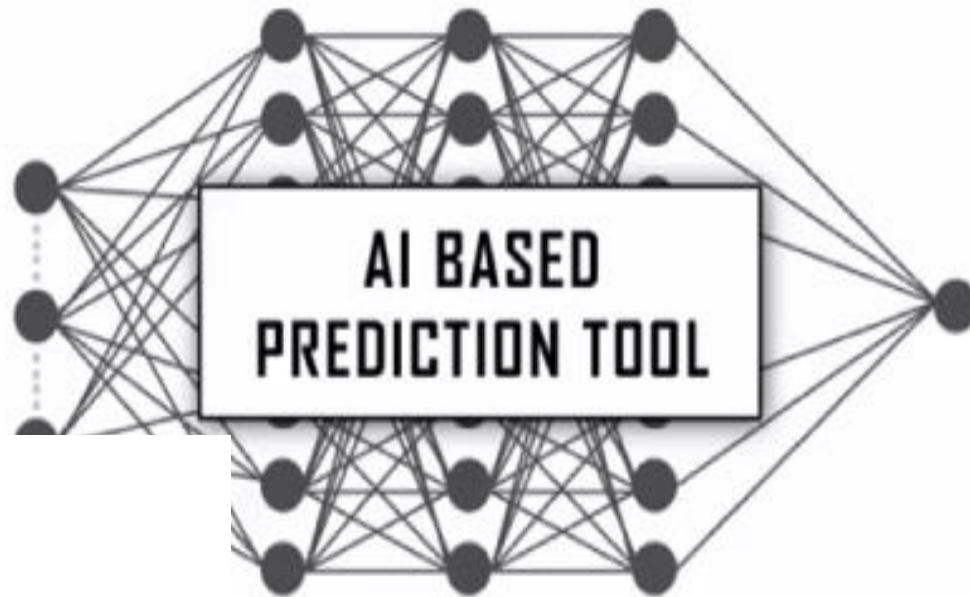
Home

Train

Predict

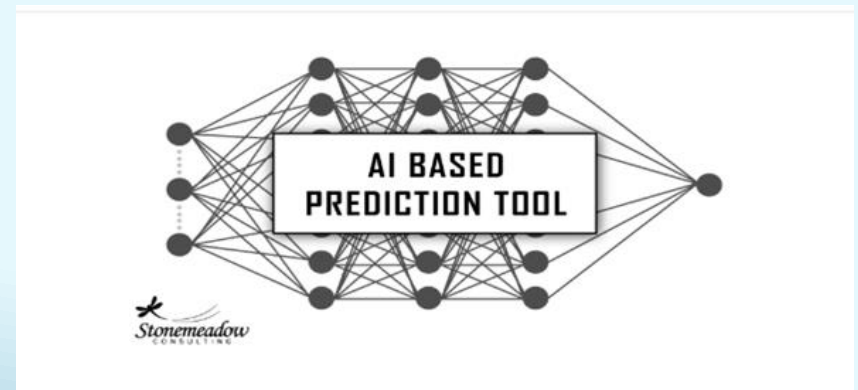
Users

Logout



Predictor Tool Templates

- Project prediction
- Agile sprint prediction
- Risk
- Stakeholder Management
- Basic Agile
- Resource issues
- Schedule issues
- Budget issues
- Communication
- Procurement
- Portfolio interactions
- Quality
- Vendor Execution



All templates offer customized feature definition

Machine Learning: Unsupervised Learning

Unsupervised learning

- Uses characteristics (features)
- Looks for patterns in a set of data
- Clusters or groups similar items together

Example:



No Label

Machine Learning: Unsupervised Learning

CLUSTERING

Example: Task complexity



Applications:

- Complexity
- Risk
- Change orders
- and more

Machine Learning: Reinforcement Learning

Reinforcement learning

- Uses self-correction to make decisions
- Feedback is ongoing
- The algorithm is trained based on feedback

Example: Learning to ride a bicycle



Imagine if humans never made the same mistake twice.

Machine Learning: Reinforcement Learning

Example: Building a knowledge repository

Issue description	Characteristics of project issue	Characteristics of project conditions	Decision/ Action	Success of decision

Imagine if ***project managers*** never made the same mistake twice.

Natural Language Processing

Document Analysis

- Analyzes scope description for completeness or errors
- Performs cost and duration estimates

“Honesty” in documentation

Natural Language Processing

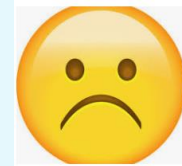
Sentiment Analysis

- Evaluate communication for positive and negative sentiment
- Words and phrases – verbal or written – are compared to a standard
- Can also understand facial expressions

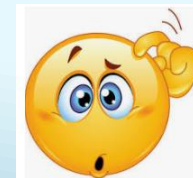
“What a great day”



“This is a miserable project”



“Can you repeat that?”



Natural Language Processing

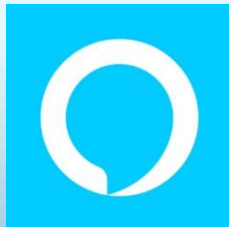
Sentiment Analysis

- Evaluates effectiveness of the project communication plan
- Improves team member communication
- Identifies stakeholder threshold limits

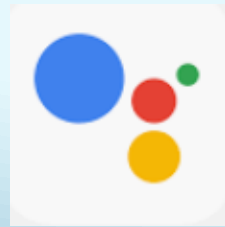
Natural Language Processing

Virtual Assistant

- Interactive communication
- Searches for content based on requests
- Evolving to more 'humanized' dialogue
- Provides ubiquitous project management capability



Alexa



Google
Assistant



Cortana



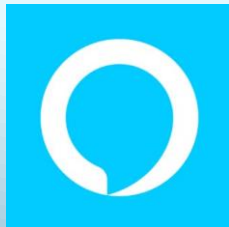
Siri

Virtual Assistant for Project Management

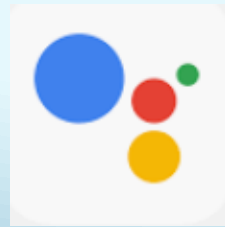
Level 1: Basic Retrieval of information

Level 2: Understands Project Management Concepts

Level 3: Linked to Machine Learning/Expert Systems



Alexa



Google
Assistant



Cortana



Siri

The Value of AI

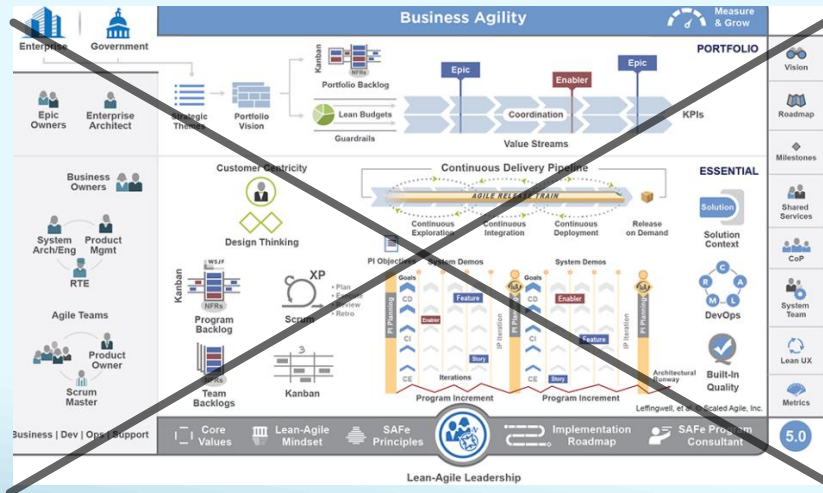
Project Success Rates

- 68% of IT projects are unsuccessful (PMI)
- 70% of organizations report at least 1 project failure in the past 12 months (KPMG)
- 11% of project spending is wasted due to poor project performance (PMI)

We need to change our methodology!

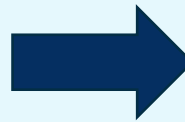
The AI Disruption Has Started

*From
Process-based adherence*



*30% to 40%
Project Success*

*To
Data-driven model*



*Using AI to Make
Decisions
Based on Data*

THE VALUE OF AI TECHNOLOGY

1. Productivity. Use Generative AI and NLP for documents
 - > Create a scope document up to four times faster
 - > Perform error review up to 10 times faster

2. Decision-making. Based on AI analysis
 - > Take action sooner.
 - > Take action with higher probability of success

3. Project Outcome Analysis.
 - > Decide which project to prioritize or cancel

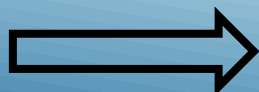
The Importance of Data

- Project documents
- Project status
- Project conditions
- External environment
- Historical results
- Project management language



The Importance of Data

Problem	Example
Data entry errors	Product A Product a
Data meaning	Location
Raw data and derived data	Raw: 4, 10, 22 Average: 12
Common format	dd/mm/yy, mm/dd/yy, mm/yy
Blank data fields	3, 0, 5, , 6, 8, 12
Data elements per field	Owner Name: Marie Owner Name: Marie, Sam, Alex
Duplicate data	Product A certified June 3 Product A certified June 3



Structured data is essential

Managing Data:

80% of the time implementing AI is spent on Data

Data Cleansing

- Find & fix typos, missing values, inconsistent formats
- Rationalize data fields: raw data, derived data, redundant data fields

Data maintenance

- Updates: frequency, timeliness
- Feedback loop based on results

Feature engineering

- Extraction, selection and transformation of data

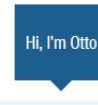
The AI Vendor Landscape



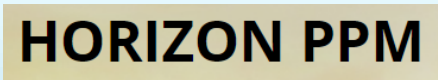
Canada



Europe



UK



Australia



CASE STUDY 1: LARGE MULTINATIONAL BUSINESS

Background



- Large multinational conglomerate based in Europe
- Produces a variety of industrial products
- 26 PMOs situated around the world
- CIO endorses AI as an opportunity for project management
- Director of PMO hosts an AI Workshop for global PMO leaders
- Several participants are skeptical of AI capability

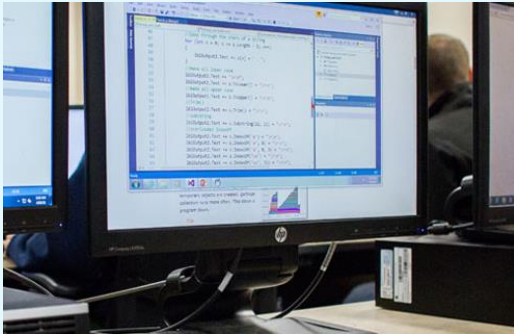
Actions

- Global PMO leader selects one PMO site for a pilot project
- Project performance problems are defined
- Vendor demos organized
- Project data strategy is defined and implemented

AI tools are deployed for risk management

CASE STUDY 2: GOVERNMENT

Background



- Project to consolidate payroll software
- Reputable vendor selected
- Project budget of \$310M becomes project spending of \$1B
- Project duration extends to 9 years
- Auditor report: an **incomprehensible failure of project management** and oversight.

Auditor Recommendation

- "...ensure that project managers understand the requirements for...a formal software upgrade plan..."

**2022/2023: Similar new software consolidation project:
 Use NLP tools to review scope**

Getting Started...

1. Evaluate existing project data
2. Identify current project issues
3. Create an AI roadmap
 - Request vendor demos or use internal IT resources
 - Determine project data gaps and address them
 - Define the value
4. Deploy AI tools and monitor the value delivered



Key Takeaways



Risk management processes were developed in the 1980s

The critical path concept was developed in the 1960s



We need to modernize project management!

Key Takeaways

- *Organizations are already moving to a data-driven strategy*
- *Numerous vendors are building AI-based tools to improve project performance*
- *Organizations need to capitalize on the value of AI tools*

This is your opportunity to lead the change to AI-based project management



Contact Information

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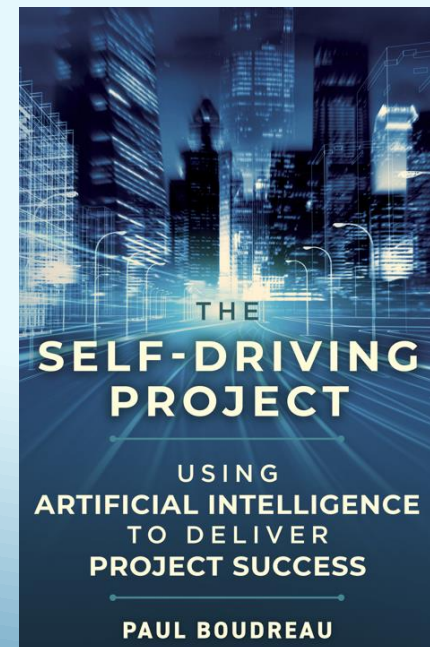
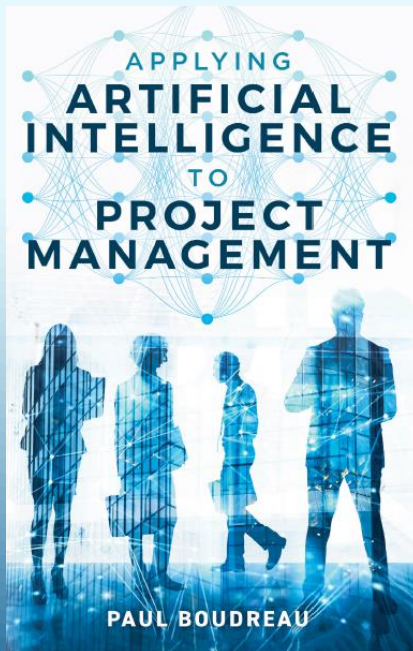
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