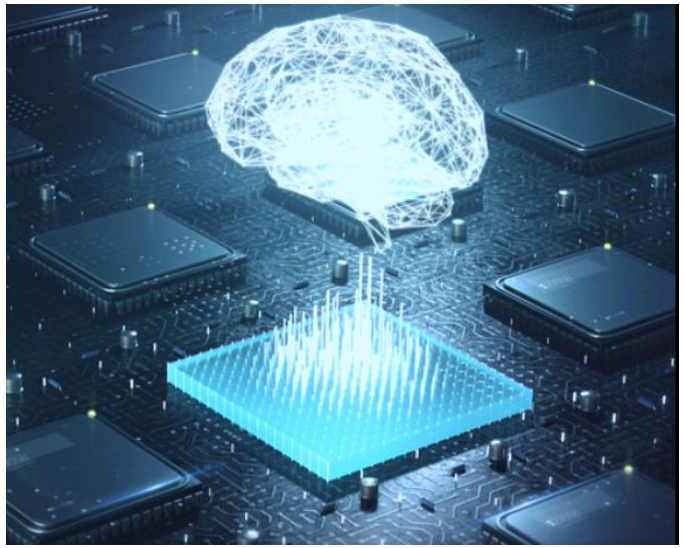
AI For Business Decision Making

Artificial Intelligence - Introduction

- A branch of computer science focused on the automation of intelligent behavior
- What is intelligence though?



Intelligence?

- Flexible responses vs. mechanical behavior
- Adapt to ambiguous or contradictory messages

Assess relative importance of different elements of a situation

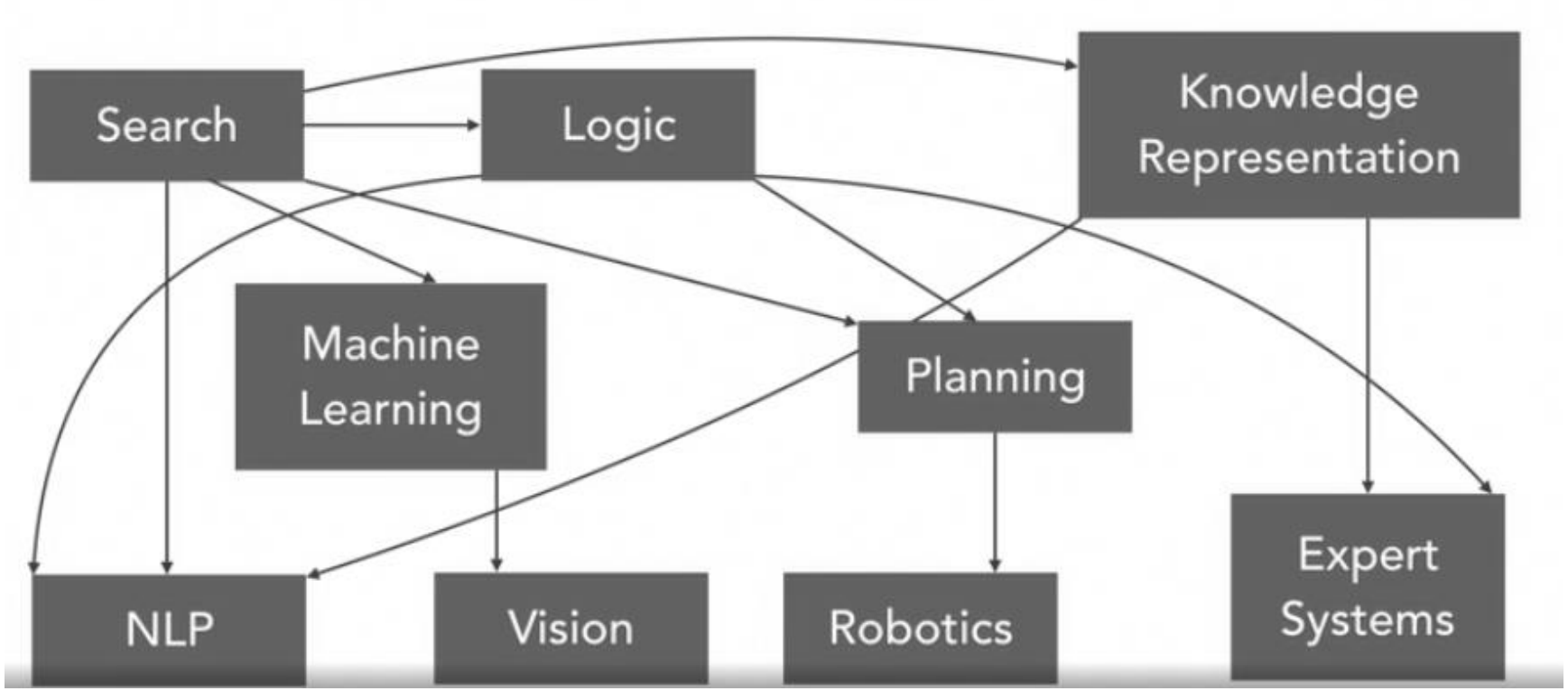
- For example, quality versus price of a product

Find similarities between situations despite differences which may separate them

- For example, two dogs in two different pictures

Draw distinctions between situations despite similarities

Fields of AI


Search
Logic
Knowledge Representation
Machine Learning
Planning
NLP
Vision
Robotics
Expert Systems

AI Systems

AI systems for solving problems consist of two parts:

1. Knowledge base
2. Inference engine

Search

- Search is the fundamental technique of AI
- Search is either blind or informed

Knowledge Representation and Reasoning

- The second most important concept in AI
- Must understand environment and draw inferences

Text & Data

- Textual analysis
- Natural language processing
- Sentiment analysis
- Content analysis
- Computational linguistics

Natural Language Processing

- Communication between people and computers in ordinary or natural English
- Comprehension of natural language
- Generation of natural language – think Bloomberg or IB research analysts

Textual Analysis Software

- Ability to download data and convert into a string/ character variable
- Ability to parse large quantities of text and match against a dictionary of existing words

- Most modern languages provide for both of these functions:
  - Perl
  - Python
  - SAS Text Miner
  - VB.net
- Blackbox canned programs also available (for example, Diction)

NLP Dictionaries

- Need a dictionary
- Implication of words/phrases

Pattern and shape recognition and AI

Expert systems

- Computer program designed to act as an expert
- Includes knowledge base and rules for application
- Medical (for example, PXDES, MYCIN) and agriculture (for example, AGREX)

Solving Problems with AI

- Choosing among sets of options with each decision opening the door to another array of choices
- Expert systems organize fields of knowledge to systematically search
- Initially rules set by humans, then by computer

AI in Business

Attribute	Human Intelligence	Artificial Intelligence
Use a variety of information sources	High	High
Ability to acquire large amounts of external info	Medium	High
Ability to do rapid, accurate, and complex calculations	Low	High
Ability to transfer information rapidly	Low	High
Ability to use sensors or senses	High	Medium
Creativity or imagination	High	Low
Ability to learn from experience	High	Medium
Ability to be adaptive	High	Medium

- AI continues to improve and evolve
- Human vs. computer problem-solving

AI Tools

Decision support

- Integrating the advantages of AI with human intelligence
- More intelligent interfaces
- More intelligent processing for massive data

Information retrieval

- Automatic simplification for massive data
- Natural language technology: computer can speak our language

Virtual reality

- Travel (flight) applications
- Medical applications

Robotics

- Bringing the precision and speed of computers into the physical world
- Goes beyond manufacturing and assembly lines: baggage inspection, bomb removal, replacement limbs

Applications of AI Expert Systems

- Triage – medical expert system
- Agricultural – farming
- Patriot missile guidance system
- Financial decision-making – currency trading

Expert System Categories

Decision-making

- Buy/sell
- Risk/no risk
- Rain/no rain

Troubleshooting/diagnosis

- Hello, welcome to Microsoft; how can I help you?
- Suddenly a novice seems like an expert

Selection/classification

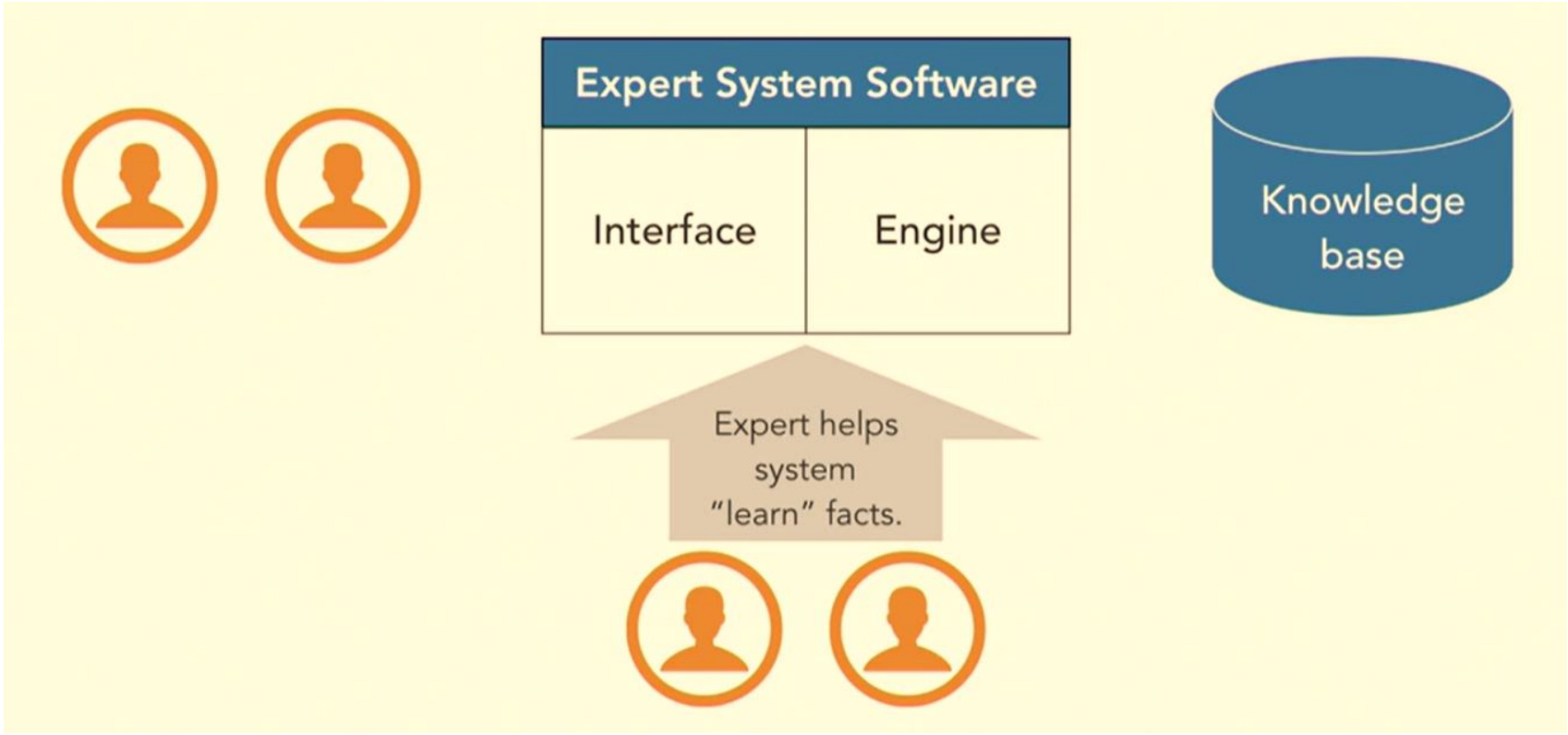
- Disease and medicine

Process monitoring and control

- Robotic control
- Self-driving application

Design/configuration

Expert System Components



AI in Everyday Life

- Post office
- Banks
- Telephone companies
- Credit card companies
- Computer companies

Applications of AI: Consumer Marketing

Credit card data in shopping goes into AI data sets

Companies like Nielsen gather this information weekly and search for patterns

How do they do this?

- Algorithms (data mining) search data for patterns
- Harder for business analysts to spot these trends

Applications of AI: Identification Technologies

Biometric identification

- Walk up to a locked door
  - Camera
  - Fingerprint sensor
  - Microphone
- Machine vision identifies you
  - Face
  - Eyes
  - Fingerprints
  - Voice

AI: Current State

Speech synthesis, recognition, and understanding

Computer vision

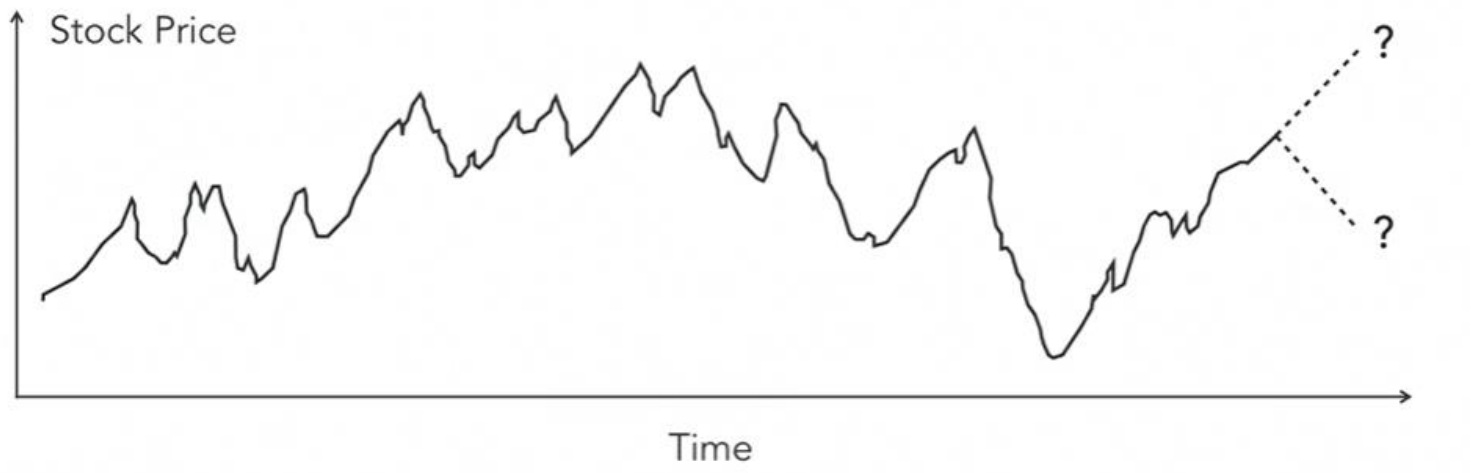
Learning

Planning and reasoning

Summary

- Many components of AI are usable
- Many issues remaining

Limits of AI: Finance Example



Steps in Building an AI Algorithm

Define goal and constraints

- Programmable
- Code-able
- Objective

Set operating time horizon and constraints

- Data and performance can be monitored at all times
- Human oversight available at all times
- Programmable start and stop rules
- Results tracking

AI algo testing

- Backtesting-time periods, entry and exit triggers, stress scenarios, shutdown points
- Test risk-tolerance measures
- Live testing without direct business impact, then with business impact

Maintaining an AI Algorithm

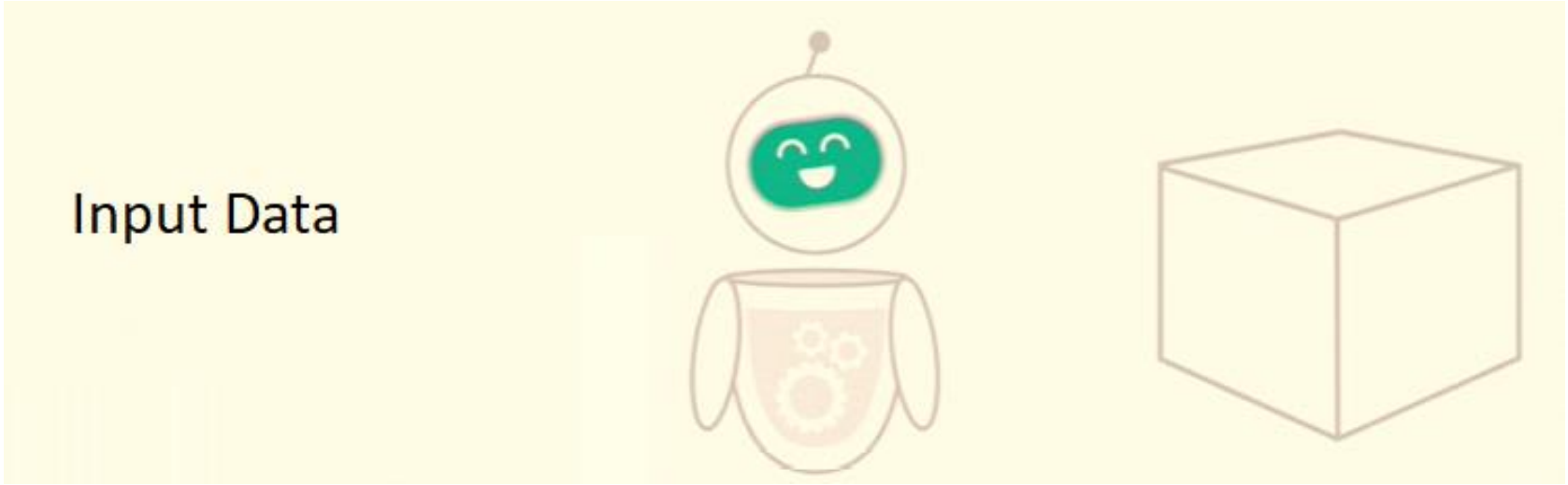
Continual monitoring and maintenance

- Don't tinker with it – nullifies results
- Monitor performance

Maintenance and rejuvenation

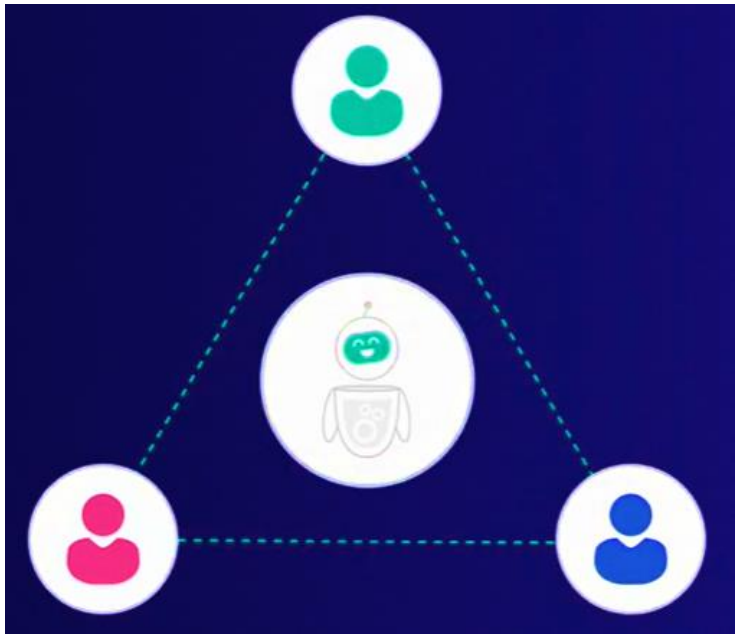
- AI algorithms tend to degenerate over time – data relationships change
- Evaluate possible revisions and conduct tuneups
- May decommission altogether and start from scratch
- Never set it and forget it

AI, Project Management & Business Decision Making



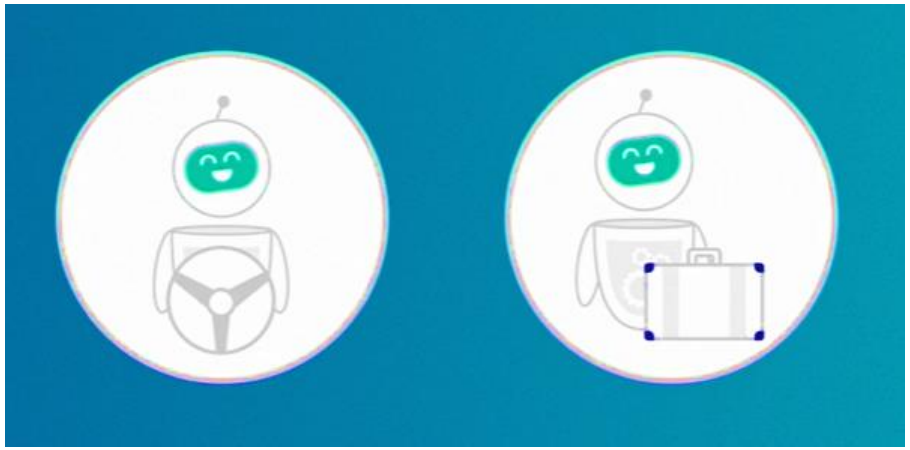
Impact on Project Management

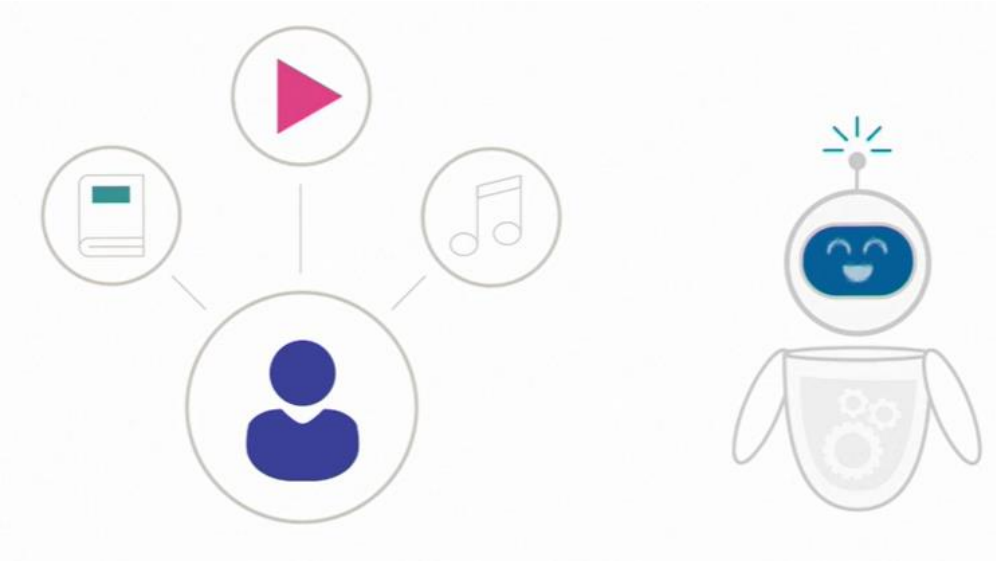
- Repositioning of project managers
- Improved communications
- Repositioning of project managers
- Improved communications
- Outsourcing work
- Decentralizing operations



Impact on HR Management

- Monitor process flows
- Check resource availability
- Assign tasks
- Provide real-time reporting
- Curate self-paced study programs

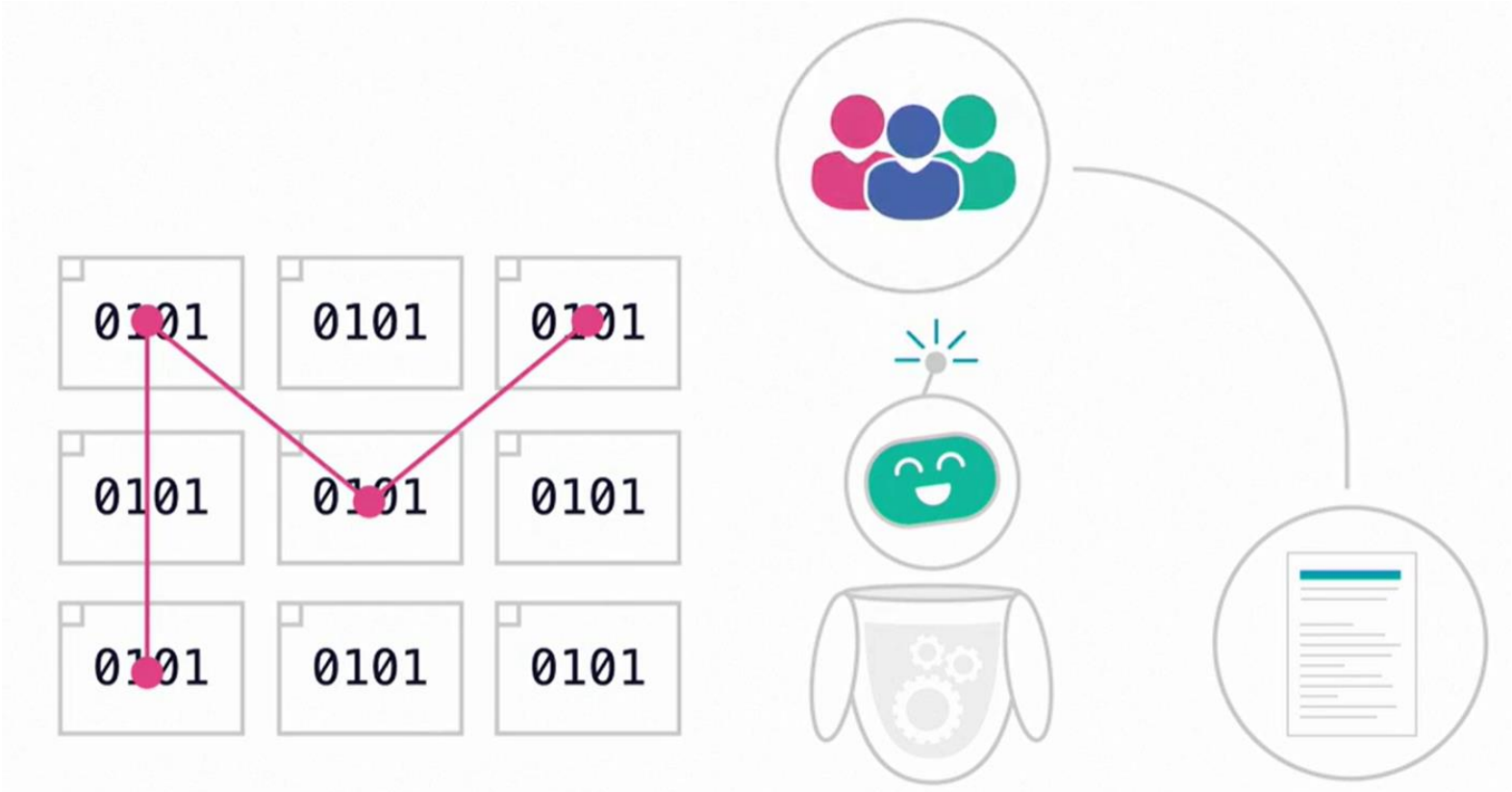




Focus on How …

"Whatever you are studying right now, if you are not getting up to speed on deep learning, neural networks, etc., you lose. We are going through the process where software will automate software, automation will automate automation."

—Mark Cuban



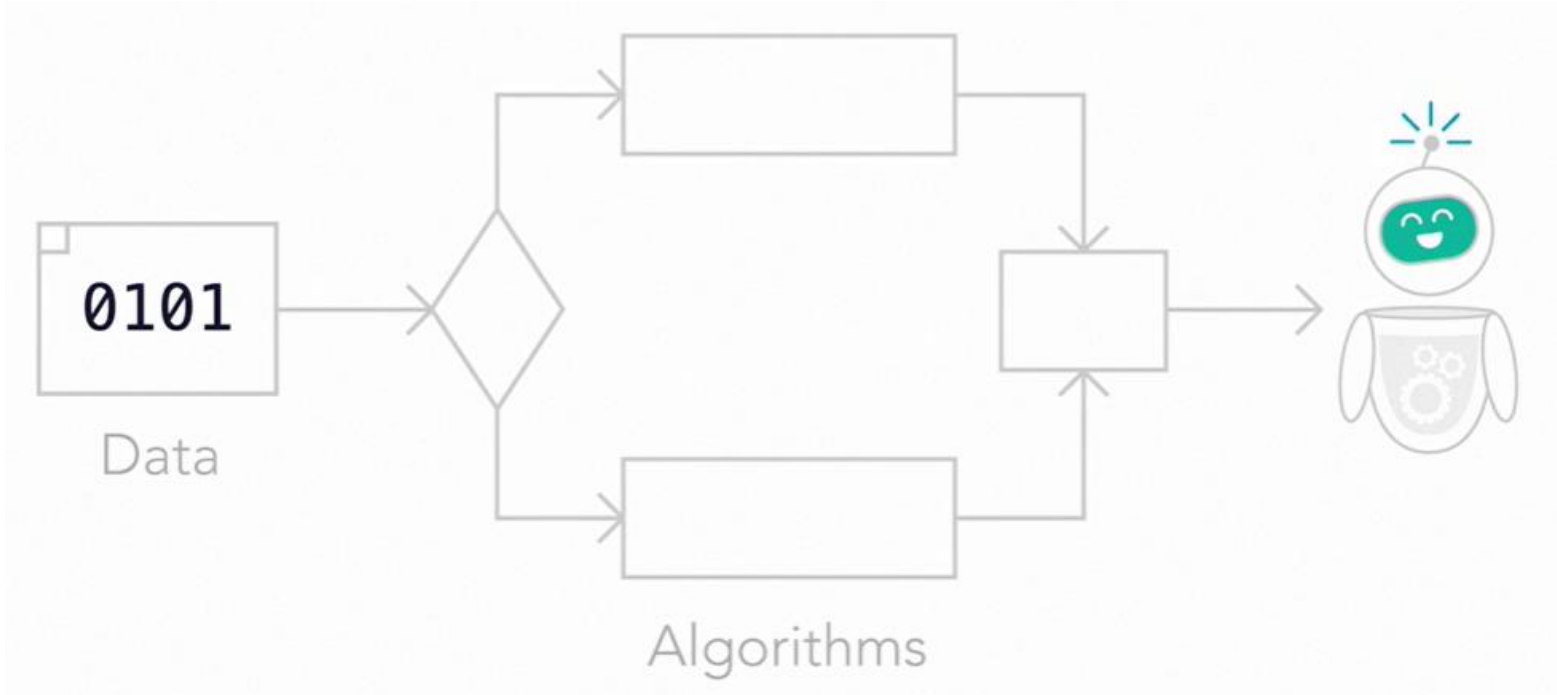
What AI Monitors

- Deadlines
- Productivity
- Risks
- Quality

What's the probability of delivering on time?

Will the project come in under budget?

Which team member is best assigned to a specific task?


0101
Data
Algorithms

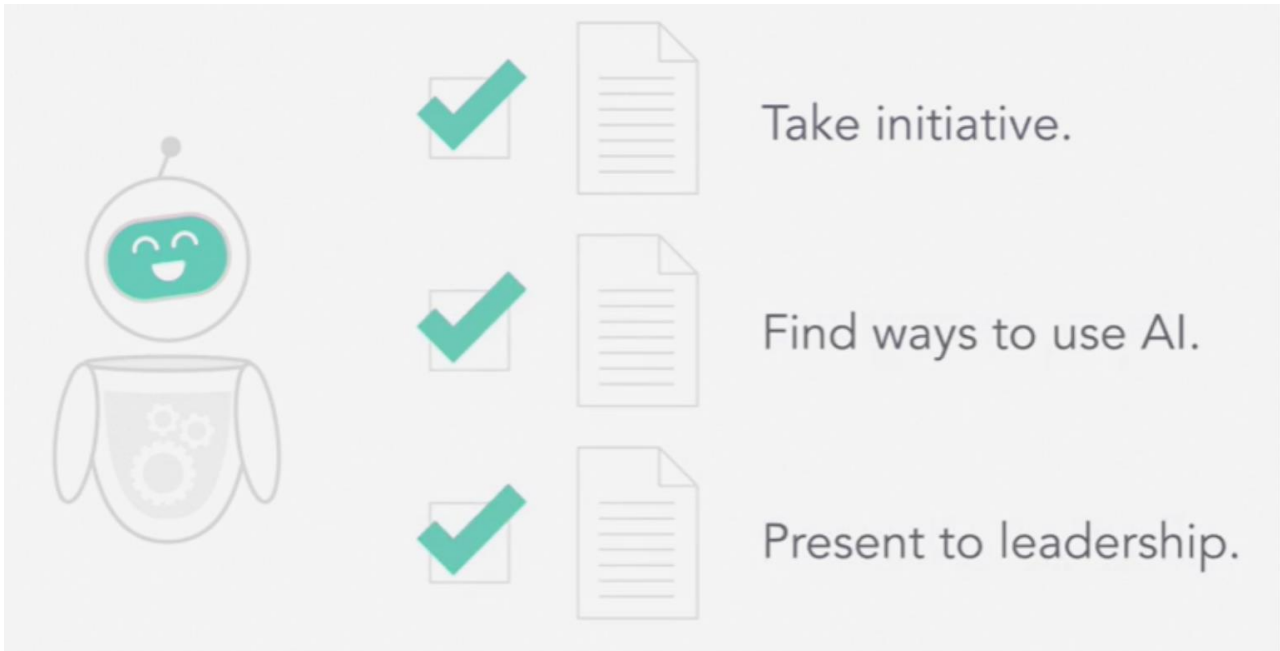
Benefits of AI Predictive Analytics

- Identify patterns
- Improve processes
- Make realistic estimates
- Reduce errors
- Deliver consistent results

Embrace The Disruption

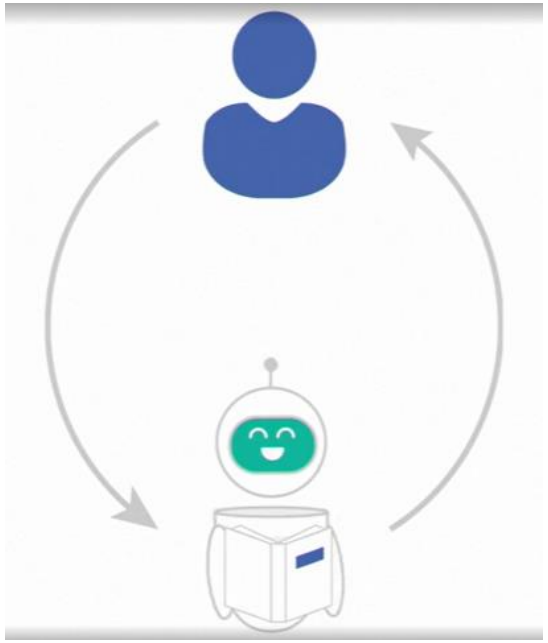
- Become curious about AI
- Talk to people in other professions
- Be ready for change

- what aspects of my projects can be improved?
- Which problems are having the greatest impact on my projects?
- How can AI potentially make my processes more efficient?
- How can I influence senior leadership to embrace AI?
- And are there other teams within my organization that could also benefit from adopting from AI?

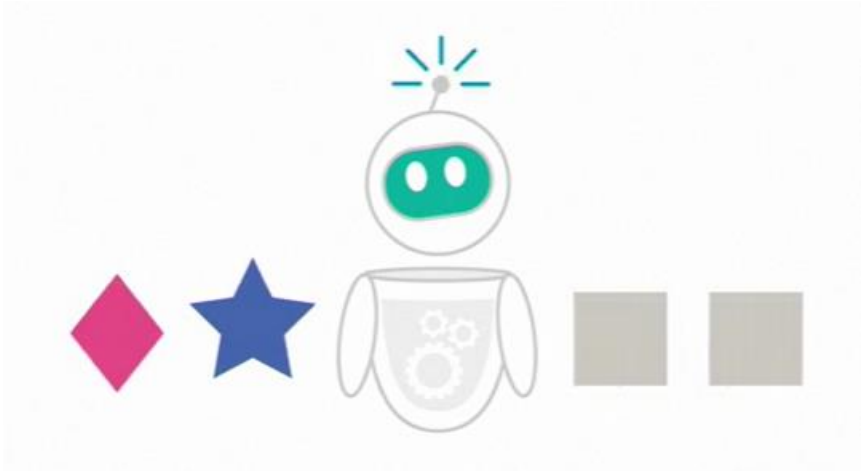

Take initiative.
Find ways to use AI.
Present to leadership.

Entrepreneurial Characteristics

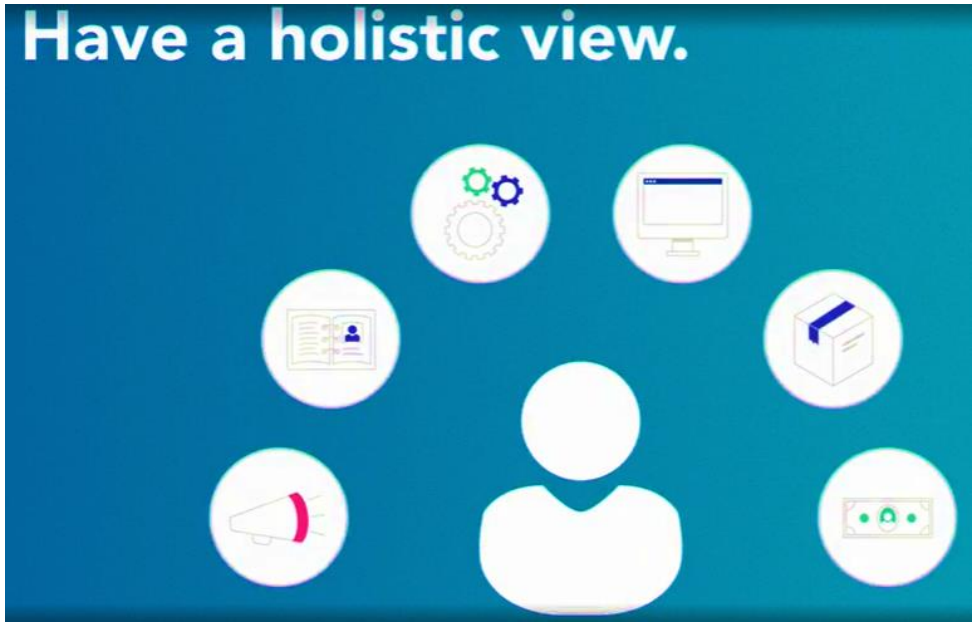
- Have a creative spirit
- See opportunities
- Take ownership
- Be flexible



Leverage Human Creativity

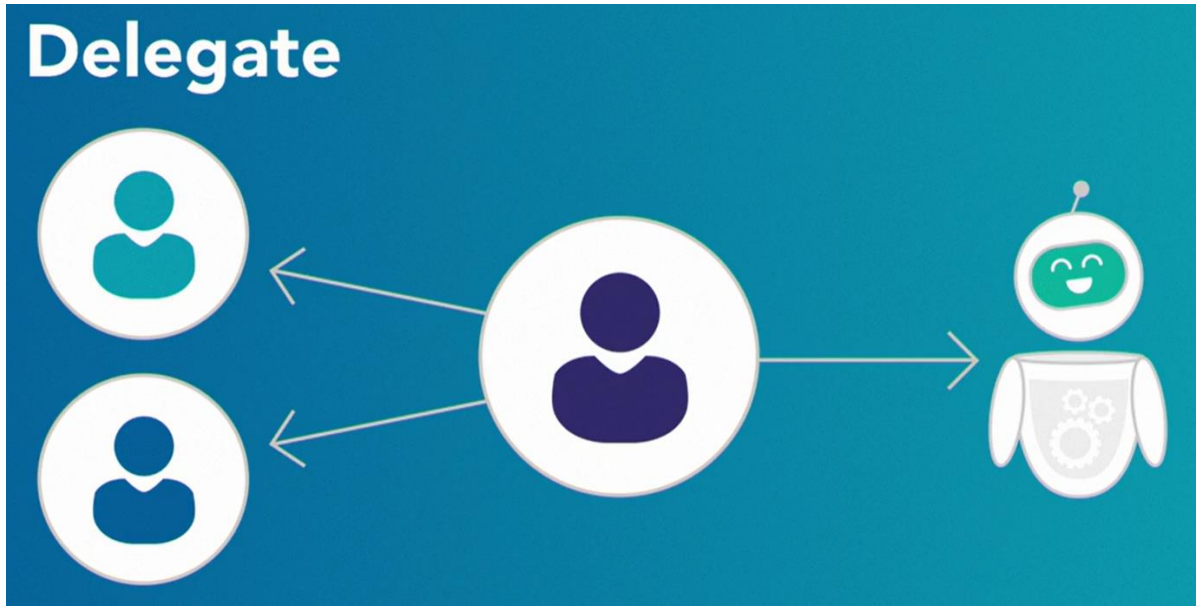


Hone Leadership Skills



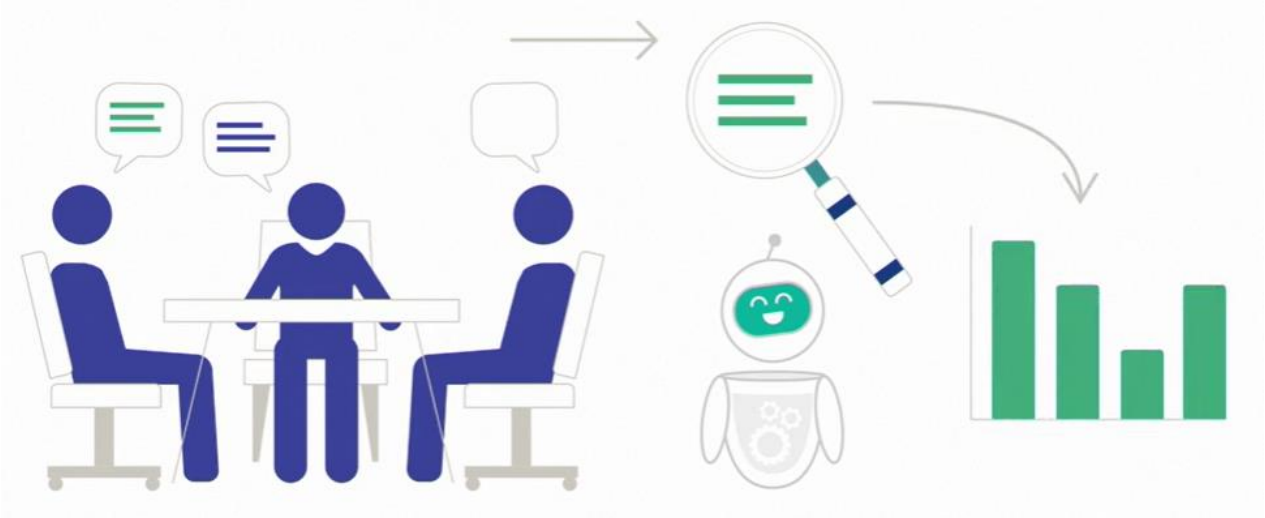
Interpersonal Skills

- Diplomacy
- Negotiation
- Public speaking
- Communication
- Emotional intelligence



Uses of AI

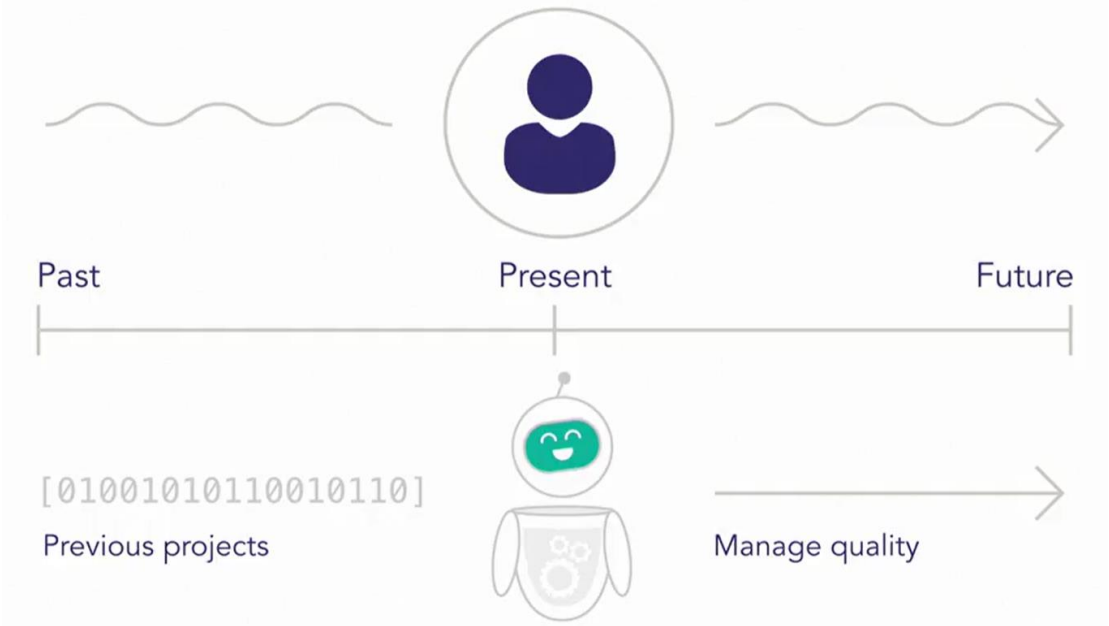
- Decision-making
- Predictions
- Project kickoff
- Meeting notes and analysis

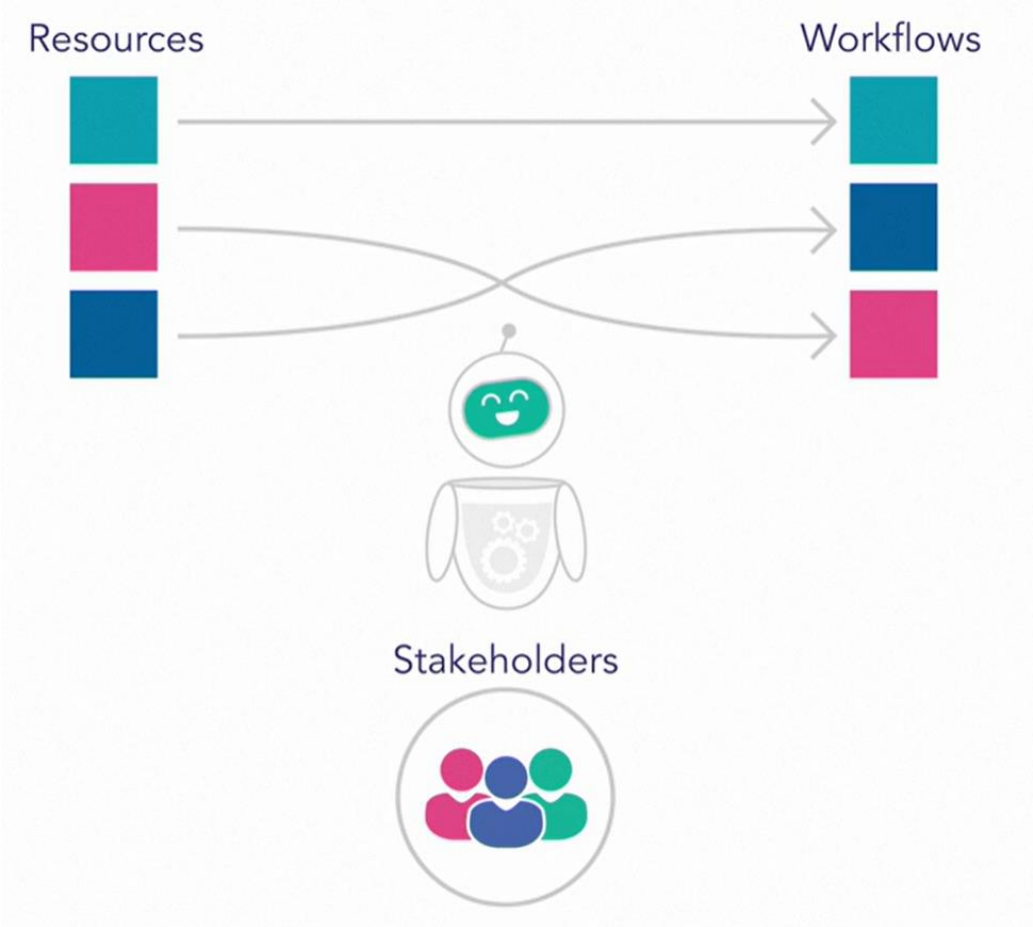


AI Project Management Planning

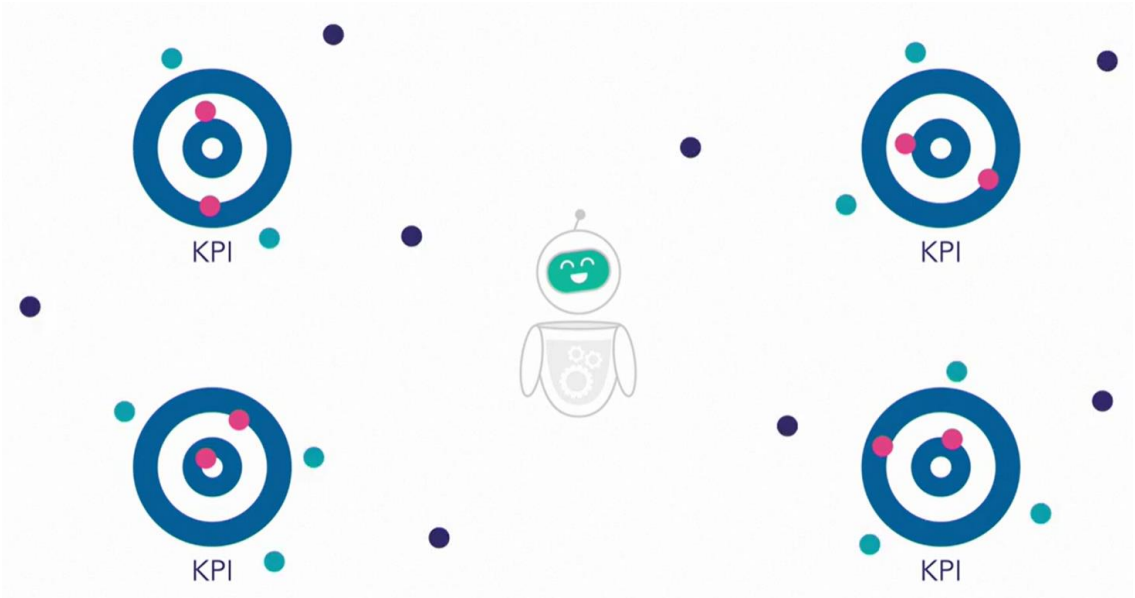
- Collect requirements
- Track assumptions
- Archive materials
- Analyze lessons learned
- Create schedules
- Develop budgets
- Allocate resources
- Analyze risks
- Plan risk responses

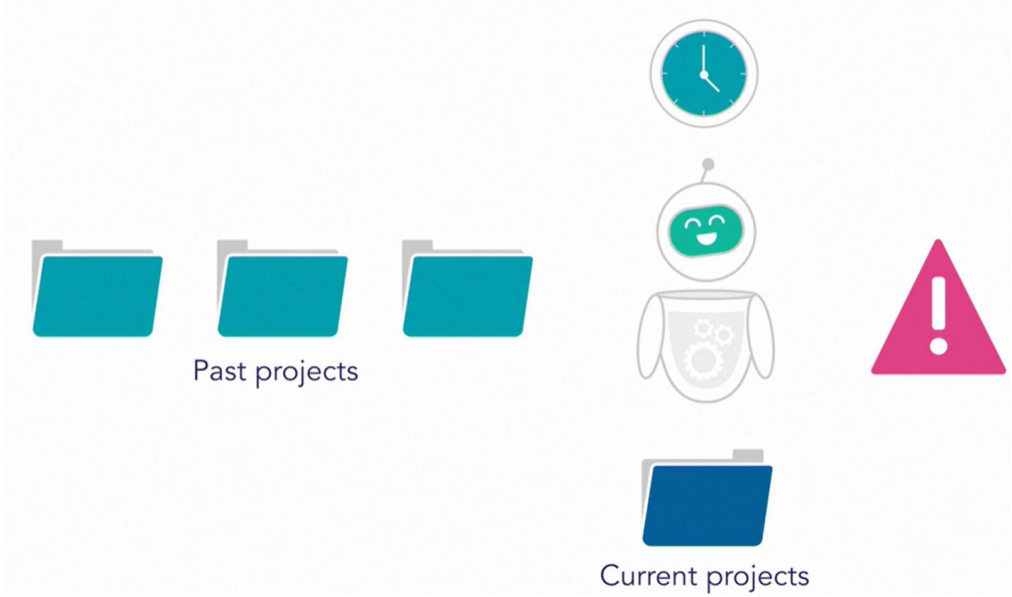
Execute Projects Using AI





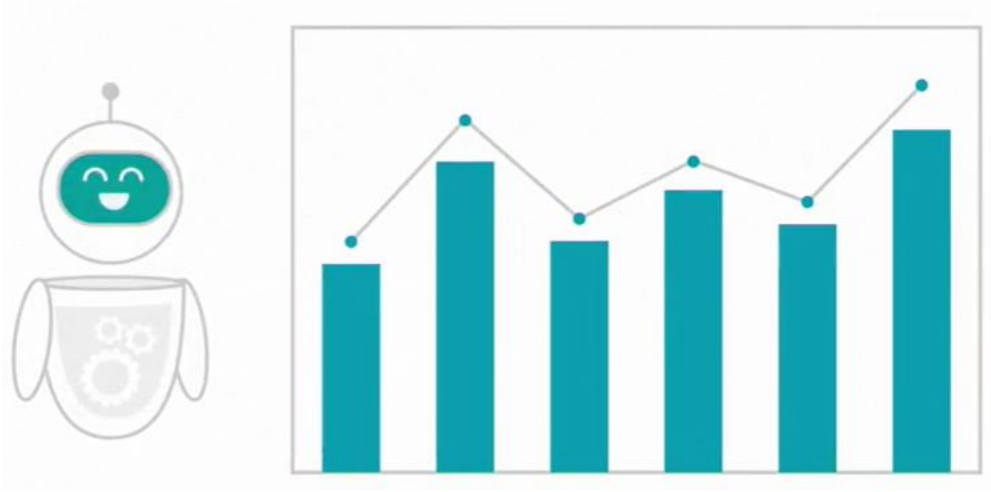
Monitor & Control Projects Using AI





Close Projects Using AI

Integrate Projects Using AI



Project Integration Requirements

1. Holistic view
2. Tailoring of processes
3. Plan for changes

QUIZ TIME!!!

Question 1 of 6

_____ use rules to evaluate and reach conclusions about problems based on data in a very specific domain or area.

- Natural language processing
- Textual analyzer
- Image recognition
- Expert systems

Question 2 of 6

Which object characteristic is used in image recognition?

- color
- all of these answers
- texture
- shape

Question 3 of 6

What are the two types of knowledge?

- explanatory and procedural
- declarative and procedural
- declarative and comprehensive
- declarative and explanatory

Question 4 of 6

Which is an important element in textual analysis?

- a blockchain
- an optimization algorithm
- a dictionary
- none of these answers

Question 5 of 6

Natural _____ processing is an area of AI

- image
- artificial
- language
- driving

Question 6 of 6

What does AI stand for?

- artificial inspection
- applied intelligence
- artificial intelligence
- accurate inspection

Answers

Answer1 - Expert systems
ES are computer programs designed to act as experts in particular areas.

Answer2 - all of these answers
All of these characteristics are used in image recognition.

Answer3 - declarative and procedural

Answer4 - a dictionary
A dictionary is important to let an AI classify words based on their meaning.

Answer5 - language
Natural language processing is an area of AI.

Answer6 - You are right!
AI stands for artificial intelligence.