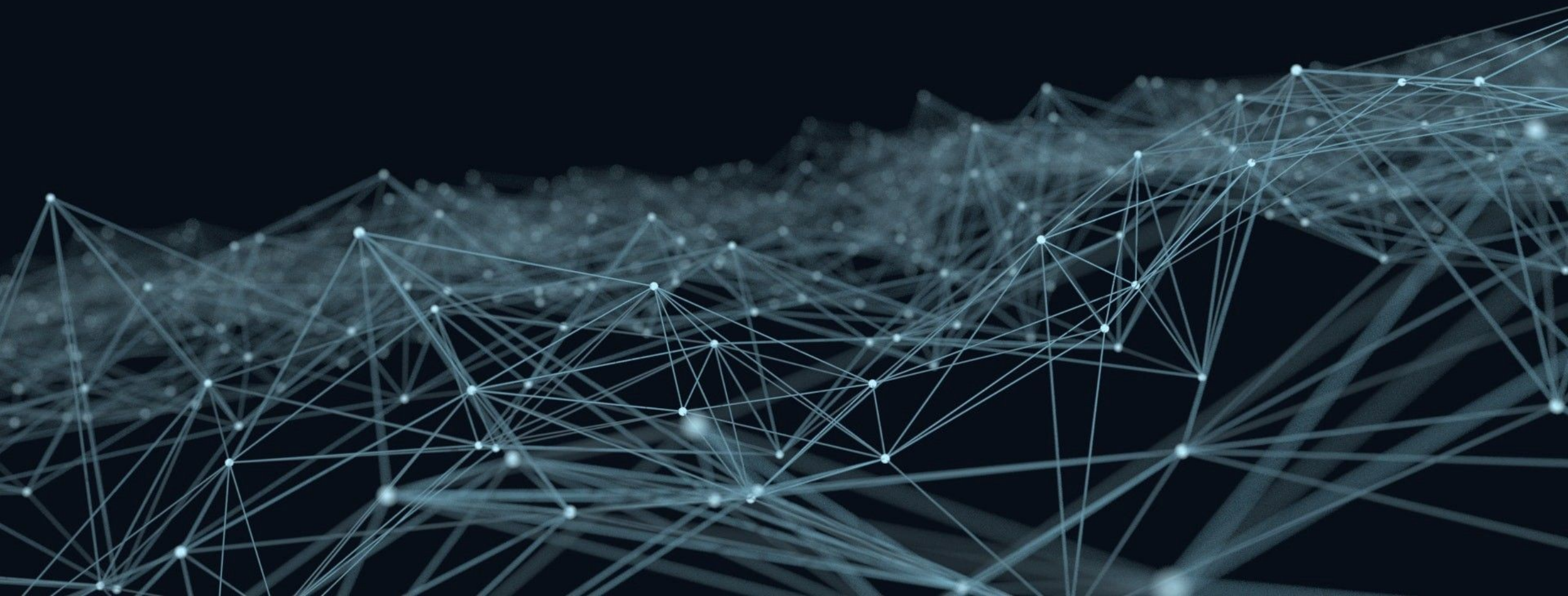
AI Implications for Business Strategy

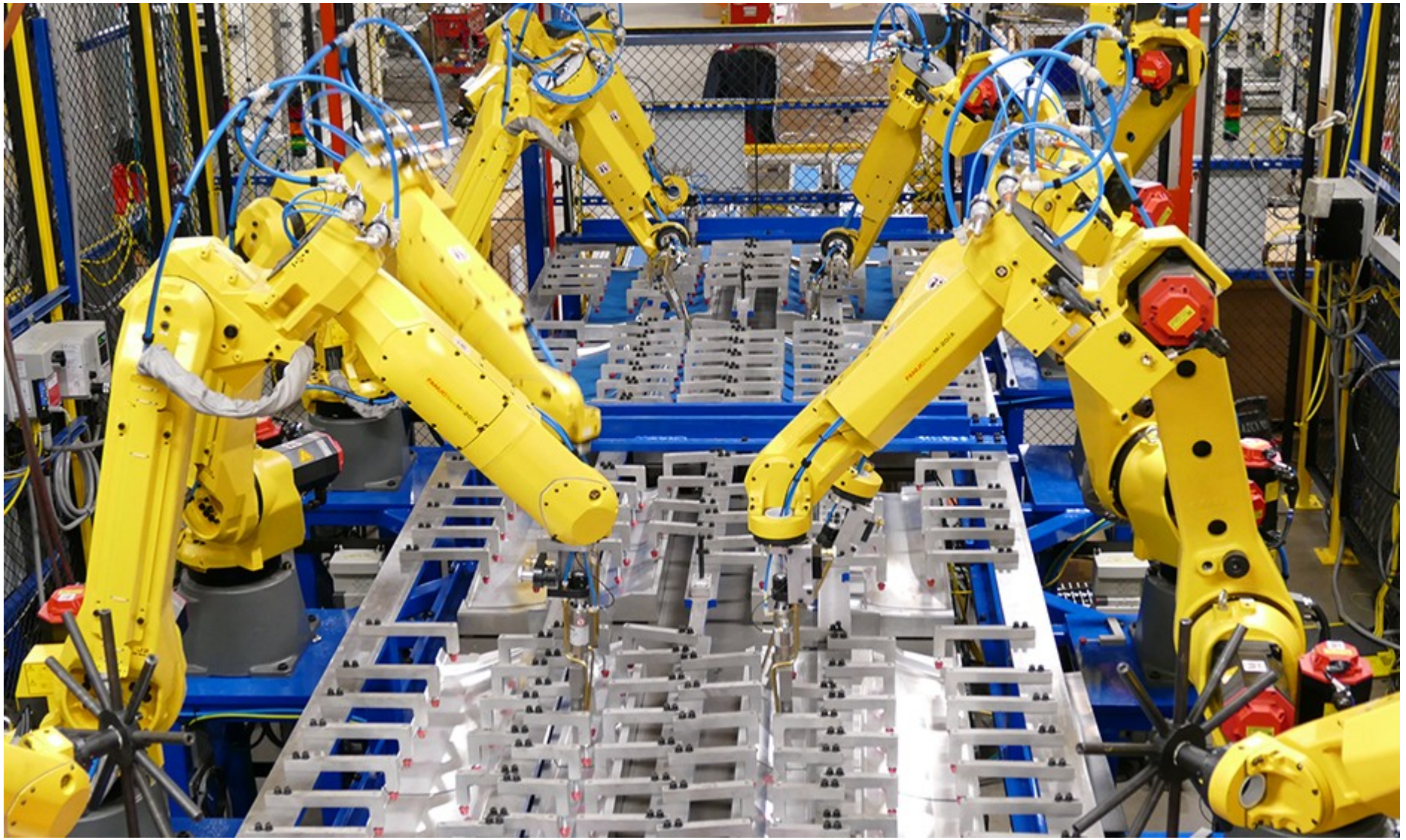
8. Robotics and RPA



Robotics

- We generally divide robots into two types
- Physical robots that interact with the real world
  - Tethered robots generally perform routine tasks
  - AI is often integrated to provide visual or other capabilities
  - Autonomous robots use ML to interact independently with the world
- Software robots that work in cyberspace (bots)
  - Robotic Process Automation – software agents that execute defined processes
  - Autonomous bots – software agents that interact with other agents in a software environment

Tethered Physical Robots



Autonomous Physical Robots

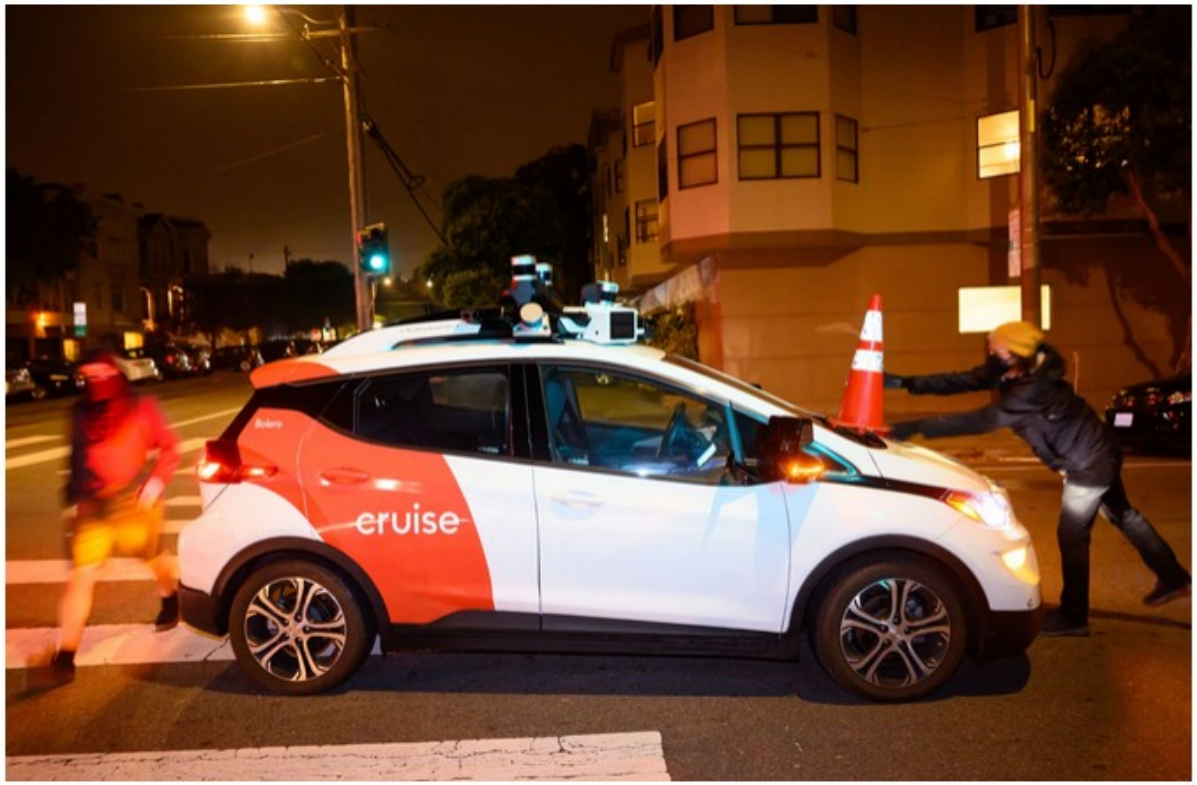
Autonomous Physical Robots

- Requires interactions with the environment
  - Going up stairs, avoiding obstacles etc
  - Deciding what action to take (should the car stop? Turn? Speed up?)
- This requires identifying what is in the environment
  - Self driving cars have to recognize pedestrians and red lights
  - Battlefield robots need to identify friend or foe
  - Identify targets and non-targets
- This can be done with reinforcement learning
- Cannot extapolate to new or unexpected environments

Armed with traffic cones, protesters are immobilizing driverless cars

By Dara Kerr
Published August 28, 2023 at 11:04 AM CDT

LISTEN • 3:51



Robotic Process Automation

- Replicating human actions in a process to execute a sequence of steps
  - Produces a meaningful activity (accomplishes a goal)
  - Without human intervention
- Main goal is to replace repetitive and boring tasks done by humans with bot
- Examples
  - Logging into an application
  - Moving files and folders
  - Filling out forms
  - Identifying missing information
  - Extracting data from documents or websits

Robotic Process Automation

- Uses software with AI and ML capabilities to handle high-volume, repeatable tasks that previously required humans to perform.
  - These tasks can include queries, calculations and maintenance of records and transactions.
  - RPA bots, mimics a human worker, logging into applications, entering data, calculating and completing tasks and logging out.
- RPA software is not part of an organization's IT infrastructure.
  - Instead, it sits on top of it, enabling a company to implement the technology quickly and efficiently -- all without changing the existing infrastructure and systems.

Scope of Automation

What should be automated ?

- Repetitive steps
- Time-consuming steps
- High-risk tasks
- Tasks with a low-quality yield
- Tasks involving multiple people and multiple steps

What can be automated ?

- Well defined and rule-based steps
- Logical
- An input to the task can be diverted to the software system
- Input can be deciphered by software systems with available techniques
- The output system is accessible
- Benefits are more than the cost

Evolution of RPA

- The term "robotic process automation" can be traced to the early 2000s, but the technology had been developing for a number of years previously.
- RPA evolved from three key technologies:
  - screen scraping,
  - workflow automation
  - artificial intelligence.
- Screen scraping is the process of collecting screen display data from a legacy application so that the data can be displayed by a more modern user interface.
- Workflow automation software often results in increased speed, efficiency and accuracy.
- AI eliminates the need for human intervention

Claimed Benefits of RPA

- Enabling better customer service.
- Ensuring business operations and processes comply with regulations and standards.
- Allowing processes to be completed much more rapidly.
- Providing improved efficiency by digitizing and auditing process data.
- Creating cost savings for manual and repetitive tasks.
- Enabling employees to be more productive.

Examples of RPA

- Customer service:
  - Verifying e-signatures, uploading scanned documents and verifying information for automatic approvals or rejections.
- Accounting:
  - Managing general accounting data processing, reporting and budgeting.
- Financial services:
  - Foreign exchange payments, automating account openings and closings, managing audit requests and processing insurance claims.
- Healthcare:
  - Handling patient records, claims, customer support, account management, billing, reporting and analytics.

Examples of RPA

- Human resources:
  - Onboarding and offboarding, updating employee information and timesheet submission processes.
- Supply chain management:
  - Procurement, automating order processing and payments, monitoring inventory levels and tracking shipments.

Examples of RPA

Take over repetitive tasks that employees carry out **50-60** times a day

Periodic reporting, data entry and **data analysis**

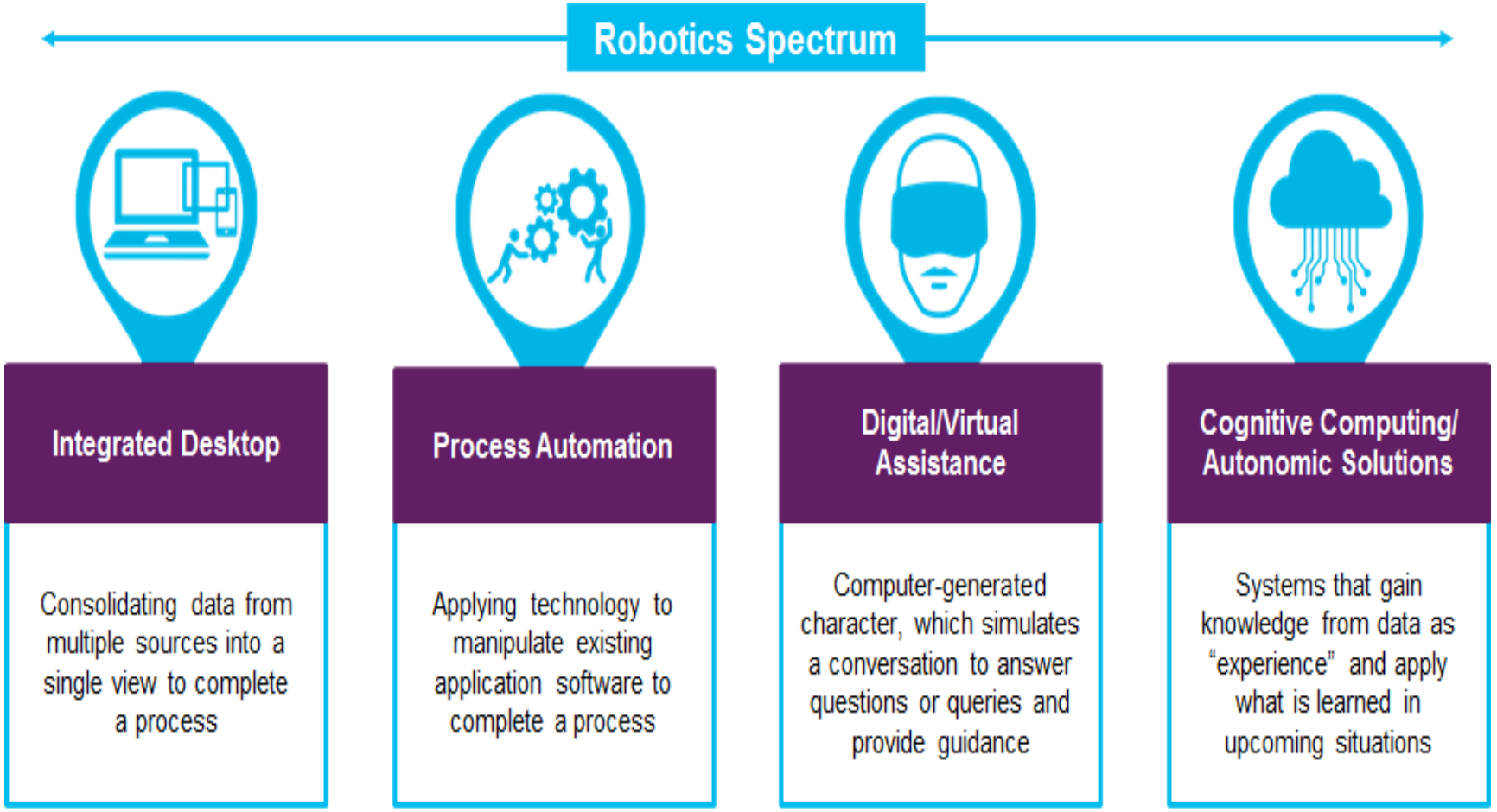
Mass email generation, archiving, extracting

Conversion of data formats and graphics

ERP transactions

Process lists and **file storage**

Types of RPA


Robotics Spectrum
Integrated Desktop
Consolidating data from multiple sources into a single view to complete a process
Process Automation
Applying technology to manipulate existing application software to complete a process
Digital/Virtual Assistance
Computer-generated character, which simulates a conversation to answer questions or queries and provide guidance
Cognitive Computing/ Autonomic Solutions
Systems that gain knowledge from data as "experience" and apply what is learned in upcoming situations

RPA versus Traditional Automation

- RPA software is aware and adapts to changing circumstances, exceptions and new situations.
- After a bot is trained to capture and interpret the actions of specific processes in existing software applications
  - It can then manipulate data, trigger responses, initiate new actions and communicate with other systems autonomously.
  - It can interact and collaborate with other bots
- RPA is used for organizations when there are many different and complicated systems that need to interact together fluidly.
- RPA technology software that has the ability to adapt, self-learn and self-correct would handle the exception and interact with the business systems without human assistance.

RPA versus Traditional Automation

- RPA software is aware and adapts to changing circumstances, exceptions and new situations.
- After a bot is trained to capture and interpret the actions of specific processes in existing software applications
  - It can then manipulate data, trigger responses, initiate new actions and communicate with other systems autonomously.
  - It can interact and collaborate with other bots
- RPA is used for organizations when there are many different and complicated systems that need to interact together fluidly.
- RPA technology software that has the ability to adapt, self-learn and self-correct would handle the exception and interact with the business systems without human assistance.

Chatbots

- These are bots that are specifically designed to interact with people
- These can be overt
  - Help systems and query systems
- These can be covert
  - Often used to influence people or trend algorithms by generating artificial interactions
  - For example, sexbots on twitter
  - Used for malicious purposes
- These are becoming increasingly sophisticated with LLM support

End of Module