Research Paper 1

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# Part 1 Artificial Intelligence

1. Describe what is AI – How does it work? (5 marks)

Artificial intelligence (AI) is the simulation of human intelligence processes by machines, especially computer systems. A few specific applications of AI are machine vision, natural language processing, expert systems, and speech recognition (Laskowski & Tucci, 2023).

Vendors have been rushing to highlight how their products and services leverage artificial intelligence (AI) as the buzz around the technology has grown. Frequently, though, what they call AI is just a part of the technology, like machine learning. Writing and training machine learning algorithms requires a foundation of specialized hardware and software, so there is no one programming language that is synonymous with AI, though Python, R, Java, C++, and Julia have features that are popular with AI developers (Laskowski & Tucci, 2023).

To put it another way, an image recognition tool can learn to identify and describe objects in images by reviewing millions of examples, and new, rapidly improving generative AI techniques can create realistic text and image content. Generally speaking, AI systems operate by ingesting large amounts of labeled training data, analyzing the data for correlations and patterns, and using these patterns to make predictions about future states (Laskowski & Tucci, 2023).

**Reference :** Laskowski, N., & Tucci, L. (2023, November 13). *artificial intelligence (AI)*. Enterprise AI. https://www.techtarget.com/searchenterpriseai/definition/AI-Artificial-Intelligence.

1. List the benefits associated with Artificial Intelligence (5 marks)

List of benefits of Artificial Intelligence:

### 24x7 Availability

### Zero Risks

### Digital Assistance

### New Inventions

### Perform Repetitive Jobs

### Daily Applications

### Medical Applications

**Reference:**Duggal, N. (2023, November 24). *Advantages and Disadvantages of Artificial intelligence [AI]*. Simplilearn.com. https://www.simplilearn.com/advantages-and-disadvantages-of-artificial-intelligence-article

1. Human Intelligence v/s Artificial Intelligence (5 marks)

Artificial Intelligence:

Artificial intelligence is an area of data science that focuses on building intelligent machines that can do a variety of jobs that frequently require human perception and intelligence. These intelligent devices are capable of learning from past mistakes and historical data, assessing the current situation, and determining the appropriate course of action.

Artificial Intelligence (AI) is a multidisciplinary field that incorporates concepts and techniques from many different fields, such as mathematics, computing science, cognitive sciences, language studies, neurology, and psychology.

The machine can analyze data with little to no human intervention and is capable of self-learning, self-analysis, and self-improvement.

It helps technologies mimic human activity based on behavior and is used in almost every area, including the media, healthcare, graphics, and animation industries.

Human Intelligence:

Human intelligence is the term used to describe a person's capacity for thought, understanding a wide range of expressions, grasping difficult ideas, solving mathematical puzzles, adapting to changing conditions, using knowledge to control their surroundings, and interacting with others (Avcontentteam, 2023).

In addition to details about social networks and personal connections, it might provide information about a particular skill set and body of knowledge that may be related to a different human being or, in the case of intelligence agents and locators, diplomatic information they had to access. Human intelligence and behavior are rooted in an individual's unique combination of genetics, early development, and experience with a variety of situations and events (Avcontentteam, 2023).

**Reference:** Avcontentteam. (2023, November 2). *Artificial Intelligence vs. Human Intelligence: Top 7 Differences*. Analytics Vidhya. https://www.analyticsvidhya.com/blog/2023/07/artificial-intelligence-vs-human-intelligence/

# Part 2 Tools supporting AI

1. List the tools available as of today using AI technology in any domain (5 marks)

• NLTK (Natural Language Toolkit):

(Bird, S., Klein, E., & Loper, E. (2009). "Natural Language Processing with Python.")

• Google Cloud AI Platform:

(Google Cloud. (2021). "AI and Machine Learning.")

• Amazon SageMaker:

(Amazon Web Services. (2021). "Amazon SageMaker.")

• OpenCV (Computer Vision):

Bradski, G. (2000). "The OpenCV Library."

• TensorFlow and PyTorch:

Abadi, M., Barham, P., Chen, J., Chen, Z., Davis, A., Dean, J., ... & Zheng, X. (2016). "TensorFlow: A system for large-scale machine learning."

1. Describe in detail any one of them (5 marks)

One of the best platforms for writing Python programs that interact with data in human languages is NLTK. In addition to a suite of text processing libraries for classification, tokenization, stemming, tagging, parsing, and semantic reasoning, wrappers for industrial-strength NLP libraries, and an active discussion forum, it offers user-friendly interfaces to more than 50 corpora and lexical resources, including WordNet.

Linguists, engineers, students, educators, researchers, and industry users can all benefit from NLTK's thorough API documentation and hands-on approach that covers computational linguistics and programming principles. Linux, Mac OS X, and Windows may all use NLTK. The best part is that NLTK is a community-driven, open-source, free project.

NLTK has received praise for being "an amazing library to play with natural language" and "a wonderful tool for teaching, and working in, computational linguistics using Python."

Python's Natural Language Processing offers a useful introduction to language processing programming. The book, which was written by the people who created NLTK, walks the reader through the principles of using corpora, categorizing text, linguistic structure analysis, and developing Python programs. The book's online version has been updated to support NLTK 3 and Python 3.

(*NLTK :: Natural Language Toolkit*. (n.d.). https://www.nltk.org/)

1. Successful AI Tools in Education domain (5 marks)

•**Cognii:**

Offers artificial intelligence-driven virtual tutors that use natural language processing to help students become better writers. ( Cognii. (2021). "Cognii Virtual Learning Assistant.")

•**SMART Learning Suite:**

provides virtual tutors powered by artificial intelligence that employ natural language processing to assist students in improving as writers.(SMART Technologies. (2021). "SMART Learning Suite.")

•**Quillionz:**

Makes use of AI to create tests and quizzes based on instructional content, promoting effective learning.( Quillionz. (2021). "Quillionz - Your AI-Powered Quiz Maker.")

•**Coursera:**

Uses AI to provide individualized feedback, assessments, and suggestions in online courses that colleges and organizations offer. (Coursera. (2021). "How Coursera Uses Machine Learning.")

**•Duolingo:**

A language-learning platform that uses artificial intelligence (AI) algorithms to tailor lessons to the needs of specific students.(von Ahn, L., & Dabbish, L. (2008). "Designing games with a purpose.")