



The role of HR in Artificial Intelligence to assess the Individual Performance

These slides were created to discuss the role of AI and what our understanding of AI is and where it may take us in measuring individual performance.

Sharing Research:
**The role of Artificial Intelligence in assessing
Individual Performance – A HR Perspective**



- 1. What is AI?**
2. The Research Question
3. Background about AI
4. How AI can transform HR
5. The Impact on HR
6. Current Thinking & Practices
7. Question & Answers

Professor Jonathan Liu

Dr Sree Lekshmi Sreekumaran & Dr Ozlem Ozdemir

This session is intended for our Doctoral students who are keen to learn about new areas of research. This presentation is about AI and HR

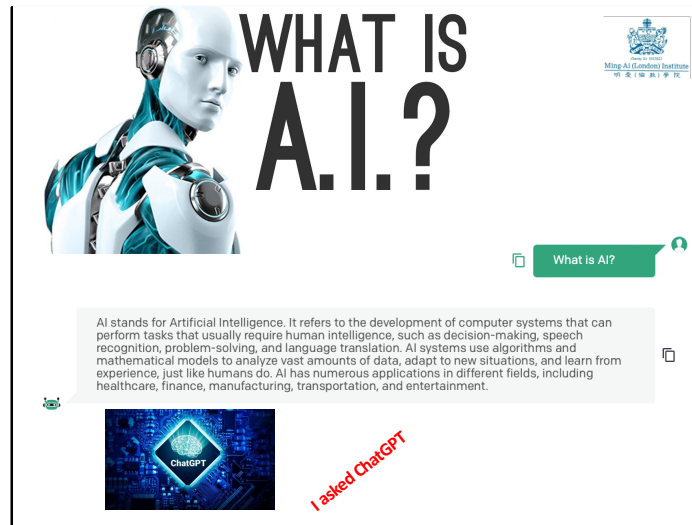
The facilitator of this session, Professor Jonathan Liu, will highlight the work that his team is doing in the area of performance management and AI. This is going to be an interactive session.

Professor Jonathan is Chairman of the Board of Trustees at Ming-Ai (London) Institute, a British Chinese Heritage Charity. He provides strategic leadership and governance of the Board and ensures that the Board discusses all key and appropriate issues in a timely manner. Jonathan has in-depth and hands-on experienced in launching new ventures and start-up businesses and has been involved in transforming established businesses in both academic and public institutions in the United Kingdom, Europe, South East Asia and China. He was Professor of Global Business Management at Regent's University London, where he was Assistant Dean for research, scholarship and engagement. He was a Professor of Management and Assistant Dean for Research at Newport University and was Professor of Chinese Management and Director of the China Management Centre during his time at Middlesex

University. He has been with the University of Wales, Trinity Saint David as a supervisor of research students since 2008.

Professor Jonathan is the Editor-in-Chief of the International Journal of Business Performance Management with Inderscience Publishers. He is on the editorial board of the Journal of Islamic Marketing, book review editor of the Journal of Technology Management in China and on the editorial board of leading academic journals in Pakistan and Hungary. Jonathan publishes extensively and has over a hundred articles and ten books published in subject areas relating to Business and Management. He is Secretary to the Council of the National Conference of Universities Professors, a Council member of the Universities China Committee in London, a Fellow of Higher Education Academy and a Chartered Fellow of the Chartered Management Institute. He is a Council Member of the British Academy of Management and Chair of the Special Interest Group on Performance Management. His primary research interest lies in three areas concerning Performance Management, Entrepreneurship and Heritage.

His co-authors are Dr. Sree Lekshmi Sreekumaran Nair (Trinity St David, University of Wales) and Dr Ozlem Ozdemir (Regent's University London) and the paper will be featured in the British Academy of Management's Conference in 2023.



What is Artificial Intelligence? Definition, History, and Types

Artificial intelligence (AI) is the practice of simulating of human intelligence in machines that are coded to think like people with the help of software tools. The concept is applicable to any type of machine that demonstrates skills related to human mind. Simply put, Artificial Intelligence (AI) is a way of associating features such as learning, motion, creativity, reasoning, social intelligence, etc. that human beings possess with a computer or a computer-controlled robot.

History of Artificial Intelligence

1956 – The term ‘artificial intelligence’ is created by John McCarthy

1969 – The earliest built multipurpose mobile robot was the “Shakey”

1997 – A robot designed, which beat the chess player was the supercomputer “Deep Blue”

2002 – Robotic vacuum sweeper was designed earliest in the order.

2005 – 2020 – We have a dancing robot, cleaning robot, speech recognition, etc.

What is the Definition of Artificial Intelligence?

Designing a computer, robots, and computer software are the outcomes of the term “Artificial Intelligence”. It is achieved by working on the human brain and examining the process of brain cognition. There are two concepts of AI which are Machine Learning and Deep Learning. Like people, a computer software tool can automatically learn from a submitted data and adapt to new conditions. This is the concept of machine learning. Deep Data, on the other hand, is the subset of Machine Learning which enables learning from unstructured or unlabeled data.

There are some aims of Artificial Intelligence;

1.Logical Reasoning

AI software allows computers to do complex tasks.

2.Knowledge Representation

To create a new innovative world resembling to a “human-computer symbiosis”, the programming language called “Smalltalk” was designed.

3.Planning and Navigation

The method of allowing the computer to help you move from point X to point Y.

4.Natural Language Processing

Make computers so that they can deal with different languages.

5.Perception

The usage of computers to communicate with the world over smell, tangibility, vision, and sound.

6.Emergent Intelligence

To create robots with emotions and moral reasoning. AI-enabled devices can recognize speeches of different people, detect various types of objects and solve a problem by the help of given parameters.

Kinds of AI

1.Theory of Mind

This Artificial Intelligence is able to comprehend social interactions, emotions, and ideas.

2.Purely Reactive

Robotic machines do not need any memory or data to operate. For instance, a computer can evaluate the

moves of the competitor and decides the best move to win in a chess game.

3. Self-Aware

Future type of AI is assumed to be more sentimental, conscious, and smart.

4.Limited Memory

Machines which gather preceding data and keep on attaching them to their previous memory.

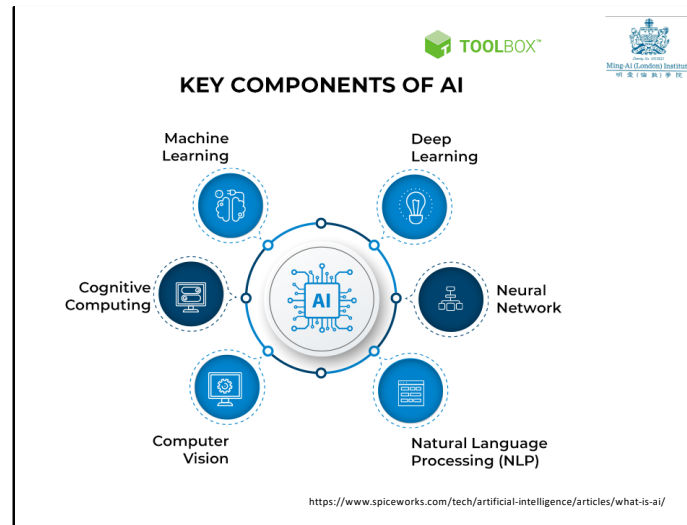
Areas of Usage of Artificial Intelligence in our daily lives

1.[Cyber Security](#)

2.Online Customer Support

3.Virtual Assistants

4.Banking Fraud Detection



What Is Artificial Intelligence (AI)? Definition, Types, Goals, Challenges, and Trends in 2022

What Is Artificial Intelligence (AI)?

Artificial intelligence (AI) is the intelligence of a machine or computer that enables it to imitate or mimic human capabilities.

AI uses multiple technologies that equip machines to sense, comprehend, plan, act, and learn with human-like levels of intelligence. Fundamentally, AI systems perceive environments, recognize objects, contribute to decision making, solve complex problems, learn from past experiences, and imitate patterns. These abilities are combined to accomplish tasks like driving a car or recognizing faces to unlock device screens.

The AI landscape spreads across a constellation of technologies such as machine learning, natural language processing, computer vision, and others. Such cutting-edge technologies allow computer systems to understand human language, learn from examples, and make predictions.

Although each technology is evolving independently, when applied in combination with other technologies, data, analytics, and automation, it can revolutionize businesses and help them achieve their goals, be it optimizing supply chains or enhancing customer service.

How does AI work?

To begin with, an AI system accepts data input in the form of speech, text, image, etc. The system then processes data by applying various rules and algorithms, interpreting, predicting, and acting on the input data. Upon processing, the system provides an outcome, i.e., success or failure, on data input. The result is then assessed through analysis, discovery, and feedback. Lastly, the system uses its assessments to adjust input data, rules and algorithms, and target outcomes. This loop continues until the desired result is achieved.

Key components of AI

Intelligence has a broader context that reflects a deeper capability to comprehend the surroundings. However, for it to qualify as AI, all its components need to work in conjunction with each other. Let's understand the key components of AI.

- 1. Machine learning:** Machine learning is an AI application that automatically learns and improves from previous sets of experiences without the requirement for explicit programming.
- 2. Deep learning:** Deep learning is a subset of ML that learns by processing data with the help of artificial neural networks.
- 3. Neural network:** [Neural networks](#) are computer systems that are loosely modeled on neural connections in the human brain and enable deep learning.
- 4. Cognitive computing:** Cognitive computing aims to recreate the human thought process in a computer model. It seeks to imitate and improve the interaction between humans and machines by understanding human language and the meaning of images.
- 5. Natural language processing (NLP):** NLP is a tool that allows computers to comprehend, recognize, interpret, and produce human language and speech.
- 6. Computer vision:** Computer vision employs deep learning and pattern identification to interpret image content (graphs, tables, PDF pictures, and videos).

Sharing Research:

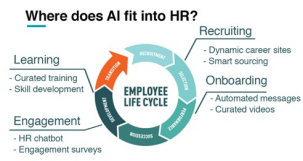
The role of Artificial Intelligence in assessing
Individual Performance – A HR Perspective



1. What is AI?
 - 2. The Research Question**
 3. Background about AI
 4. How AI can transform HR
 5. The Impact on HR
 6. Current Thinking & Practices
 7. Question & Answers
-



The Research Question



Where does AI fit into HR?

- Recruiting**
 - Dynamic career sites
 - Smart sourcing
- Onboarding**
 - Automated messages
 - Curated videos
- Engagement**
 - HR chatbot
 - Engagement surveys
- Learning**
 - Curated training
 - Skill development

EMPLOYEE LIFE CYCLE

1. Where does AI fit into HR?
2. Will the use of AI replace the functions of performance management and measurements currently done by HR?
3. Will AI implementation be ethical?

The Research Question

Performance management benefits for both employees and organisation. Employees in the organisation is keen to find out their performance, however the organisation is aware of the performance level of the staffs and decides who needs training to improve and increase the performance or update their skills. Also, the evaluation is essential to decide who is going to be penalised, rewarded and promoted depends upon the skills of the employees. According to Orlikowski (2000), for organisations to gain the competitive advantage, they need to use the technological developments which allow them to develop their business. Through AI, the organisation can improve their performance appraisal systems and encourage employees to provide the correct results of the evaluation system (Sholihin, 2013). Also, especially with hybrid working culture, it is essential to track the performance of the

employees and record it. By using AI, this process can be less time consuming and accurate data has been generated. There are no evidence discusses the use of AI into Performance Management of hybrid working culture. Thus, the research question developed as follows:

1. Where does AI fit into HR? (<https://www.mebobot.com/how-will-hr-budget-for-artificial-intelligence-ai-solutions-in-2020/>)
2. Will the use of AI replace the functions of performance management and measurements currently done by HR?
3. Will AI implementation be ethical?

Sharing Research:

The role of Artificial Intelligence in assessing
Individual Performance – A HR Perspective



1. What is AI?
 2. The Research Question
 - 3. Background about AI**
 4. How AI can transform HR
 5. The Impact on HR
 6. Current Thinking & Practices
 7. Question & Answers
-

History of Artificial Intelligence



1950 – Alan Turing Test ... can machines think?

1951 - Isaac Asimov proposed the 3 Laws of Robotics and the first AI program was written

1955 First self learning game playing program was created

1956 – The term 'artificial intelligence' is created by John McCarthy

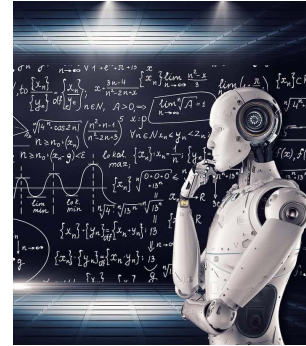
1969 – The earliest built multipurpose mobile robot was the "Shakey"

1997 – A robot designed, which beat the chess player was the supercomputer "Deep Blue"

2002 – Robotic vacuum sweeper was designed earliest in the order.

2005 – 2020 – We have a dancing robot, cleaning robot, speech recognition, etc.

2021 – Welcome Chat GPT Open AI



OECD (2019), *Artificial Intelligence in Society*, OECD Publishing, Paris, <https://doi.org/10.1787/aeaf77-en>

History of Artificial Intelligence

1950 – Alan Turing ... can machines think?

1951 – Isaac Asimov 3 Laws of robotics

1956 – The term 'artificial intelligence' is created by John McCarthy

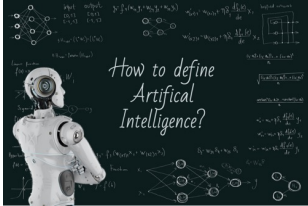
1969 – The earliest built multipurpose mobile robot was the "Shakey"

1997 – A robot designed, which beat the chess player was the supercomputer "Deep Blue"

2002 – Robotic vacuum sweeper was designed earliest in the order.

2005 – 2020 – We have a dancing robot, cleaning robot, speech recognition, etc.





Professor John McCarthy defined AI as -

“the science and engineering of making intelligent machines”.

2 main types of definitions

Type I and Type II

What is the Definition of Artificial Intelligence?

Designing a computer, robots, and computer software are the outcomes of the term “Artificial Intelligence”. It is achieved by working on the human brain and examining the process of brain cognition. There are two concepts of AI which are Machine Learning and Deep Learning. Like people, a computer software tool can automatically learn from a submitted data and adapt to new conditions. This is the concept of machine learning. Deep Data, on the other hand, is the subset of Machine Learning which enables learning from unstructured or unlabeled data.

Professor John McCarthy in 1955, was defined by him as “the science and engineering of making intelligent machines”.

2023 - 4 main types of artificial intelligence

Learning in AI can fall under the types “narrow,” “general,” and “super.” These categories demonstrate AI’s capabilities as it evolves—performing narrowly defined sets of tasks, performing the same ability to think like humans (general), and performing beyond human capability. Then, there are four main types of AI as defined by Arend Hintze, researcher and professor of integrative biology at Michigan State University [1]. They are as follows:

1. Reactive machines

Reactive machines are AI systems that have no memory and are task specific, meaning that an input always delivers the same output. [Machine learning models](#) tend to be reactive machines because they take customer data, such as purchase or search history, and use it to deliver recommendations to the same customers.

This type of AI is reactive. It performs “super” AI, because the average human would not be able to process a customer’s entire Netflix history and feed back customized recommendations. Reactive AI, for the most part, is reliable and works well in inventions like self-driving cars. It doesn’t have the ability to predict future outcomes unless it has been fed the appropriate information.

Compare this to our human lives, where most of our actions are not reactive because we don’t have all the information we need to react upon, but we have the capability to remember and learn. Based on those successes or failures, we may act differently in the future if faced with a similar situation.

Beat at chess by IBM’s supercomputer: One of the best examples of reactive AI is when Deep Blue, IBM’s chess-playing AI system, beat Garry Kasparov in the late 1990s. Deep Blue could identify their own and their opponents’ pieces on the chessboard to make predictions, but it does not have the memory capacity to use past mistakes to inform future decisions. It only makes predictions based on what moves could be next for both players and selects the best move.

Netflix recommendations: Netflix’s recommendation engine is powered by machine learning models that process the data collected from a customer’s viewing history to determine specific movies and TV shows that they will enjoy.

Humans are creatures of habit—if someone tends to watch a lot of Korean dramas, Netflix will show a preview of new releases on the home page.

2. Limited memory

The next type of AI in its evolution is limited memory. This algorithm imitates the way our brains’ neurons work together, meaning that it gets smarter as it receives more data to train on. [Deep learning](#) improves image recognition and other types of reinforcement learning.

Limited memory AI, unlike reactive machines, can look into the past and monitor specific objects or situations over time. Then, these observations are programmed into the AI so that its actions can perform based on both past and present moment data. But in limited memory, this data isn't saved into the AI's memory as experience to learn from, the way humans might derive meaning from their successes and failures. The AI improves over time as it's trained on more data.

Self-driving cars: A good example of limited memory AI is the way self-driving cars observe other cars on the road for their speed, direction, and proximity. This information is programmed as the car's representation of the world, such as knowing traffic lights, signs, curves, and bumps in the road. The data helps the car decide when to change lanes so that it does not get hit or cut off another driver.

3. Theory of mind

The first two types of AI, reactive machines and limited memory, are types that currently exist. Theory of mind and self-awareness are AI types that will be built in the future. As such, there aren't any real world examples yet.

If it is developed, theory of mind AI could have the potential to understand the world and how other entities have thoughts and emotions. In turn, this affects how they behave in relation to those around them.

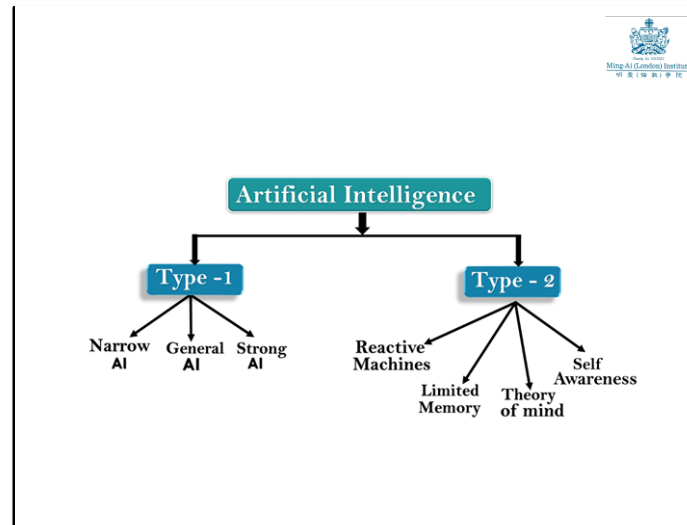
Humans understand how our own thoughts and emotions affect others, and how others' affect us—this is the basis of our society's human relationships. In the future, theory of mind AI machines could be able to understand intentions and predict behavior, as if to simulate human relationships.

4. Self-awareness

The grand finale for the evolution of AI would be to design systems that have a sense of self, a conscious understanding of their existence. This type of AI does not exist yet.

This goes a step beyond theory of mind AI and understanding emotions, to being aware of themselves, their state of being, and being able to sense or predict others' feelings. For example, "I'm hungry" becomes "I know I am hungry" or "I want to eat lasagna because it's my favorite food."

We are a long way from self-aware AI because there is still so much to uncover about the human brain's intelligence and how memory, learning, and decision-making work.



Types of AI

Artificial Intelligence can be broadly divided into two categories: AI based on capability and AI based on functionality. Let's understand each type in detail.

Let's first look at the types of AI based on capability.

1. Narrow AI

Narrow AI is a goal-oriented AI trained to perform a specific task. The machine intelligence that we witness all around us today is a form of narrow AI. Examples of narrow AI include Apple's Siri and IBM's Watson supercomputer.

Narrow AI is also referred to as weak AI as it operates within a limited and pre-defined set of parameters, constraints, and contexts. For example, use cases such as Netflix recommendations, purchase suggestions on ecommerce sites, autonomous cars, and speech & image recognition fall under the narrow AI category.

2. General AI

General AI is an AI version that performs any intellectual task with a human-like efficiency. The objective of general AI is to design a system capable of thinking for itself just like humans do. Currently, general AI is still under research, and efforts are being made to develop machines that have enhanced cognitive capabilities.

3. Super AI

[Super AI](#) is the AI version that surpasses human intelligence and can perform any task better than a human. Capabilities of a machine with super AI include thinking, reasoning, solving a puzzle, making judgments, learning, and communicating on its own. Today, super AI is a hypothetical concept but represents the future of AI.

Now, let's understand the types of AI based on functionality.

4. Reactive machines

Reactive machines are basic AI types that do not store past experiences or memories for future actions. Such systems zero in on current scenarios and react to them based on the best possible action. Popular examples of reactive machines include IBM's Deep Blue system and Google's AlphaGo.

5. Limited memory machines

Limited memory machines can store and use past experiences or data for a short period of time. For example, a self-driving car can store the speeds of vehicles in its vicinity, their respective distances, speed limits, and other relevant information for it to navigate through the traffic.

6. Theory of mind

Theory of mind refers to the type of AI that can understand human emotions and beliefs and socially interact like humans. This AI type has not yet been developed but is in contention for the future.

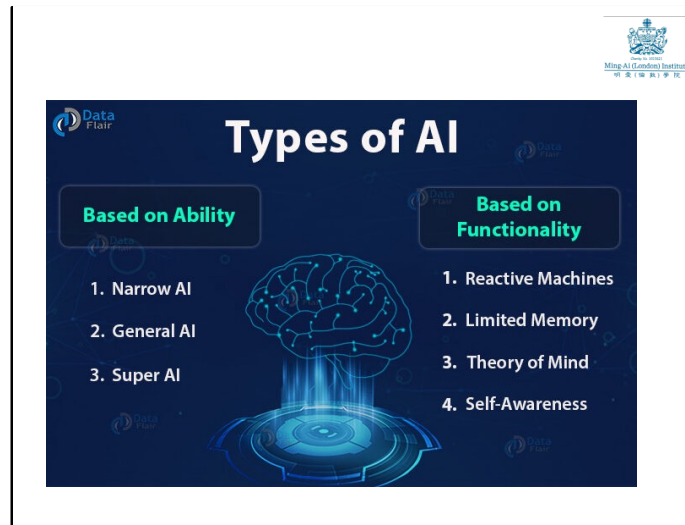
7. Self-aware AI

Self-aware AI deals with super-intelligent machines with their consciousness, sentiments, emotions, and beliefs. Such systems are expected to be smarter than a human mind and may outperform us in assigned tasks. Self-aware AI is still a distant reality, but efforts are being made in this direction.

Goals of Artificial Intelligence

AI is primarily achieved by reverse-engineering human capabilities and traits and applying them to machines. At its core, AI reads human behavior to develop intelligent machines. Simply put, the foundational goal of AI is

to design a technology that enables computer systems to work intelligently yet independently. The essential goals of AI are explained below.



What is the Definition of Artificial Intelligence?

Designing a computer, robots, and computer software are the outcomes of the term “Artificial Intelligence”. It is achieved by working on the human brain and examining the process of brain cognition. There are two concepts of AI which are Machine Learning and Deep Learning. Like people, a computer software tool can automatically learn from a submitted data and adapt to new conditions. This is the concept of machine learning. Deep Data, on the other hand, is the subset of Machine Learning which enables learning from unstructured or unlabeled data.

Professor John McCarthy in 1955, was defined by him as “the science and engineering of making intelligent machines”.

2023 - 4 main types of artificial intelligence

Learning in AI can fall under the types “narrow,” “general,” and “super.” These categories demonstrate AI’s capabilities as it evolves—performing narrowly defined sets of tasks, performing the same ability to think like humans (general), and performing beyond human capability. Then, there are four main types of AI as defined by Arend Hintze, researcher and professor of integrative biology at Michigan State University [1]. They are as follows:

1. Reactive machines

Reactive machines are AI systems that have no memory and are task specific, meaning that an input always delivers the same output. [Machine learning models](#) tend to be reactive machines because they take customer data, such as purchase or search history, and use it to deliver recommendations to the same customers.

This type of AI is reactive. It performs “super” AI, because the average human would not be able to process a customer’s entire Netflix history and feed back customized recommendations. Reactive AI, for the most part, is reliable and works well in inventions like self-driving cars. It doesn’t have the ability to predict future outcomes unless it has been fed the appropriate information.

Compare this to our human lives, where most of our actions are not reactive because we don’t have all the information we need to react upon, but we have the capability to remember and learn. Based on those successes or failures, we may act differently in the future if faced with a similar situation.

Beat at chess by IBM’s supercomputer: One of the best examples of reactive AI is when Deep Blue, IBM’s chess-playing AI system, beat Garry Kasparov in the late 1990s. Deep Blue could identify their own and their opponents’ pieces on the chessboard to make predictions, but it does not have the memory capacity to use past mistakes to inform future decisions. It only makes predictions based on what moves could be next for both players and selects the best move.

Netflix recommendations: Netflix’s recommendation engine is powered by machine learning models that process the data collected from a customer’s viewing history to determine specific movies and TV shows that they will enjoy.

Humans are creatures of habit—if someone tends to watch a lot of Korean dramas, Netflix will show a preview of new releases on the home page.

2. Limited memory

The next type of AI in its evolution is limited memory. This algorithm imitates the way our brains’ neurons work together, meaning that it gets smarter as it receives more data to train on. [Deep learning](#) improves image recognition and other types of reinforcement learning.

Limited memory AI, unlike reactive machines, can look into the past and monitor specific objects or situations over time. Then, these observations are programmed into the AI so that its actions can perform based on both past and present moment data. But in limited memory, this data isn't saved into the AI's memory as experience to learn from, the way humans might derive meaning from their successes and failures. The AI improves over time as it's trained on more data.

Self-driving cars: A good example of limited memory AI is the way self-driving cars observe other cars on the road for their speed, direction, and proximity. This information is programmed as the car's representation of the world, such as knowing traffic lights, signs, curves, and bumps in the road. The data helps the car decide when to change lanes so that it does not get hit or cut off another driver.

3. Theory of mind

The first two types of AI, reactive machines and limited memory, are types that currently exist. Theory of mind and self-awareness are AI types that will be built in the future. As such, there aren't any real world examples yet.

If it is developed, theory of mind AI could have the potential to understand the world and how other entities have thoughts and emotions. In turn, this affects how they behave in relation to those around them.

Humans understand how our own thoughts and emotions affect others, and how others' affect us—this is the basis of our society's human relationships. In the future, theory of mind AI machines could be able to understand intentions and predict behavior, as if to simulate human relationships.

4. Self-awareness

The grand finale for the evolution of AI would be to design systems that have a sense of self, a conscious understanding of their existence. This type of AI does not exist yet.

This goes a step beyond theory of mind AI and understanding emotions, to being aware of themselves, their state of being, and being able to sense or predict others' feelings. For example, "I'm hungry" becomes "I know I am hungry" or "I want to eat lasagna because it's my favorite food."

We are a long way from self-aware AI because there is still so much to uncover about the human brain's intelligence and how memory, learning, and decision-making work.



What is the Definition of Artificial Intelligence?

Designing a computer, robots, and computer software are the outcomes of the term “Artificial Intelligence”. It is achieved by working on the human brain and examining the process of brain cognition. There are two concepts of AI which are Machine Learning and Deep Learning. Like people, a computer software tool can automatically learn from a submitted data and adapt to new conditions. This is the concept of machine learning. Deep Data, on the other hand, is the subset of Machine Learning which enables learning from unstructured or unlabeled data.

Professor John McCarthy in 1955, was defined by him as “the science and engineering of making intelligent machines”.

2023 - 4 main types of artificial intelligence

Learning in AI can fall under the types “narrow,” “general,” and “super.” These categories demonstrate AI’s capabilities as it evolves—performing narrowly defined sets of tasks, performing the same ability to think like humans (general), and performing beyond human capability. Then, there are four main types of AI as defined by Arend Hintze, researcher and professor of integrative biology at Michigan State University [1]. They are as follows:

1. Reactive machines

Reactive machines are AI systems that have no memory and are task specific, meaning that an input always delivers the same output. [Machine learning models](#) tend to be reactive machines because they take customer data, such as purchase or search history, and use it to deliver recommendations to the same customers.

This type of AI is reactive. It performs “super” AI, because the average human would not be able to process a customer’s entire Netflix history and feed back customized recommendations. Reactive AI, for the most part, is reliable and works well in inventions like self-driving cars. It doesn’t have the ability to predict future outcomes unless it has been fed the appropriate information.

Compare this to our human lives, where most of our actions are not reactive because we don’t have all the information we need to react upon, but we have the capability to remember and learn. Based on those successes or failures, we may act differently in the future if faced with a similar situation.

Beat at chess by IBM’s supercomputer: One of the best examples of reactive AI is when Deep Blue, IBM’s chess-playing AI system, beat Garry Kasparov in the late 1990s. Deep Blue could identify their own and their opponents’ pieces on the chessboard to make predictions, but it does not have the memory capacity to use past mistakes to inform future decisions. It only makes predictions based on what moves could be next for both players and selects the best move.

Netflix recommendations: Netflix’s recommendation engine is powered by machine learning models that process the data collected from a customer’s viewing history to determine specific movies and TV shows that they will enjoy.

Humans are creatures of habit—if someone tends to watch a lot of Korean dramas, Netflix will show a preview of new releases on the home page.

2. Limited memory

The next type of AI in its evolution is limited memory. This algorithm imitates the way our brains’ neurons work together, meaning that it gets smarter as it receives more data to train on. [Deep learning](#) improves image recognition and other types of reinforcement learning.

Limited memory AI, unlike reactive machines, can look into the past and monitor specific objects or situations over time. Then, these observations are programmed into the AI so that its actions can perform based on both past and present moment data. But in limited memory, this data isn't saved into the AI's memory as experience to learn from, the way humans might derive meaning from their successes and failures. The AI improves over time as it's trained on more data.

Self-driving cars: A good example of limited memory AI is the way self-driving cars observe other cars on the road for their speed, direction, and proximity. This information is programmed as the car's representation of the world, such as knowing traffic lights, signs, curves, and bumps in the road. The data helps the car decide when to change lanes so that it does not get hit or cut off another driver.

3. Theory of mind

The first two types of AI, reactive machines and limited memory, are types that currently exist. Theory of mind and self-awareness are AI types that will be built in the future. As such, there aren't any real world examples yet.

If it is developed, theory of mind AI could have the potential to understand the world and how other entities have thoughts and emotions. In turn, this affects how they behave in relation to those around them.

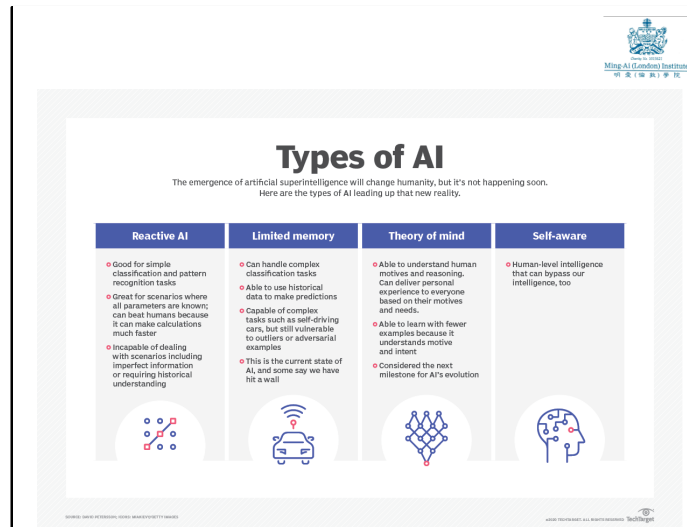
Humans understand how our own thoughts and emotions affect others, and how others' affect us—this is the basis of our society's human relationships. In the future, theory of mind AI machines could be able to understand intentions and predict behavior, as if to simulate human relationships.

4. Self-awareness

The grand finale for the evolution of AI would be to design systems that have a sense of self, a conscious understanding of their existence. This type of AI does not exist yet.

This goes a step beyond theory of mind AI and understanding emotions, to being aware of themselves, their state of being, and being able to sense or predict others' feelings. For example, "I'm hungry" becomes "I know I am hungry" or "I want to eat lasagna because it's my favorite food."

We are a long way from self-aware AI because there is still so much to uncover about the human brain's intelligence and how memory, learning, and decision-making work.



What is the Definition of Artificial Intelligence?

Designing a computer, robots, and computer software are the outcomes of the term “Artificial Intelligence”. It is achieved by working on the human brain and examining the process of brain cognition. There are two concepts of AI which are Machine Learning and Deep Learning. Like people, a computer software tool can automatically learn from a submitted data and adapt to new conditions. This is the concept of machine learning. Deep Data, on the other hand, is the subset of Machine Learning which enables learning from unstructured or unlabeled data.

Professor John McCarthy in 1955, was defined by him as “the science and engineering of making intelligent machines”.

2023 - 4 main types of artificial intelligence

Learning in AI can fall under the types “narrow,” “general,” and “super.” These categories demonstrate AI’s capabilities as it evolves—performing narrowly defined sets of tasks, performing the same ability to think like humans (general), and performing beyond human capability. Then, there are four main types of AI as defined by Arend Hintze, researcher and professor of integrative biology at Michigan State University [1]. They are as follows:

1. Reactive machines

Reactive machines are AI systems that have no memory and are task specific, meaning that an input always delivers the same output. [Machine learning models](#) tend to be reactive machines because they take customer data, such as purchase or search history, and use it to deliver recommendations to the same customers.

This type of AI is reactive. It performs “super” AI, because the average human would not be able to process a customer’s entire Netflix history and feed back customized recommendations. Reactive AI, for the most part, is reliable and works well in inventions like self-driving cars. It doesn’t have the ability to predict future outcomes unless it has been fed the appropriate information.

Compare this to our human lives, where most of our actions are not reactive because we don’t have all the information we need to react upon, but we have the capability to remember and learn. Based on those successes or failures, we may act differently in the future if faced with a similar situation.

Beat at chess by IBM’s supercomputer: One of the best examples of reactive AI is when Deep Blue, IBM’s chess-playing AI system, beat Garry Kasparov in the late 1990s. Deep Blue could identify their own and their opponents’ pieces on the chessboard to make predictions, but it does not have the memory capacity to use past mistakes to inform future decisions. It only makes predictions based on what moves could be next for both players and selects the best move.

Netflix recommendations: Netflix’s recommendation engine is powered by machine learning models that process the data collected from a customer’s viewing history to determine specific movies and TV shows that they will enjoy.

Humans are creatures of habit—if someone tends to watch a lot of Korean dramas, Netflix will show a preview of new releases on the home page.

2. Limited memory

The next type of AI in its evolution is limited memory. This algorithm imitates the way our brains’ neurons work together, meaning that it gets smarter as it receives more data to train on. [Deep learning](#) improves image recognition and other types of reinforcement learning.

Limited memory AI, unlike reactive machines, can look into the past and monitor specific objects or situations over time. Then, these observations are programmed into the AI so that its actions can perform based on both past and present moment data. But in limited memory, this data isn't saved into the AI's memory as experience to learn from, the way humans might derive meaning from their successes and failures. The AI improves over time as it's trained on more data.

Self-driving cars: A good example of limited memory AI is the way self-driving cars observe other cars on the road for their speed, direction, and proximity. This information is programmed as the car's representation of the world, such as knowing traffic lights, signs, curves, and bumps in the road. The data helps the car decide when to change lanes so that it does not get hit or cut off another driver.

3. Theory of mind

The first two types of AI, reactive machines and limited memory, are types that currently exist. Theory of mind and self-awareness are AI types that will be built in the future. As such, there aren't any real world examples yet.

If it is developed, theory of mind AI could have the potential to understand the world and how other entities have thoughts and emotions. In turn, this affects how they behave in relation to those around them.

Humans understand how our own thoughts and emotions affect others, and how others' affect us—this is the basis of our society's human relationships. In the future, theory of mind AI machines could be able to understand intentions and predict behavior, as if to simulate human relationships.

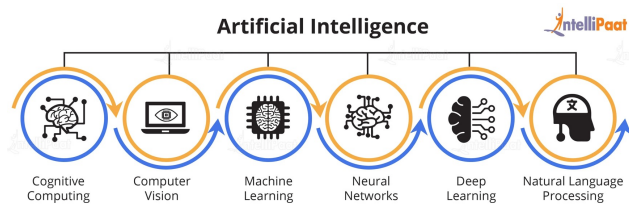
4. Self-awareness

The grand finale for the evolution of AI would be to design systems that have a sense of self, a conscious understanding of their existence. This type of AI does not exist yet.

This goes a step beyond theory of mind AI and understanding emotions, to being aware of themselves, their state of being, and being able to sense or predict others' feelings. For example, "I'm hungry" becomes "I know I am hungry" or "I want to eat lasagna because it's my favorite food."

We are a long way from self-aware AI because there is still so much to uncover about the human brain's intelligence and how memory, learning, and decision-making work.

Key Components of AI





Goals of AI

- Logical Reasoning:** Empower computer systems to perform almost all types of classy mental tasks that humans can do.
- Knowledge representation:** Helps computer systems to identify, recognize and describe objects, people, languages, etc.
- Natural Language Processing:** Enable computers to comprehend and process language. The first project related to this, was attempting to translate English to Russian and vice versa.
- Navigation and perception:** Enable a computer to go from one point to another and to interact with the world through sight, hearing, touch, and smell.
- Emergent Intelligence:** Intelligence is what that is not explicitly programmed but arises from the rest of the explicit [AI and deep learning](#). The idea for this goal was to have machines show emotional intelligence, moral reasoning, etc.

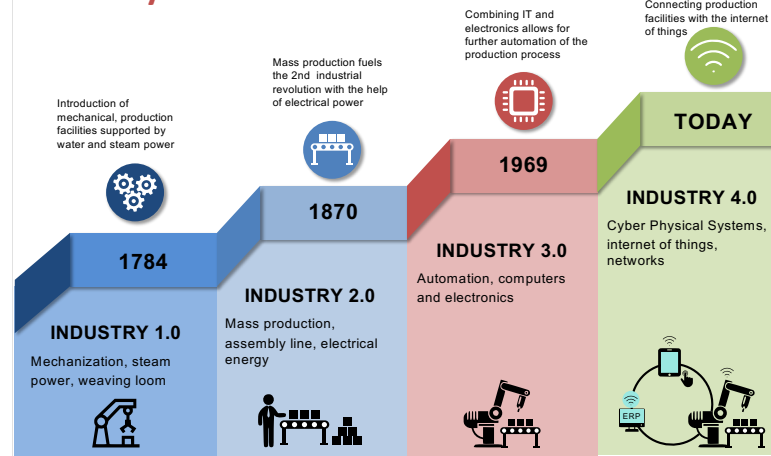
Why Use Artificial Intelligence for Teaching and Learning?

There are two somewhat different goals for the general use of artificial intelligence. The first is to increase the efficiency of a system or organization, primarily by reducing the high costs of labour, namely by replacing relatively expensive human workers with relatively less costly machines (automation). In education in particular, the main cost is that of teachers and instructors. Politicians, entrepreneurs and policy makers increasingly see a move to automation as a way of reducing the costs of education.

The second is to increase the effectiveness of teaching and learning, in economic terms to increase outputs: better learning outcomes and greater benefits for the same or more cost. With this goal, AI would be used alongside or supporting teachers and instructors.

Klutka et al. ([2018](#)) provide a general statement of the potential of AI in higher education

How did we get to Industry 4.0



Sharing Research:

The role of Artificial Intelligence in assessing
Individual Performance – A HR Perspective



1. What is AI?
 2. The Research Question
 3. Background about AI
 - 4. How AI can transform HR**
 5. The Impact on HR
 6. Current Thinking & Practices
 7. Question & Answers
-

So What has change from Industry 1.0 to 4.0 ?



	WORK 1.0	WORK 4.0
TIME	Fixed time	Flexible & self controlled
PLACE	Fixed place (factory – office)	Changing & mobile
ORGANISATION	Fixed organization structures	Agile & project based
ENVIRONMENT	Fixed procedures for task	Problem & task oriented
MANAGEMENT	Defined standards and processes	Self-controlled & variable benchmark

What impact – for organizations?



(I) Work in the digital world takes place in the information and data space

Digitalization

... makes everything easier and gives more opportunities

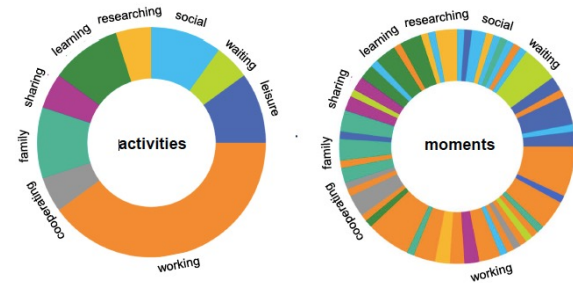
- ⇒ The usage of software for analysis, statistics, communication processes
- ⇒ The access to globally shared information and competencies
- ⇒ The usage of individualized digital assistants

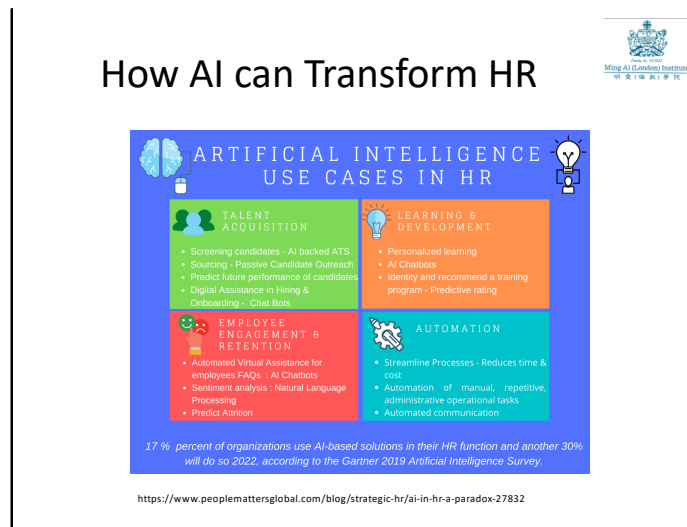
... changes the communication

- ⇒ Social networks
- ⇒ Less hierarchical communication / spreading to many different places

What impact – for individuals?

(II) Work and personal life can no longer be separated





AI in HR: A paradox

“AI in Human Resources” - the phrase may sound like a paradox that may be self-contradictory but is turning out to be a truth considering the way technology is revolutionizing how organizations run the business now.

Advanced technology is rapidly transforming the way businesses used to work. In this competitive environment, where organizations are striving hard to be a preferred choice, adopting digital transformation to automate, streamline and make the informed data-driven decision is imperative. With the availability of huge data and sources to store and process data, it is now possible to use data insights for multiple applications. Artificial Intelligence has acted as a lever to catapult the use of Big Data by helping organizations in predicting future outcomes. AI emphasizes building smart machines which nearly exhibit human-level intelligence while making a decision. Machine Learning is a subset of AI which collects, uses, and analyzes data to identify the patterns through learning algorithms on similar data sets and derive insights that can be used to take actions. ML does not take action itself, when its data insights are used to make decisions without human intervention, is when AI comes into the picture.

“AI in Human Resources” - the phrase may sound like a paradox that may be self-contradictory but is turning out to be a truth considering the way technology is revolutionizing how organizations run the business now. AI has proven to have multiple use cases in HR if backed by correct data. It can definitely be a facilitator to transform HR to a strategic partner by advocating data-driven decisions instead of good old gut feeling ones. People Analytics coupled with AI and human interventions as and when required can be the best combination in providing solutions to unsolved problems.

How AI can transform HR -

In addition to data-driven insights and predictive analysis for decision making, AI can enhance the candidate and employee experience by automating repetitive tasks and streamlining the processes. It can free up HR from mundane administrative tasks, complicated excel sheets, and paperwork. The saved time can be used in more productive activities of building relationships with clients, employees, candidates and focus on strategies. In fact, to deal with times like COVID -19, organizations have become open to adopting AI-backed HR Tech solutions to improve the productivity and performance of the function. Here are some of the use cases of AI in HR-

Talent Acquisition

According to the 2019 Artificial Intelligence in the Recruiting Industry benchmark report of CEIPAL, SaaS provider of staffing companies - two-thirds of all staffing firms will adopt AI-driven ATS by the end of 2020, while 79 % of enterprise staffing firms (firms with more than 100 recruiters) will have done the same.

- AI can automate the screening efforts of recruiters and find the best match from a pool of hundreds of candidate's applications received through the one-click Apply button. It can rank qualified candidates on top based on a matching algorithm for resume with data points from the job description or pre-screening questionnaire scores. Applicant Tracking System (ATS) backed with AI, ranks the potential candidates with high match scores for the recruiter's manual reviews and saves on time by disqualifying irrelevant applications. Data Scientists suggest that ML models like Latent semantic analysis can be used to discover the similarity between two documents i.e. resume and job description through keyword match/similarity scores.

- AI can help to identify passive candidates who may show interest if reached out by the analysis of social media and online data related to prospective candidates which may include data points like education, social

media post, experience, skillset, recommendations, etc. The response of a candidate can be predicted by data scientists using artificial neural networks and Regression i.e. probability between 0 to 1. The best source/channel of applications for open requisition can also be identified.

- While hiring, it may be possible to predict the future performance of candidates as an employee through AI by using past credentials and interview assessment/performance scores. The input data will be past credentials and performance scores which can be used to predict the future. Again simple artificial neural networks may work for this.

- AI can enhance candidate engagement and experience of the recruitment process through digital assistance in the form of automated processes and chatbots. Assistance provided in the form of cognitive and rule base chatbots for application, pre-screening, scheduling interviews, conducting video interviews, or answers to common questions can improve a recruiter's as well as a candidate's experience.

Learning & Development

With the new normal post COVID-19, L&D has become the top most priority of organizations for upskilling, reskilling, cross functional skilling and continuous learning of its employees to make them relevant in the uncertain future ahead. It is revolving around being a Personal, Precise, and Proactive approach for employees.

- AI in combination with an effective LMS can help to create personalized learning tracks for employees based on their skill set needs.

- AI chatbots can be integrated into LMS which can answer questions 24x7 and provide real times automated assistance during a training program. It can also list out training courses based on employee's interests, skill gaps or queries to create an enhanced learning experience.

- AI can also facilitate identifying and recommending a training program for an employee by analyzing ratings provided by similar kinds of employees to different training programs and select the programs that a specific employee may like. Data scientists recommend the User item recommendation technique of ML using deep learning and word embedding for desired outcomes. It works on the same concept as in E-commerce/Netflix by generating recommendations of products/services to customers/viewers using ML. Training course recommendation is based on the highest predicted ratings that employees may give to each of the courses not taken.

Employee Engagement & Retention

Employee engagement is considered an important factor that drives employee productivity and retention.

- This can be enhanced through automated virtual assistance for self-service of employees. Whenever employees have any questions around policies and procedure for benefits, insurance, leaves, reimbursements etc. they don't need to write or ask HR but can refer the chatbots /virtual assistant instantly for human-like communication. AI backed chatbots have the ability to comprehend the natural language questions from employees and map them to document/guide of that respective topic in form of direct links or short answers.

This too may work on the similarity score concept of the Latent Semantic Analysis technique of ML. This can prove extremely beneficial in case of repetitive questions or FAQs and save time of employees as well as HR.

- AI can also help HR practitioners in tracking the pulse of employees through sentiment analysis via communication platforms like employee engagement survey feedback, chatbots or internal post on any of the topics related to work. The text used can be an indicator to assess whether content of the message is positive, negative or neutral. It can act as an alert in case of low levels of employee engagement or motivation which might cause attrition and needs to be immediately addressed. It's just like a natural language processing technique.

- AI models can be used to predict Attrition considering data points/attributes like tenure in the company, performance ratings, number of promotions/promotion duration or compensation which may push employees to take a decision to leave. HR can be proactive by fixing the problems of employees and prevent employee turnover costs.

Automation

- The streamlining and automation of the workflows help to reduce the time and cost. The repetitive and high volume administrative tasks can be performed by AI tools leaving HR to concentrate on building meaningful engagement and relationships with employees and candidates. It also enables HR to enhance its role as a strategic business partner than just transactional activities.

- AI-enabled automated communication can help to disseminate required info like policy changes, internal announcements etc. among employees in no time.

- ATS backed by AI can help to generate automated messages based on the status of candidates and

communicate the same to candidates and hiring managers thereby reducing the workload of recruiters. It can also automate the scheduling of interviews, send feedback or status of candidature in the recruitment process.

Conclusion

Whether AI will replace humans from human resources function - will be too big a statement to make as AI is a facilitator, not a complete solution. It can help to give data-driven insights which coupled with human interventions can provide optimal solutions. The huge amount of input data used for AI should be properly stored and managed as it has sensitive employee personal data which is generally kept private and confidential. If HR is able to identify precisely what questions they want to get answered or what problem you are trying to solve, what are the benefits, what data inputs into the algorithm will be useful, AI can do wonders. There may be initial challenges around lack of skills, quality of data or understanding use cases of AI. But if HR, technology teams, and data scientists work in tandem, AI can re-imagine the way HR function works. The automation, operational analysis, and predictive analysis provided by AI techniques can definitely help to increase productivity and performance of HR function, and contribute to enhancing its role as a strategic partner in an organization.

Sharing Research:

The role of Artificial Intelligence in assessing
Individual Performance – A HR Perspective

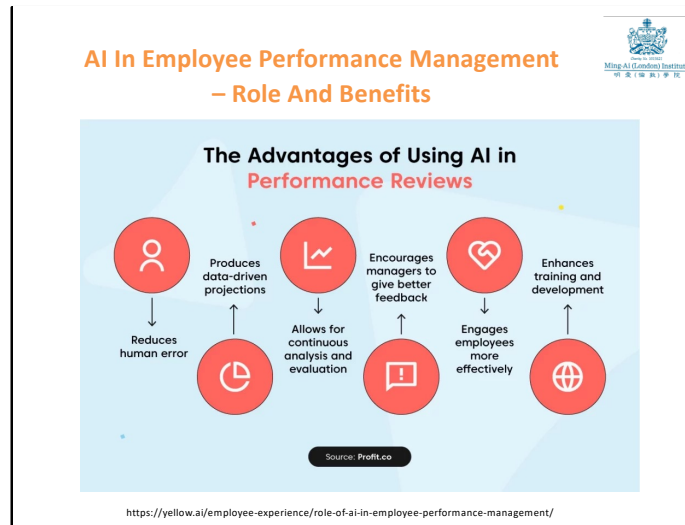


1. What is AI?
 2. The Research Question
 3. Background about AI
 4. How AI can transform HR
 - 5. The Impact on HR**
 6. Current Thinking & Practices
 7. Question & Answers
-

The Impact of AI on HR



1. Recruitment and Selection
2. Onboarding
3. Training and Development
4. Performance Management
5. Employee Engagement
6. Compensation Management
7. Employee Retention
8. Career Path



1. Reduces human error

In a traditional performance review, the managers are in charge of giving the employees feedback, which can make or break their careers. The managers have a lot to do, including rating the performance, finding the right training courses, figuring out what each person brings to the team, giving feedback on performance, setting goals for the future, and more.

When managers have to do all of this for a lot of employees, it can be hard on them and lead to mistakes like personal biases, conclusions based on incomplete data, and favoritism.

AI-powered performance management is entirely based on data. It has no personal likes or dislikes. It gathers information from many different places, so there is no room for error in the data itself. So, AI can help managers give objective feedback that helps both the employees and the organization.

2. Produces data-driven projections

Conventional performance reviews are based on the limited data available and the performance

indicators listed on the evaluation form.

AI-powered performance reviews go through a lot of data and make predictions based on not only the current review, but also how the employee's performance and career have changed over time.

This is a crucial part of figuring out an employee's potential and setting the right goals for them. It can help the manager find promotions and calculate incentives more accurately.

3. Allows for continuous analysis and evaluation

There are many benefits to switching from periodic performance reviews to ongoing reviews. Performance can be fine-tuned and improvements and course corrections can be made constantly. As a result, the organization becomes agile and flexible. Moreover, research suggests that up to 60% of employees prefer [continuous feedback](#).

AI gives you the ability to continuously collect data from a variety of sources, like written communication between employees, calendars, etc. So, the system can give real-time information about how people are doing, which helps managers make quick decisions and give immediate feedback.

4. Encourages managers to give better feedback

AI helps managers double-check their decisions and make sure that the feedback they give is accurate. It will help the managers improve and give them access to more data and information about the employees they are reviewing.

In traditional performance reviews, managers have to rely on an employee's word and their own opinion of a person's performance. With AI-powered performance reviews, there is simply more data to use.

This can also improve how managers give feedback, because they can point to specific metrics to either back up their praise for an employee or show them where they can improve their output and job performance.

5. Engages employees more effectively

As part of a continuous performance review, AI can send out frequent intelligent surveys and collect feedback in real-time. It can also give employees personalized insights based on the results of these surveys or even their own self-evaluations.

This will help the management communicate better with the employees and give a more accurate picture of the day-to-day feats and challenges the employees face as individuals and as a team.

6. Enhances training and development

AI can help managers find gaps in the talent pool and give personalized training suggestions for each person

by analyzing their career progression using data from past performance reviews, interests and skill sets. A big part of performance management is finding out what employees are good at and where they can improve. AI can help make this part of an employee's performance evaluation more accurate. [AI technology](#) built into learning programmes can help employees learn better and faster.

To sum up

Human resources is no stranger to artificial intelligence (AI). AI is already influencing recruitment, learning and the employee experience. The next best area for AI integration is performance management. Since it is mostly data-driven, performance management lends itself nicely to the use of technologies such as AI and ML.

Traditional techniques to performance management are limited by bias, inaccuracy of performance data and long turnaround times. Most employees are evaluated based on recent accomplishments that their bosses or supervisors recall rather than their overall performance. So naturally, the subjectivity of these processes fail to capture employee potential.

By implementing AI in the employee performance management processes, you can make the whole process data-driven and reduce the room for errors. To know more about how AI can help you gather and communicate employee feedback effectively, [get in touch with our experts](#).

The Differences Between AI and BI



	Business Intelligence	Artificial Intelligence
What is it?	Traditional analytics that make analyzing data easier but leaves decision-making in the hand of humans	Advanced analytics that enables computers to make critical business decisions themselves
Goal	To streamline the process of collecting and analyzing data and provide businesses with useful information and analysis to aid decision-making	To mimic human intelligence, behavior, and thought process and help businesses to make rational decisions
Why and when is it used?	Develops insights based on data already gathered; it is used to answer what has happened in the past	Analyzes large quantities of big data; it is used to answer what will happen in the future
How does it work?	It works on the principles of statistical analysis	It uses sophisticated machine learning and deep learning algorithms
How does it help businesses?	It analyzes past data and enables businesses to make better data-driven decisions to improve business processes, customer service, and employee satisfaction	It creates human-like intelligence in machines and enables businesses to forecast and predict customer demand, competitor standing, and market changes
Hierarchy	BI comes first in the hierarchy of analytics	AI comes after BI in the hierarchy of analytics
Application	Majority used in reporting, data mining, data warehousing, and highlights key metrics and visuals out of historic data in the form of modern, intuitive dashboards	Majority used for predictive analytics, gaming, forecasting, natural language processing, robotics, image recognition, and self-driving cars
Goal and final outcome	It starts with gathering and analyzing data points from various data sources, and ends with visual reports and dashboards	It starts by training computer systems to think and work like humans, and ends with predictive insights about the future
Usefulness	BI is helpful in descriptive analytics	AI is a key player in prescriptive analytics

The Definitions of Artificial Intelligence and Business Intelligence

AI, put simply, is a way to make a computer system think intelligently like humans. It learns from past experiences, and several problem-solving measures and mimics human intuitions and judgment, post-training, and iterative experiments.

BI is a technology used to gather, store, access, and analyze data to help business users in making better decisions. BI turns data into meaningful insights – in the form of reports and dashboards – and enables organizations to make better data-driven decisions. It helps capitalize and maximize available historical data.

AI and BI – How They Can Work Together?

Although AI and BI have a lot to offer individually, when used together, they can drive even better results. BI and AI combine to create a perfect recipe that delivers analytical solutions in any business situation. Using BI, analysis on historical data can be done; the resulting dashboards can help determine the pattern in data which can be utilized at its best by AI to predict future outcomes and foresight.

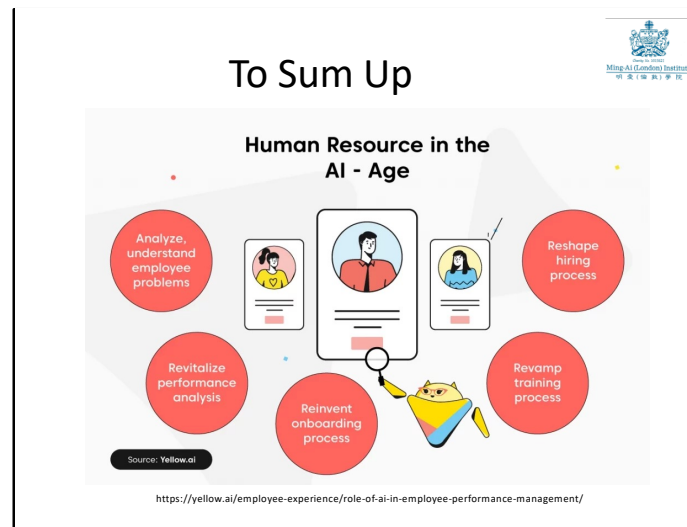
Earlier, standalone [BI applications](#) were capable of analyzing historical data; however, when combined with AI, it can suggest what will happen in the future, considering the patterns of historical data. Moreover, [data management](#) and analysis done in BI gives a lot of handy resources for AI applications; by integrating and utilizing those insights, businesses can build predictive machine learning models and attain quick and more accurate results.

AI-enabled BI can delve deeper into unknown problems, and find critical insights in previously unexamined data. By leveraging the benefits of natural language generation capabilities, it can make businesses understand what these insights mean and how they should act on them. When used together, they can automatically review past data and provide alerts to new and interesting features. [AI-powered BI platforms](#) can free up a lot of time for analysts, and enable them to move to more effective data analytics projects. By combining BI with the best capabilities of AI, businesses will get an opportunity to analyze and derive actionable insights more efficiently.

The Perfect Match

The pace at which BI and AI are growing, individually, in their respective domains is unimaginable. However, what most businesses fail to realize is the combined benefits of [AI and BI](#) that can help them in creating entirely new business models. While BI is greatly useful in analyzing historic data – through the use of analytical models, AI makes predicting future outcomes a breeze – through the use of human-like problem-solving skills, learning, and judgment.

Having said that, it is not a battle between BI and AI, rather how these two technologies can be the perfect match for business excellence. All that is required is for the hype surrounding AI and BI to start wearing off, for the differences to seem trivial, and the opportunity more apparent.



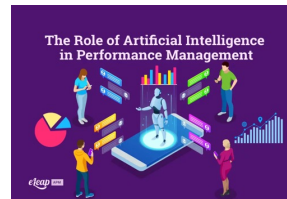
To sum up

Human resources is no stranger to artificial intelligence (AI). AI is already influencing recruitment, learning and the employee experience. The next best area for AI integration is performance management. Since it is mostly data-driven, performance management lends itself nicely to the use of technologies such as AI and ML.

Traditional techniques to performance management are limited by bias, inaccuracy of performance data and long turnaround times. Most employees are evaluated based on recent accomplishments that their bosses or supervisors recall rather than their overall performance. So naturally, the subjectivity of these processes fail to capture employee potential.

By implementing AI in the employee performance management processes, you can make the whole process data-driven and reduce the room for errors. To know more about how AI can help you gather and communicate employee feedback effectively, [get in touch with our experts.](#)

How have Assessments Changed?



- **Advantages**

1. Predictions Based on More Precise Data
2. Never-Ending Assessment Based on Real-Time Data Analysis
3. Better Management

- **Disadvantages**

1. Price
2. Lacks Human Element
3. Question of Ethics

<https://performance.eleapsoftware.com/the-role-of-artificial-intelligence-in-performance-management/>

Long before artificial intelligence in the workplace, data collection has been a mandatory element of performance assessments. Reviewing an employee's performance gives us insight into what they've accomplished, what we believe they can accomplish, and how we can help them arrive at their goals.

We also analyze whether or not their performance and behaviors can contribute to the success of an organization or ultimately attribute to its failure. Other important elements include their ability to function with coworkers and their alignment with an organization's goals.

Coming to these types of conclusions requires the collection of enormous amounts of data. However, collecting uniform amounts of data is only the beginning of these assessments.

In the past, [performance management](#) assessments consisted of one universal performance sheet. Every employee within an organization was graded based on the same set of questions and assessment sheets.

However, as the workforce changed and methods of hiring and retaining gradually morphed, it was clear that the old way of completing assessments was obsolete. A melting pot of different personalities, backgrounds, educations, and other elements has made it mandatory to adopt AI into the performance management sector.

How Have Assessments Changed?

Present assessments take into account different traits of employees within an organization based on things like age, educational background, hobbies, interests, and areas of expertise. Why is such a vast amount of information required to complete an assessment?

New methods have been adopted when it comes to retaining employees and helping to align their goals with the goals of a company to form an all-inclusive relationship. The “our way, or the highway” style of running a business is old news. All of the data mentioned leads to a created profile that predicts traits and behavior patterns of workers within an organization. These profiles are used to assist an organization with the ability to view certain things from the worker’s standpoint.

By accomplishing this viewpoint, organizations can better understand how to [accommodate certain workers](#) through Artificial intelligence, predict their reactions and responses to work situations, and how to retain them or make them comfortable.

Understanding all this, it should be clear why the old performance assessment method wasn’t cutting it. All these different dynamics and data points thrown into the mix make it mandatory for fast-computing AI to analyze all this information. AI in PMS has several other advantages. Let’s examine some of the positives and potential downfalls of using AI with Performance Management Systems.

Advantages of Using AI with PMS

1. Predictions Based on More Precise Data

Obsolete performance assessments were based on limited data and uniform performance indicators that didn’t fit all worker types. AI-based performance assessments scrape massive amounts of data to provide accurate projections based on past and present performance.

The current assessments also take into account the entire career of the employee. By coupling this with assessments from the current organizations, a clear picture is painted of that worker’s potential for success within the current workplace. Assuming any potential downfalls are predicted, management can address these projections and potentially avoid them. This leads to substantially higher levels of employee retainment.

2. Never-Ending Assessment Based on Real-Time Data Analysis

The days of the six-month review and yearly assessment are gone. AI has allowed organizations to conduct a perpetual

assessment that uses fresh data to paint a picture of potential employee response and performance constantly. This ongoing assessment makes organizations more flexible with incredibly fast response times. Managers can make quick work delegation, project management, and team paring based on lightning-fast data analysis.

3. Better Management

AI has undoubtedly led to more efficient management within organizations. Managers can now cross-reference their judgment calls against data. Their feedback can be checked for accuracy when it comes to critiquing worker performance. Managers also can use pinpoint data when referring to metrics and areas of improvement. After referring to the AI analysis, there's no question when a manager offers advice or accolades. The outcome for managers in this situation is simple. More data leads to more efficient performance.

Disadvantages of AI with PMS

1. Price

Taking advantage of AI in the performance assessment process comes with a high price tag. It's not just the initial deployment of this technology that requires investment.

Any malfunction of the system or its hardware will also require a remedy. These remedies don't come with a low price point and require advanced technological maintenance and service methods.

2. Lack of Human Element

AI can only work as efficiently as the coding used during program creation. This could potentially lead to employee frustration in certain situations.

For example, if a worker has objections about their assessment, what is the next course of action? The lack of human element and versatility can lead to a disconnected worker and management communication and relationship.

Suppose AI uses data from connected devices to report the amount of time a worker spends away from their desk. In that case, this could lead to an unfavorable report. Sometimes this unfavorable report is not warranted, especially if the worker is engaged in other diligent projects or activities.

3. Question of Ethics

Some people see the vast collection of data and conclusions this data leads to as unethical. The information scraped against a worker to reach a final assessment leads to a feeling of intrusion.

If certain data used to perform these assessments lead to an inaccurate picture of the worker's performance or work habits, what is the outcome? These situations can lead to a lack of trust between the employee and the organization. Many of these algorithms use performance from prior jobs to complete an assessment. What if there is a hiccup in the data or inaccuracy that leads to a negative report. This can lead to a question of whether the data collection is ethical. There are clear advantages and disadvantages of using AI in the workplace. However, if PMS continues to utilize the advantages of AI algorithms, there has to be a careful balance.

A healthy mixture of data scraping combined with the watchful eye of management is key to a healthy PMS implementation. The assessment created based on AI data should be combined with a personal assessment conducted personally by management, so a human element is involved. In theory, this should lead to a fair mixture of both elements.

Oliver Lucas

October 21, 2022

-



Sharing Research:

The role of Artificial Intelligence in assessing
Individual Performance – A HR Perspective



1. What is AI?
 2. The Research Question
 3. Background about AI
 4. How AI can transform HR
 5. The Impact on HR
 - 6. Current Thinking & Practices**
 7. Question & Answers
-



Current Thinking & Practices

How Will Artificial Intelligence Shape Our Future?

AI Technology giants such as Google, Facebook, Apple, and Microsoft are increasingly attracting attention for their investment in artificial intelligence and taking huge steps for AI future. Investment in artificial intelligence in 2013 was \$700 million. However, that figure tripled to \$2.4 billion in 2015, said CB Insights, a research firm working on the technology sector.

Cb Insights said 140 companies working on artificial intelligence have been acquired since 2011, and 40 of those acquisitions occurred this year. Google, IBM, Yahoo, Intel, Apple, and Salesforce are the top investors in artificial intelligence, according to the company's report. Samsung, on the other hand, has just entered the race this year.

Artificial intelligence, which stars in dystopian sci-fi films, can create a dark perception at first.

Mustafa Suleiman, the co-founder of Deepmind, which works on artificial intelligence technologies, says Hollywood is the wrong address for understanding artificial intelligence. Suleiman, who is part of the think tank of Deepmind, the British company that Google bought for \$400 million in 2014, believes the look of intelligence is far from what it is in the movies:

"Hollywood is good at addressing past events like war, love, or politics. When you look at what's

going to happen in the future, it just makes it more fun. But the artificial intelligence that Hollywood reflects is not very similar to the systems we have built. I don't remember watching a movie and saying, "Yes, AI is going to look like this." If there's a producer here somewhere, it's time to make a better sci-fi movie."

People Are Starting to Like Robots More

AI isn't Google's only interest. The company acquired robot design company Boston Dynamics in 2013. Boston Dynamics is a company that applies artificial intelligence to some robot models. One of TechCrunch Disrupt's most intriguing presentations was from Boston Dynamics. Marc Raibert, founder and CEO of Boston Dynamics, called the robot SpotMini to the stage. Designed for home delivery, SpotMini can climb stairs, open doors, and carry objects containing liquid.

Raibert says the design robots as friendly, saying their likes are growing on their YouTube pages: "The media keeps saying how scary robots are. I can't make that connection."

Bloomberg claimed earlier this year that Google wanted to sell Boston Dynamics. Raiber has not commented.

Artificial Intelligence Will Work Best in the Healthcare Sector

Dominik Seisser, a scientist at Gyana, a company that processes data about cities using artificial intelligence, was one of the participants in the event.

Seisser told that AI's place in technology is to "connect the dots by changing the way they process all kinds of information": "Computers can do much more. People can't make sense of every bit of information by looking at a city map." Seisser says that in the AI future, our lives will be much more easier and even turn it into an 'almost magical state'.

The company called Emteq measures people's emotions with the artificial intelligence they develop and transfers them to [virtual reality](#). Charles Nduko of Emteq says that artificial intelligence is more of a "tool" like a screwdriver.

So according to Nduko, AI technology doesn't mean much without being a person who uses, processes, or makes sense.

In Nduko's opinion, who is also a doctor, the most exciting area where artificial intelligence will be a huge

part the future is the health sector. Nduko says AI technology will work in diagnosing many diseases!

Unemployment Is the Cause of Fear

George Gericke, the founder of Eone aims to increase employee productivity at work by using artificial intelligence. He believes that people's fear of artificial intelligence is caused by concerns about unemployment.

Gericke says the belief that people will be out of work because of artificial intelligence is born. That's partly true when we think about the AI future. He points out that it is inevitable that drivers will be unemployed due to autonomous vehicles. According to Gericke, artificial intelligence will soon be in our lives:

"Very soon our society will be dependent on artificial intelligence. No one will be able to give up artificial intelligence products that make our lives easier in many respects. Security is one of the examples. I think AI will grow in a few years. I think it's his greatest strength to tell us about things that we never thought of."

Gericke says that, unlike Solomon, a future dominated by artificial intelligence looks "dangerous." According to Gericke, just as the industrial revolution caused unemployment for some people, artificial intelligence will have the same effect. However, Gericke emphasizes that new jobs will be formed thanks to AI .

The South African entrepreneur also points out that artificial intelligence machines can make decisions. Nevertheless, not yet "moral" decisions.

The Physical and Digital World Will Be Introspected

As you walk through the space set up by the TechCrunch conference for startups, you come across many companies that do business on virtual reality. Sujan McGlynn of WeEvolve, a company that brings virtual reality to the field of education, explains that virtual reality is at the point of explosion.

While McGlynn says virtual reality plays a role, from sculpture programs with 3D modeling to games that process the theme of fear, he stresses that virtual reality is a new field in the education sector.

Tomas Westerholm, a scientist at Sessio, a company that works in the field of [augmented reality](#), says virtual reality is now part of our everyday lives and will be the most important part of the AI future.

According to Westerholm, this can lead to possible errors in advance and be corrected with better ideas and more dramatic innovations. Westerholm's vision of the future of virtual reality is as follows:

"We will see that the physical and digital worlds are very close to each other and are now almost whole.

Digital will always be a copy of the real world. Augmented reality is one of the biggest and most interesting technologies. Which means our vision will become the target of data. Communication will become completely visual instead of message or sound.”
For further reading, you can visit [Cambridge University's](#) website.

How Will Artificial Intelligence Shape Our Future?



1. People Are Starting to Like Robots More
2. Artificial Intelligence Will Work Best in the Healthcare Sector
3. Unemployment Is the Cause of Fear
4. The Physical and Digital World Will Be Introspected



AI Technology giants such as Google, Facebook, Apple, and Microsoft are increasingly attracting attention for their investment in artificial intelligence and taking huge steps for AI future. Investment in artificial intelligence in 2013 was \$700 million. However, that figure tripled to \$2.4 billion in 2015, said CB Insights, a research firm working on the technology sector.

Cb Insights said 140 companies working on artificial intelligence have been acquired since 2011, and 40 of those acquisitions occurred this year. Google, IBM, Yahoo, Intel, Apple, and Salesforce are the top investors in artificial intelligence, according to the company's report. Samsung, on the other hand, has just entered the race this year.

Artificial intelligence, which stars in dystopian sci-fi films, can create a dark perception at first.

Mustafa Suleiman, the co-founder of Deepmind, which works on artificial intelligence technologies, says Hollywood is the wrong address for understanding artificial intelligence. Suleiman, who is part of the think tank of Deepmind, the British company that Google bought for \$400 million in 2014, believes the look of intelligence is far from what it is in the movies:

"Hollywood is good at addressing past events like war, love, or politics. When you look at what's

going to happen in the future, it just makes it more fun. But the artificial intelligence that Hollywood reflects is not very similar to the systems we have built. I don't remember watching a movie and saying, "Yes, AI is going to look like this." If there's a producer here somewhere, it's time to make a better sci-fi movie."

People Are Starting to Like Robots More

AI isn't Google's only interest. The company acquired robot design company Boston Dynamics in 2013. Boston Dynamics is a company that applies artificial intelligence to some robot models. One of TechCrunch Disrupt's most intriguing presentations was from Boston Dynamics. Marc Raibert, founder and CEO of Boston Dynamics, called the robot SpotMini to the stage. Designed for home delivery, SpotMini can climb stairs, open doors, and carry objects containing liquid.

Raibert says the design robots as friendly, saying their likes are growing on their YouTube pages: "The media keeps saying how scary robots are. I can't make that connection."

Bloomberg claimed earlier this year that Google wanted to sell Boston Dynamics. Raiber has not commented.

Artificial Intelligence Will Work Best in the Healthcare Sector

Dominik Seisser, a scientist at Gyana, a company that processes data about cities using artificial intelligence, was one of the participants in the event.

Seisser told that AI's place in technology is to "connect the dots by changing the way they process all kinds of information": "Computers can do much more. People can't make sense of every bit of information by looking at a city map." Seisser says that in the AI future, our lives will be much more easier and even turn it into an 'almost magical state'.

The company called Emteq measures people's emotions with the artificial intelligence they develop and transfers them to [virtual reality](#). Charles Nduko of Emteq says that artificial intelligence is more of a "tool" like a screwdriver.

So according to Nduko, AI technology doesn't mean much without being a person who uses, processes, or makes sense.

In Nduko's opinion, who is also a doctor, the most exciting area where artificial intelligence will be a huge

part the future is the health sector. Nduko says AI technology will work in diagnosing many diseases!

Unemployment Is the Cause of Fear

George Gericke, the founder of Eone aims to increase employee productivity at work by using artificial intelligence. He believes that people's fear of artificial intelligence is caused by concerns about unemployment.

Gericke says the belief that people will be out of work because of artificial intelligence is born. That's partly true when we think about the AI future. He points out that it is inevitable that drivers will be unemployed due to autonomous vehicles. According to Gericke, artificial intelligence will soon be in our lives:

"Very soon our society will be dependent on artificial intelligence. No one will be able to give up artificial intelligence products that make our lives easier in many respects. Security is one of the examples. I think AI will grow in a few years. I think it's his greatest strength to tell us about things that we never thought of."

Gericke says that, unlike Solomon, a future dominated by artificial intelligence looks "dangerous." According to Gericke, just as the industrial revolution caused unemployment for some people, artificial intelligence will have the same effect. However, Gericke emphasizes that new jobs will be formed thanks to AI .

The South African entrepreneur also points out that artificial intelligence machines can make decisions. Nevertheless, not yet "moral" decisions.

The Physical and Digital World Will Be Introspected

As you walk through the space set up by the TechCrunch conference for startups, you come across many companies that do business on virtual reality. Sujan McGlynn of WeEvolve, a company that brings virtual reality to the field of education, explains that virtual reality is at the point of explosion.

While McGlynn says virtual reality plays a role, from sculpture programs with 3D modeling to games that process the theme of fear, he stresses that virtual reality is a new field in the education sector.

Tomas Westerholm, a scientist at Sessio, a company that works in the field of [augmented reality](#), says virtual reality is now part of our everyday lives and will be the most important part of the AI future.

According to Westerholm, this can lead to possible errors in advance and be corrected with better ideas and more dramatic innovations. Westerholm's vision of the future of virtual reality is as follows:

"We will see that the physical and digital worlds are very close to each other and are now almost whole.

Digital will always be a copy of the real world. Augmented reality is one of the biggest and most interesting technologies. Which means our vision will become the target of data. Communication will become completely visual instead of message or sound.”
For further reading, you can visit [Cambridge University's](#) website.

What Are The Negative Impacts Of Artificial Intelligence (AI)?



1. AI Bias
2. Loss of certain Jobs
3. A shift in Human Experience
4. Global Regulations
5. Accelerated Hacking
6. AI Terrorism



<https://bernardmarr.com/what-are-the-negative-impacts-of-artificial-intelligence-ai/>

What Are The Negative Impacts Of Artificial Intelligence (AI)?

Artificial intelligence (AI) is doing a lot of good and will continue to provide many benefits for our modern world, but along with the good, there will inevitably be negative consequences. The sooner we begin to contemplate what those might be, the better equipped we will be to mitigate and manage the dangers.

Legendary physicist [Stephen Hawking](#) shared this ominous warning: “Success in creating effective AI could be the biggest event in the history of our civilisation. Or the worst. So we cannot know if we will be infinitely helped by AI or ignored by it and sidelined, or conceivably destroyed by it.” The first step in being able to prepare for the [negative impacts of artificial intelligence](#) is to consider what some of those negative impacts might be. Here are some key ones:

1. AI Bias

Since AI algorithms are built by humans, they can have [built-in bias](#) by those who either intentionally or inadvertently introduce them into the algorithm. If AI algorithms are built with a bias or the data in

the training sets they are given to learn from is biased, they will produce results that are biased. This reality could lead to unintended consequences like the ones we have seen with discriminatory recruiting algorithms and Microsoft's Twitter chatbot that became racist. As companies build AI algorithms, they need to be developed and trained responsibly.

2. Loss of Certain Jobs

While many [jobs will be created by artificial intelligence](#) and many people predict a net increase in jobs or at least anticipate the [same amount will be created to replace](#) the ones that are lost thanks to AI technology, there will be jobs people do today that machines will take over. This will require changes to training and education programmes to prepare our future workforce as well as helping current workers transition to new positions that will utilise their unique human capabilities.

3. A shift in Human Experience

If AI takes over menial tasks and allows humans to significantly reduce the amount of time they need to spend at a job, the extra freedom might seem like a utopia at first glance. However, in order to feel their life has a purpose, humans will need to channel their newfound freedom into new activities that give them the same social and mental benefits that their job used to provide. This might be easier for some people and communities than others. There will likely be economic considerations as well when machines take over responsibilities that humans used to get paid to do. The economic benefits of increased efficiencies are pretty clear on the profit-loss statements of businesses, but the overall benefits to society and the human condition are a bit more opaque.

4. Global Regulations

While our world is a much smaller place than ever before because of technology, this also means that AI technology that requires new laws and regulations will need to be determined among various governments to allow safe and effective global interactions. Since we are no longer isolated from one another, the actions and decisions regarding artificial intelligence in one country could adversely affect others very easily. We are seeing this already playing out, where Europe has adopted a robust regulatory approach to ensure consent and transparency, while the US and particularly China allows its companies to apply AI much more liberally.

5. Accelerated Hacking

Artificial intelligence increases the speed of what can be accomplished and in many cases, it exceeds our

ability as humans to follow along. With automation, nefarious acts such as phishing, delivery of viruses to software and taking advantage of AI systems because of the way they see the world, might be difficult for humans to uncover until there is a real quagmire to deal with.

6. AI Terrorism

Similarly, there may be new AI-enabled form of terrorism to deal with: From the expansion of autonomous drones and the introduction of robotic swarms to remote attacks or the delivery of disease through nanorobots. Our law enforcement and defence organisations will need to adjust to the potential threat these present.

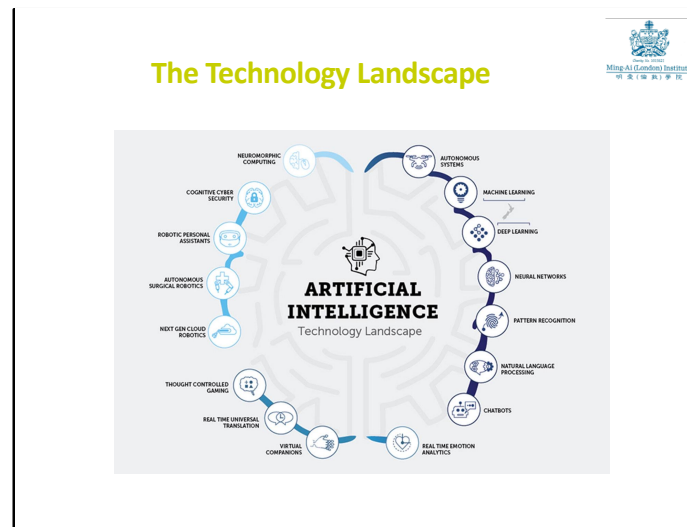
It will take time and extensive human reasoning to determine the best way to prepare for a future with even more artificial intelligence applications to ensure that even though there is potential for adverse impacts with its further adoption, it is minimised as much as possible.

As is the case with any disruptive event, these aren't easy situations to solve, but as long as we still have humans involved in determining solutions, we will be able to take advantage of the many benefits of artificial intelligence while reducing and mitigating the negative impacts.

Written by

Bernard Marr

Bernard Marr is a world-renowned futurist, influencer and thought leader in the fields of business and technology, with a passion for using technology for the good of humanity. He is a best-selling author of 20 books, writes a regular column for Forbes and advises and coaches many of the world's best-known organisations. He has over 2 million social media followers, 1 million newsletter subscribers and was ranked by LinkedIn as one of the top 5 business influencers in the world and the No 1 influencer in the UK. Bernard's latest book is 'Business Trends in Practice: The 25+ Trends That Are Redefining Organisations'



1. Computer vision set to grow

In the race for AI supremacy, organizations and businesses are set to embrace computer vision technology at an unprecedented scale in 2022. According to a September 2021 survey by Gartner, organizations investing in AI are expected to make the highest planned investments in computer vision projects in 2022.

Computer vision refers to AI that uses [ML algorithms](#) to replicate human-like vision. The models are trained to identify a pattern in images and classify the objects based on recognition. For example, computer vision can scan inventory in warehouses in the retail sector. Similarly, the technology finds application in several other industries such as healthcare, agriculture & farming, manufacturing, autonomous vehicles, and more.

2. Boost to the autonomous vehicle industry

As more and more car manufacturers continue to invest in autonomous vehicles, the market penetration of driverless cars is expected to rise considerably. According to Statista's Dec 2021 projections, the global autonomous vehicle market is estimated to be valued at around \$146.4 billion in 2022, a substantial rise

from \$105.7 billion in 2021.

Self-driving cars enabled with computer vision are already being tested by companies like Tesla, Uber, Google, Ford, GM, Aurora, and Cruise. This trend is only expected to scale in the next 12 months. In August 2021, Tesla unveiled the 'Dojo' chip specifically designed to process large volumes of images collected by computer vision systems embedded in its self-driving cars. Around the same time, Waymo, Google's subsidiary, expanded its self-driving taxi services outside Arizona.

3. Chatbots and virtual assistants to get smarter

Another AI trend that is most talked about in 2022 is smarter chatbots and virtual assistants. This comes from the pandemic, as global industries are now comfortable giving their employees digital workplace experiences. Most chatbots and virtual assistants use deep learning and NLP technologies on the verge of automating routine tasks. Moreover, researchers and developers continue to add features and enhance these bots.

For example, Amelia, a global leader in conversational AI, performs complex conversation tasks with supplemental training provided by developers. Amelia claims to achieve 90% accuracy in identifying customer intent and a customer satisfaction rate of 91%, which is at par with human assistants. Tech companies such as Nuance, IBM, and Amazon Lex are making significant efforts to improve their virtual assistance through smarter bots.

4. Solutions for metaverse

AI agents and virtual assistants will play a key role as the tech world plunges into the concept of the metaverse. Metaverse defines a virtual environment that allows users to interact with digital tools and gives them an immersive experience. In October 2021, Mark Zuckerberg rebranded Facebook as 'Meta' and announced plans to build a metaverse.

Virtual agents are expected to use AI to enable people to connect to the virtual environment. The famous humanoid AI robot Sophia is tokenized for metaverse appearance. Developers claim that tokenized Sophia, being AI, will interact with users from anywhere, at any time, and across devices and media platforms.

Although metaverse may not reveal itself in a full-fledged version in 2022, the blend of virtual and augmented technologies and AI will continue to stay as a backbone of the metaverse. Metaverse is therefore expected to be one of the major AI research trends in the next 12 months.

5. Improved language modeling

Another AI trend that will continue to feature in 2022 is improved language modeling. Language modeling is a

technology that allows computers to understand language semantics, complete sentences via word prediction, and convert text into computer codes.

Generative Pre-trained Transformer 3 (GPT-3), by OpenAI, is a comprehensive language modeling tool available today. It uses 175 billion parameters to process and generate human-like language. Also, OpenAI, in August 2021, released a better version of its tool, Codex, which parses natural language and generates programming code in response. The company is also working on the next version of GPT-3 (i.e., GPT-4), and it is expected that GPT-4 will be 500 times the size of GPT-3 in terms of the parameters that it may use to parse a language.

Apart from the trends listed above, other popular AI trends that could grab attention in 2022 include hyperautomation in modern businesses, the rise of [artificial intelligence as a service \(AIaaS\)](#), AI in cybersecurity, and increased sophistication in AIoT (merger of AI and the internet of things (IoT)).

See More: [AI Job Roles: How to Become a Data Scientist, AI Developer, or Machine Learning Engineer](#)

Takeaway

As AI deepens its roots across every business aspect, enterprises are increasingly relying on it to make critical decisions. From leveraging AI-based innovation, enhancing customer experience, and maximizing profit for enterprises, AI has become a ubiquitous technology. This shift to AI has become possible as AI, ML, deep learning, and neural networks are accessible today, not just for big companies but also for small to medium enterprises.

Moreover, contrary to popular beliefs that AI will replace humans across job roles, the coming years may witness a collaborative association between humans and machines, which will sharpen cognitive skills and abilities and boost overall productivity.



Can artificial intelligence contribute to the implementation of the UN sustainability goals?

Artificial intelligence (AI) can contribute to the achievement of the 17 Sustainable Development Goals, especially at the ecological level. However, AI can also impede the implementation of measures, especially at the social level. The United Nations has adopted the 17 Sustainable Development Goals (SDG) 2015 as a guideline for global political and social development in the near future. The study published in Nature Communications examined the influence of AI on the 169 individual SDG targets.

"Artificial intelligence is already changing everyone's lives in different ways," says Francesco Fuso-Nerini of KTH, one of the two leaders of the study. "This analysis provides the basis for a needed dialogue on what kind of future humanity should aim for with AI," says Ricardo Vinuesa of KTH, second director of the study.

The study was conducted under the direction of the KTH Royal Institute of Technology in Stockholm, Sweden, and with the participation of Dr. Sami Domisch from the Leibniz-Institute of Freshwater Ecology and Inland Fisheries (IGB) in Berlin, Germany, and Dr. Simone Langhans, former IGB scientist and

currently Marie Skłodowska-Curie Fellow at the Basque Center for Climate Change in Bilbao, Spain, and the University of Otago, New Zealand.

The Sustainable Development Goals (SDG) take aim at 169 individual targets running the gamut from economy and society to environment. The research results as a whole show that 134 of these targets could benefit from AI, while another 59 goals would not. Calculated as a percentage, AI has a positive impact of 79 percent. According to the researchers, AI has the greatest potential to positively support the achievement of the environmental goals.

Positive influence on species and environmental protection

Goal 14 and 15 of the SDGs concern the protection of species in water and on land and the sustainable use of the terrestrial and aquatic environment. "We can use AI-based technologies to better capture biodiversity through automated procedures using remote sensing data. Machine learning plays a major role here. Computer algorithms are trained with existing data to recognize similar patterns using new data," explains Simone Langhans of the Basque Center for Climate Change.

Sami Domisch from IGB adds: "AI technologies can thus be a support in environmental protection. Because with a better understanding of species distribution patterns, the planning of protected areas can be made more efficient. This is particularly important for water protection and the threatened aquatic biodiversity. However, the regulated and transparent use of these technologies must be of great importance here, because AI can also be applied to simplify the use and exploitation of the environment".

Reducing energy consumption by people

Artificial intelligence shows a clear potential in reducing energy consumption and promoting clean affordable energy. For example, so-called "smart" electricity grids can match and balance the need for electricity against various renewable energy sources. However, overall demand for ICT solutions could increase data centers' electricity usage to 20 percent of the global total by 2030, the study points out.

Risk of social instability

In the sphere of global political stability and justice, growing inequality, biased election outcomes, hatred for minorities and increased nationalism can result if AI is developed in the absence of ethical scrutiny, democracy and transparency, the study states. On an individual level, social media algorithms that display content for users tend to rely on the receivers' own preconceived opinions. This type of AI can further polarize societies, Fuso-Nerini says. "There's an underlying risk of prejudice when AI evaluates and predicts human behavior."

"Regulatory oversight should be preceded by regulatory insight, where policymakers have sufficient understanding of AI challenges to be able to formulate sound policy. Developing such insight is even more urgent than oversight, since policy formulated without understanding is likely to be ineffective at best and counterproductive at worst," says Max Tegmark, co-author and professor at the American Institute of Technology in Washington, D.C.

In the field of global political stability and justice, growing inequality, distorted election results, hatred of minorities and increased nationalism can occur when AI is developed without ethical control, democracy and transparency. "Social media algorithms that display content for users tend to rely on the preconceived opinions of recipients. There is a risk of prejudice when AI evaluates and predicts human behavior," says Francesco Fuso-Nerini. This type of AI can further polarize societies.

Appropriate policy and legal frameworks are necessary to apply AI for the benefit of individuals and the environment: "Regulatory oversight should be preceded by a regulated insight where policy makers have a sufficient understanding of the challenges of AI to make informed policy decisions. Developing such an understanding is even more urgent than supervision, as policy decisions taken without this understanding are likely to be ineffective at best and counterproductive at worst," says Max Tegmark, co-author and professor at the American Institute of Technology in Washington, D.C.

[Read the publication open access in Nature Communications >](#)

Vinuesa, R., Azizpour, H., Leite, I. et al. The role of artificial intelligence in achieving the Sustainable Development Goals. Nat Commun 11, 233 (2020)

The press release is based on the [english press release of KTH](#) Royal Institute of Technology in Stockholm, Sweden



When all else fails ... turn to humour



**TO ERR IS
HUMAN BUT
TO REALLY
FOUL THINGS
UP YOU NEED
A COMPUTER!**

TO ERR IS HUMAN
**TO BLAME IT ON SOMEONE
ELSE SHOWS
MANAGEMENT POTENTIAL**

Contact



- **Professor Jonathan Liu:**
jonathan.liu@btinternet.com
j.liu@ming-ai.org.uk
jonathan.liu@uwtsd.ac.uk

- Also on

