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*Review Article*

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# Artificial Intelligence and Technology

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**ABSTRACT**

This paper presents a real-time facial recognition system tailored for advertising personalization. The proposed platform analyzes facial attributes: age, gender, and emotion from live image or video feeds to dynamically deliver targeted advertisements. The system leverages deep learning models (Convolutional Neural Networks and recurrent networks) to perform robust face analysis and couples these predictions with a content-based recommendation engine. We implement the solution as a web application using Flask, TensorFlow, and OpenCV, integrating pre-trained CNN architectures (ResNet50, VGG16, GoogleNet) and an LSTM for temporal emotion modeling. The system is trained on large-scale face datasets (UTKFace for age/gender, FER2013 for expressions) and achieves high accuracy in demographic and emotion classification, which translates into effective ad recommendations. To address ethical considerations, we incorporate privacy-by-design principles, no personal identifiers are stored, and all processing is done in- memory, and we align with legal standards (e.g. GDPR) to protect user data. Experimental evaluation demonstrates 96% gender classification accuracy, a 4-year mean absolute error in age estimation, and an average F1-score of 0.72 in emotion recognition, enabling a recommendation match F1 of 0.87. These results highlight the potential of deploying deep learning-based facial analytics in commercial advertising for enhanced user engagement, while maintaining responsible AI practices and user trust.

The ear we are living now is based on AI and Technology. It's impossible to think our life without smart phone and internet, and so many other things etc. The AI and Technology is helping human life to save time, energy and money along with efficiency; as human we must appreciate the value of AI & Technology, but we must not forget the magic of human minds unique power to have in this world for more depth, emotions, care, love, affection and respect. There for we need the balance. We need to learn to have the both in good balance as well. So that we don't lose the touch of humanity. The way AI & Tech is progressing, it comes with certain disadvantages too. Protecting AI and Technology under law, and accountability is mandatory. For example, in social media we witness how AI can rip of someone's personality, life, or a nation and the world etc, if these sorts of AI become handy to everyone; the world will be in big chaos. So, maintaining and protecting people from this and with this could be very challenging, I personally think that is alarming. We need to be very mindful about the usess of advance AI and Technology.

**However, let's Dive into this to Explore**

Artificial Intelligence (AI) is a branch of computer science that focuses on the creation of intelligent machines that can think and learn like humans. AI technology enables machines to mimic human intelligence and also improve the capabilities of the human mind. AI systems have the ability to process data, interpret speech, analyses patterns, identify objects, and make decisions on their own. Computer science is a form of study as we all know, artificial intelligence is an applied discipline within computer science. Its focus is on enabling computers and machines to solve problems and make decisions, ultimately imitating the abilities of the human brain. Artificial intelligence allows computers to carry out tasks typically completed by humans. Since its proposal in the 1950s, artificial intelligence has evolved to encompass a variety of components and concepts, including.

Machine learning: training algorithms to recognize patterns and make predictions from data without explicit programming. Neutral networks: working on computational models inspired by the structure and function of the human brain Natural

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language processing: training computers to understand, interpret and generate human language Robotics: creating intelligent machines capable of interacting with the physical world

Ethical and responsible AI: addressing issues relating to bias, fairness, transparency and accountability.

With John McCarthy's development of the first AI programming language in the 1960s, early AI systems focused on rule-based processes and symbolic reasoning. As computers' capabilities expanded, AI developed the ability to learn from data.

Over the last decade, AI has become increasingly popular due to the development of large-scale neural networks such as the Generative Pre-trained Transformer (GPT) series by OpenAI– also known as ChatGPT.

In Short, AI enables machines to think and act like us. Yes! Like humans. Imagine a computer or robot that can learn, reason, solve problems, and even understand language, just like we do. From recognizing patterns to making decisions, AI mimics the cognitive abilities of the human brain. By studying how we think and process information, AI systems are designed to think smarter and more efficiently, enabling them to perform tasks that once required human intelligence.

Whether it's recommending your next favorite movie or driving a car autonomously, AI is shaping the future in ways we once only imagined or thought of as a fantasy. On the other hand, Technology is a broad term encompassing all tools and systems created to solve problems or improve human life. Artificial Intelligence (AI) is a specific field within technology focused on creating machines that can mimic human intelligence. In essence, AI is a subfield of technology, not the other way around. The difference between AI and technology—AI refers to a part of technology that enables machines to accomplish tasks normally thought to be only the domain of human beings, such as learning, reason— Technology refers generally to something that is a tool, process, or system devised for solving problems.

**Here is More Detailed Breakdown for Better Understanding; Technology**

**Definition:** Technology refers to the application of scientific knowledge for practical purposes, especially in industry. Scope: It includes a wide range of tools, techniques, and systems, from simple tools like a hammer to complex systems like the internet.

**Examples:** Software development, network administration, cybersecurity, and hardware engineering are all examples of technology.

Technology, at its simplest, is the application of scientific knowledge for practical purposes, often involving the creation of tools and systems to solve problems or achieve goals. It encompasses a wide range of methods, systems, and devices, from basic tools to complex machinery and software. Essentially, whenever humans use their knowledge to create something that improves their lives or helps them accomplish tasks, they are engaging with technology.

**Here's a More Detailed Breakdown**

**Problem-Solving:** Technology provides tools and techniques to address various challenges, both big and small.

**Practical Application:** It involves using scientific principles to create solutions that can be used in the real world.

**Tools and Systems:** Technology can refer to the tangible objects (like a hammer or a computer) or the intangible systems (like software or a network) used to achieve a goal.

**Evolutionary:** Technology is constantly evolving, with new inventions and innovations constantly emerging.

**Wide Scope:** It includes everything from simple tools like the wheel to complex systems like the internet.

**Impact on Society:** Technology plays a significant role in various aspects of human life, including industry, communication, and daily routines.

Utilizing scientific knowledge for practical uses is known as technology. Technology has significantly altered how we live and the world works. Things that were unthinkable a few years ago are now possible; thanks to technology for sure. The use of scientific information and ideas for the benefit of humanity is referred to as technology.

**What is Artificial Intelligence?**

Picture this, a machine can organise things for you; such as organising your work station or serving tea for your family member in the morning, makes your day easier and you can start your day with much more energy & positivity for work!! These are the product of artificial intelligence. Now the question is why do we use the term artificial intelligence- these machines are artificially incorporated with human like intelligence to perform as we human do. This is built by using complex algorithm and mathematical functions, (in my understanding to understand the AI we need to understand human DNA and its complexity too and how our DNA functions and human DNA has defensive mechanism very strongly; for example [any habit that we intend to change consciously in our life, some time it's hard to change due to the defensive mechanism. Since we have life in our planet, it's human nature and it's normal for human DNA to to be defensive].

However; AI may not be as obvious as it seems in the previous Examples. Now we have AI in to everything, such as smart phone, car, social media, Video games, banks, surveillance and many other aspects of our daily life personal and corporate too.

Now the crucial question is what does an AI do at its core to really function in our life? To perform in specific task to support or human this robot needs to programmed through machine learning by inputting the data, imagine a land scape, lights, sound and others general things around, but the AI robot must perform as expected. this whole program is known as reactive program and called generalised learning.

Another is the robot is in cross road, one way the road is paved and other side is bumpy and rocky and robot has to cross the

road [these situation gives an idea of REASONING ability to perform.] It shows that robot uses the given input and finds the solutions for a problem, this is problem solving.

- Generalized Learning
- Reasoning Learning
- problem solving learning capability gives robot to be artificially intelligent.
- To be easier, AI provides machine to learn adapt, reason and provide solutions.

**There are Types of AI**

1. Weak or narrow AI for example: Alexa, [which is built to only answer based on the program]
2. Strong AI. Robot is fiction [which is self-aware]
3. Super AI

Here is the interesting part to know how artificial intelligence is different from machine learning and deep learning.

**Artificial Intelligence**

Machine learning- from data, experience, prediction, algorithm. [machin learning is a technique to achieve ai] Deep learning inputt layer, hidden layer, output layer [data and patterns can be better received]

**Examples of Artificial Intelligence (AI)**

- Robotic assistants
- Computer vision
- Self-driving cars
- Expert systems
- Virtual chatbots
- Facial recognition
- Auto correction or text editors
- Personal recommendations for shopping
- Surgical Robots
- Virtual travel booking assistants
- Social media monitoring

Ray Kurzweil predicts that by the year 2045 an ai robot will be intelligent as human and it's called' 'point of singularity'.

And Elon musk predicts that human mind and body will be enhance by AI implants which will make us partly cyborgs!

**Now will Dive into this to Elaborate.**

To distinguish between different levels of intelligence, researchers often divide artificial intelligence (AI) into three categories: Artificial narrow intelligence (ANI) Artificial general intelligence (AGI) Artificial super intelligence (ASI) Does this sound intriguing, making you wonder how AI accomplishes all of this? In the following part, will learn how AI works, types of AI, and more in details.

Let's dig in to explore AI further, Types of Artificial Intelligence based on functionalities [4]

**Purely Reactive**

These machines do not have any memory or data to work with, npecializing in just one field of work. For example, in a chess game, the machine observes the moves and makes the best possible decision to win.

**Limited Memory**

These machines collect previous data and continue adding it to their memory. They have enough memory or experience to make proper decisions, but memory is minimal. For example, this machine can suggest a restaurant based on the location data that has been gathered.

**Theory of Mind**

This kind of AI can understand thoughts and emotions, as well as interact socially. However, a machine based on this type is yet to be built, hopefuly very soon in near future.

**Self-Aware**

Self-awareness is the final and most advanced stage of AI, which is currently a hypothetical concept. This will be possible when machines develop self-awareness and have human-like consciousness. Self-aware AI machines will have the same needs, emotions, and desires as humans.

Developing Self-aware AI machines might take several decades or even centuries. Self-awareness can be considered as an extension of the theory of mind concept in AI research. The difference will be that self-aware machines will have thoughts and reactions of their own.

Self-aware machines are the future generation of these new technologies. They will be intelligent, sentient, and conscious like human.

AI systems work by merging large with intelligent, iterative processing algorithms. This combination allows AI to learn from patterns and features in the analysed data. Each time an Artificial Intelligence system performs a round of data processing, it tests and measures its performance and uses the results to develop additional expertise. Now that you know how AI works at a basic level, let's take a closer look at the two major categories of AI and how they differ in purpose and capabilities, which I have already mention very briefly earlier above.

**Weak AI vs. Strong AI**

AI discussion is weak and strong AI. When discussing artificial intelligence, it is common to distinguish between two broad categories: weak AI and strong AI. Let's explore the characteristics of each type:

**What is Weak AI (Narrow AI)**

Weak AI or Narrow AI, refers to AI systems that are designed to perform specific tasks and are limited to those tasks only. These AI systems excel at their designated functions but lack general intelligence. Examples of weak AI include voice assistants like Siri or Alexa, recommendation algorithms, and image recognition systems. Weak AI operates within predefined boundaries and cannot generalize beyond their specialized domain. Which shows the limitation of weak AI.

**What is Strong AI (General AI)**

Strong AI, also known as general AI, refers to AI systems that possess human-level intelligence or even surpass human

intelligence across a wide range of tasks. Strong AI would be capable of understanding, reasoning, learning, and applying knowledge to solve complex problems in a manner similar to human cognition. However, the development of strong AI is still largely theoretical and has not been achieved to date.

**Super AI**

Super AI or Artificial Superintelligence (ASI) would be capable of outperforming humans. ASI machines are self- aware and expected to surpass human intelligence. They can perform any task better than humans. The concept of Super AI is still hypothetical.

Artificial superintelligence (ASI) is considered the most advanced and powerful type of AI, surpassing other types based on intelligence. It has characteristics such as problem- solving, thinking, decision-making, and the ability to interpret human emotions and experiences. Ways of Implementing AI.

**Let's Explore the Following Ways That Explain How we can Implement Ai**

**Machine Learning**

Machine learning gives AI the ability to learn. This is done by using algorithms to discover patterns and generate insights from the data it is exposed to.

**Deep Learning**

Deep learning, a subcategory of machine learning, allows AI to mimic a human brain's neural network. It can make sense of patterns, noise, and sources of confusion in the data. Here, we segregated the various kinds of images using deep learning. The machine goes through multiple features of photographs and distinguishes them with feature extraction. The machine segregates the features of each photo into different categories, such as landscape, portrait, or others.

- Input Layer
- Hidden Layer
- Output Layer

You may be wondering why there are multiple layers. The hidden layers function as alternatives to some degree. The more the hidden layers are, the more complex the data that goes in and what can be produced. The accuracy of the predicted output generally depends on the number of hidden layers present and the complexity of the data going in.

The output layer gives us segregated photos. Once the layer adds up all these weights being fed in, it'll determine if the picture is a portrait or a landscape.

**Example:** Predicting Airfare Costs

This Prediction is Based on Various Factors, Including

- Airline
- Origin airport
- Destination airport
- Departure date

The system begins with some historical data on ticket prices to train the machine. Once the machine is trained, we share new data that will predict the costs. Earlier, when we learned about four kinds of machines, we discussed machines with memory. Here, we talk about the memory only, and how it understands a pattern in the data and uses it to make predictions for the new prices as shown below:

Advantages and Disadvantages of AI—Artificial Intelligence (AI) is a rapidly advancing technology that has the potential to revolutionize almost every industry today. AI technology is proven to increase process efficiency, automate repetitive tasks, and make accurate predictions about the future. Not all AI is the same. There are different types of AI that serve different purposes.

Artificial Intelligence (AI) isn't just one thing—it's a range of technologies with different capabilities. In this article, you'll discover the 7 types of AI that power everything. What is artificial intelligence discussion, and understanding how effective or helpful AI is truly! AI has pros and cons much like any other innovation. Here's a quick rundown of some pros and cons.

**Pros of AI**

- It reduces human error
- It never sleeps, so it's available 24x7
- It never gets bored, so it easily handles repetitive tasks
- It's fast

**Cons of AI**

- It's costly to implement
- It can't duplicate human creativity
- It will definitely replace some jobs, leading to unemployment
- People can become overly reliant on it

Let's continue this article on; What is Artificial Intelligence by discussing the: Applications of Artificial Intelligence

Artificial intelligence (AI) has a wide range of applications across various industries and domains. Here are some notable applications of AI achieved using the latest and in-demand AI tools:

**Natural Language Processing (NLP)**

AI is used in NLP to analyze and understand human language. It powers applications such as speech recognition, machine translation, sentiment analysis, and virtual assistants like Siri and Alexa.

**Image and Video Analysis**

Artificial Intelligence techniques, including computer vision, enable the analysis and interpretation of images and videos. This finds application in facial recognition, object detection and tracking, content moderation, medical imaging, and autonomous vehicles.

**Robotics and Automation**

AI plays a crucial role in robotics and automation systems. Robots equipped with AI algorithms can perform complex tasks in manufacturing, healthcare, logistics, and exploration. They can adapt to changing environments, learn from experience, and collaborate with humans.

**Recommendation Systems**
AI-powered recommendation systems are used in e- commerce, streaming platforms, and social media to personalize user experiences. They analyze user preferences, behavior, and historical data to suggest relevant products, movies, music, or content.

**Financial Services**
Artificial Intelligence is extensively used in the finance industry for fraud detection, algorithmic trading, credit scoring, and risk assessment. Machine learning models can analyze vast amounts of financial data to identify patterns and make predictions.

**Healthcare**
AI applications in healthcare include disease diagnosis, medical imaging analysis, drug discovery, personalized medicine, and patient monitoring. AI can assist in identifying patterns in medical data and provide insights for better diagnosis and treatment.

**Virtual Assistants and Chatbots**
AI-powered virtual assistants and chatbots interact with users, understand their queries, and provide relevant information or perform tasks. They are used in customer support, information retrieval, and personalized assistance.

**Gaming**
AI algorithms are employed in gaming for creating realistic virtual characters, opponent behavior, and intelligent decision-making. AI is also used to optimize game graphics, physics simulations, and game testing. 4-Smart Homes and IoT AI enables the development of smart home systems that can automate tasks, control devices, and learn from user preferences. AI can enhance the functionality and efficiency of Internet of Things (IoT) devices and networks.

**Cybersecurity**
Artificial Intelligence helps detect and prevent cyber threats by analyzing network traffic, identifying anomalies, and predicting potential attacks. It can also enhance the security of systems and data through advanced threat detection and response mechanisms.

AI's reach doesn't stop there. It's being integrated into many other industries in creative and impactful ways. Let's look at some real-world examples to see how AI is making a difference across fields.

**Artificial Intelligence Examples**
AI tools have become an integral part of our everyday lives, revolutionizing various industries and enhancing user experiences. From sophisticated virtual assistants to streamlining repetitive tasks, AI is everywhere. Here are some extraordinary examples of AI applications:

ChatGPT and Other Generative AI Tools ChatGPT along with other generative AI tools like Jasper AI, and Copy.ai, are revolutionizing content creation and communication. These AI models are designed to generate human-like text, which can be used for everything from customer service automation to generating creative content for marketing, education, and even software development.

**Google Maps**
Google Maps utilizes AI algorithms to provide real-time navigation, traffic updates, and personalized recommendations. It analyzes vast amounts of data, including historical traffic patterns and user input, to suggest the fastest routes, estimate arrival times, and even predict traffic congestion.

**Self-Driving Cars and Tesla Full Self-Driving (FSD) Beta**
Self-driving cars rely heavily on Artificial Intelligence AI for perception, decision-making, and control. Using a combination of sensors, cameras, and machine learning algorithms, these vehicles can detect objects, interpret traffic signs, and navigate complex road conditions autonomously, enhancing safety and efficiency on the roads.

Tesla's Full Self-Driving Beta leverages AI for autonomous driving. It's an enhanced version of Tesla's Autopilot system, using neural networks and vast datasets from Tesla's fleet of cars. FSD makes real-time decisions, navigating complex city environments, including stopping at traffic signals, recognizing pedestrians, and handling lane changes. Netflix and Spotify Leveraging AI-powered Personalization

Both Netflix and Spotify use AI to recommend personalized content based on user preferences. These platforms analyze past behavior, viewing habits, and listening patterns to suggest movies, shows, and music tailored to each user's tastes. This has greatly enhanced the user experience by providing highly relevant recommendations.

Reasons to Get an Artificial Intelligence Certification— can open up numerous opportunities, especially as AI revolutionizes various industries. Here's why you should consider it:

**Scale up Your Career**
As AI continues to transform various sectors, having a certification ensures your skills align with industry needs. A report by Mckinsey ndicates that 92% of companies plan to increase their AI investments, underscoring the growing importance of AI competencies.

**Increase your Earning Potential**
Professionals with AI expertise often enjoy higher earning potential. reports that AI engineers earn over $101,000 per year. Moreover, glassdoorndicates that the average compensation for AI Engineers in the U.S. is over $205,000. These figures highlight the lucrative opportunities available for professionals with AI expertise.

**Gain Networking Opportunities**
An AI certification often provides access to a network of professionals and experts, facilitating collaborations and opening doors to new career opportunities within the AI community.

**Branches of Artificial Intelligence**
Some Important Branches of Artificial Intelligence (AI) are
- Machine learning
- Natural language processing (NLP)
- Expert systems
- Robotics
- Deep learning

- Computer vision
- Robotic process automation (RPA)

Microsoft build 2025 edition. The era of AI agents and an evolving AI landscape. At Microsoft Build 2025 we learned how the vision of AI agents and the open web are becoming a reality through platforms, products, and infrastructure. How to take AI to the next level. Discover tools and strategies to make a bigger impact with AI. In tech, the ground is always shifting. It's all about AI and AI agents. inspiring opening keynote from Microsoft CEO Satya Nadella. We explored all the new opportunities in the era of AI and unveiled powerful new capabilities that redefine what's possible with AI in the enterprise. From trends in the AI landscape to conversations with leaders in the AI space, the keynote had a little bit of everything—including a spotlight on a case study on how the NFL and its partners are using Azure AI Foundry and Azure Cosmos DB to explore innovative new ways to assess talent, enhance training, and maximize player potential. The announcements at this year's Build marked a powerful shift in how organizations can harness AI—not just as a tool, but as a collaborative partner in solving complex challenges.

Empowering custom intelligence—Low-code tools and intuitive interfaces are making it easier than ever for businesses to shape AI to fit their unique needs. Companies can now fine-tune AI models and build intelligent agents using their own data—democratizing access to advanced AI capabilities.

- Collaboration between AI agents—A new frontier in AI is unfolding—where multiple agents can work together, coordinating tasks and sharing context to solve problems that would be too complex for a single model. This orchestration mirrors human teamwork, enabling more dynamic and scalable solutions.
- Open, flexible AI ecosystems—We are embracing openness by allowing organizations to bring their own models into its AI platforms. This flexibility ensures that AI solutions are not only powerful but also deeply relevant to each business's context, goals, and data. Drive impact with AI use cases—The question isn't whether to invest in AI—it's where will it make the biggest difference. Across industries, business leaders are turning to AI to go beyond productivity—using it to accelerate innovation, drive growth, enter new markets, and sharpen their competitive edge.

## Conclusion

Artificial intelligence (AI) is a highly fascinating and fast-evolving field of science. Although researchers are continuing their efforts to achieve General AI and Super AI, they still have a long way to go. AI is the only type of artificial intelligence that humans have developed, and this field has seen great progress in the last few years, emphasizing the importance of AI and machine learning in more depth and range. It is no secret that the future of AI holds great potential. My final take on this is to be more hopeful for greater progress through AI and Technology for us and our world, with sincerity.