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| **PROPOSAL ENGLISH**  **GENERATIVE ARTIFICAL INTELLIGENCE (AI)** |
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**INTRODUCTION**

We express our gratitude to the Almighty, for by His grace and mercy, we have been able to complete this paper successfully. This paper is prepared as part of a course assignment, with the aim of deepening our understanding of the topic under discussion.

The paper discusses the influence of technology on the development of industries, particularly in the rapidly evolving digital era. We chose this topic because we recognize the crucial role of technology in industrial development and seek to gain a deeper understanding of how technology can impact industries in the future.

In this paper, we will address the concept of technology, its development in industries, as well as the positive and negative impacts of its use in the industrial sector. We will also discuss the challenges and opportunities that industries face in coping with the rapid advancement of technology.

In conclusion, we hope that this paper will be beneficial to the readers, especially those who wish to gain a deeper understanding of the influence of technology on industrial development. We extend our thanks to all those who have assisted us in completing this paper.

Sincerely,

Our Group

**TABLE OF CONTENTS**

INTRODUCTION……………………………………………………………………………………..1

TABLE OF CONTENTS……………………………………………………………………………....2

CHAPTER 1 ARTIFICIAL INTELLIGENCE (AI)……………………………………………………………...3

CHAPTER 2 NATURAL LANGUAGE PROCESSING(NLP)………………………………………………....4

CHAPTER 3 MACHINE LEARNING…………………………………………………………………………..5

CHAPTER 4 DEEP LEARNING………………………………………………………………………………...6

CHAPTER 5 DATA MINING……………………………………………………………………………………7

CHAPTER 6 FUZZY INTERFERENCE SYSTEM……………………………………………………………..8

CHAPTER 7 ARTIFICIAL NEURAL NETWORK ………………………………………………………….....9

CHAPTER 8 GENETICS ALGORITHM............................................................................................................10

CHAPTER 9 ROBOT ..........................................................................................................................................11

CHAPTER 10 CHATGPT ...................................................................................................................................12

SUMMARY. ........................................................................................................................................................13

CHAPTER 1

**ARTIFICAL INTELLIGENCE (AI)**

1. **Definition of Artificial Intelligence (AI)**

Artificial Intelligence (AI), or known in Indonesian as Kecerdasan Buatan, is a branch of computer science that aims to develop systems and machines capable of performing tasks that typically require human intelligence. AI involves the use of algorithms and mathematical models to enable computers and other systems to learn from data, recognize patterns, and make intelligent decisions. In the context of AI, there are several important concepts such as machine learning, neural networks, natural language processing, and many more. The development of AI has had a significant impact in various fields such as speech recognition, facial recognition, autonomous vehicles, healthcare, and many others.

1. **History of Artificial Intelligence (AI)**

The history of AI development can be traced back to the early 20th century, although the concept has long existed in mythology and science fiction. Here are some key milestones in the history of AI:

1. **1947**

The concept of artificial intelligence was first discovered after World War II by a young mathematician and philosopher named Alan Turing.

1. **1956**

AI was proposed by a professor from the Massachusetts Institute of Technology named John McCarthy2. He said, AI is to know and model human thinking techniques and design machines to mimic human behavior.

1. **2022**

Elon Musk, CEO of Tesla, showcased a Humanoid Robot named Optimus at Tesla AI Day 2022.

CHAPTER 2

**NATURAL LANGUAGE PROCESSING (NLP)**

1. **Introduction to Natural Language Processing (NLP)**

Natural Language Processing (NLP) is an area of artificial intelligence focused on interactions between humans and computers using natural languages. The primary objective of NLP is to allow computers to understand, analyze, and utilize human languages effectively. Humans communicate naturally through their native languages, which are highly complex and often ambiguous in many cases. While for humans, understanding and utilizing native languages may seem easy and intuitive, for computers, these tasks are extremely challenging. Therefore, NLP strives to overcome these challenges by enabling computers to comprehend and leverage human languages.

NLP encompasses various subfields and techniques, including text processing, natural language understanding, language modeling, sentiment detection, information extraction, machine translation, and many more. These techniques involve different algorithms and statistical methods used to analyze and understand the structure, meaning, and context of human languages.

One application of NLP is in areas like search engines, natural language processing, chatbots, sentiment analysis, and automatic translation. For example, search engines use NLP to understand and index content based on user queries.

CHAPTER 3

**MACHINE LEARNING**

1. **Introduction to Machine Learning (ML)**

Machine learning is a field of artificial intelligence and computer science focusing on the utilization of data and algorithms to mimic human learning processes, gradually improving accuracy over time. In this regard, learning machines from given data and producing models that can be employed for prediction or decision-making purposes. Machine learning can be applied in various applications, such as face recognition, speech recognition, handwriting recognition, among others. There are several types of machine learning, including supervised learning, unsupervised learning, and reinforcement learning. Supervised learning involves the usage of labeled data and produced models being utilized for predictions. Unsupervised learning involves the usage of unlabeled data and produced models being utilized for pattern discovery. Reinforcement learning involves the usage of reward mechanisms and punishment schemes to produce models capable of taking appropriate actions.

CHAPTER 4

**DEEP LEARNING**

1. **Introduction to Deep Learning (DL)**

Deep learning is a branch of machine learning inspired by the structure and function of the human brain, also referred to as artificial neural networks or deep neural networks. Within this thesis, we will discuss deep learning in detail, covering definitions, working principles, architecture, applications, and challenges faced.

Deep learning can be defined as a technique of machine learning that uses multi-layered artificial neural networks to extract complex features and represent complex and abstract input data in a hierarchy. The number and complexity of neural layers distinguish deep learning from conventional machine learning approaches. Deep learning's ability to learn patterns from complex and abstract data makes it very successful in image recognition, natural language processing, speech recognition, and many other fields.

Deep Learning (or Deep Neural Networks) is one of the main branches of Artificial Intelligence (AI) that has transformed the landscape of modern technology due to its capability to learn high-level representations of data. With its ability to learn complex representations of data, Deep Learning has brought significant improvements in various applications, ranging from face recognition to speech and language processing.

CHAPTER 5

**DATA MINING**

1. **Introduction to Data Mining**

Data mining is the process of extracting useful information from a large dataset using statistical and artificial intelligence techniques to analyze data and find useful patterns. It can help companies turn raw data into useful knowledge. Data mining techniques can be divided into two main purposes: they can either describe the target dataset or they can predict outcomes through the use of machine learning algorithms. Data mining involves a number of steps from data collection to visualization to extract valuable information from a large dataset. The techniques are used to generate descriptions and predictions about a target dataset. Data mining has improved organizational decision-making through insightful data analyses. The data mining techniques that underpin these analyses can be divided into two main purposes.

CHAPTER 6

**FUZZY INTERFERENCE SYSTEM**

1. **What is Fuzzy Logic**

Fuzzy Logic resembles the methodology of human decision-making and deals with information that is not clear and precise. It is a very small tutorial that touches on the basic concepts of Fuzzy Logic. The term "fuzzy" refers to things that are unclear or vague. Any event, process, or function that continuously changes cannot always be defined as true or false, which means that we need to define these activities in a vague manner. Fuzzy Logic resembles the methodology of human decision-making. It deals with information that is not clear and precise. It is an oversimplification of real-world problems and is based on the degree of truth rather than the usual true/false or 1/0 logic like Boolean logic. Please refer to the following diagram. It shows that in a fuzzy system, its value is indicated by numbers in the range of 0 to 1. Here, 1.0 represents absolute truth and 0.0 represents absolute falsehood. The numbers indicating values in a fuzzy system are called truth values.

**ARTIFICIAL NEURAL NETWORK**

CHAPTER 7

**ARTIFICAL NEURAL NETWORK**

1. **What is Neural Network?**

The term "Artificial Neural Network" is derived from the biological neural network that develops the structure of the human brain. Similar to the human brain, which has interconnected neurons, an artificial neural network also consists of interconnected neurons in various layers of the network. These neurons are known as nodes and form the basis of Machine Learning, specifically Deep Learning, used in unsupervised learning. The Artificial Neural Network is an interconnected entity where each node is responsible for simple calculations, functioning similarly to neurons in the human brain. It is a technical model commonly used in supervised learning.

Artificial neural networks are categorized into three main types: sequential learning, classification, and functional approach. Various examples of neural networks include Perceptron, Hopfield, Convolutional Neural Network (CNN), autoencoders, Boltzmann machines, self-organizing maps, restricted Boltzmann machines, deep belief networks, recurrent neural networks, among others. The key application of neural networks is classification.

CHAPTER 8

**GENETICS ALGORITHM**

1. **Introducing Genetics Algorithm**

Genetic Algorithm (GA) is an optimization algorithm inspired by the process of natural selection. It is a population-based search algorithm that uses the concept of survival of the fittest. A new generation is produced through repeated application of genetic operators on individuals within the current population. Key elements of GA include chromosome representation, selection, crossover, mutation, and fitness function evaluation. The procedure for GA is as follows: An initial population (Y) consisting of n chromosomes is initialized randomly. The fitness value of each chromosome in Y is calculated. Two chromosomes, say C1 and C2, are selected from population Y based on their fitness values. Cross-over with one point using a cross-over probability (Cp) is applied to C1 and C2 to produce offspring, denoted as O. Afterwards, uniform mutation with a mutation probability (Mp) is applied to the resulting offspring (O') to generate O'. Offspring O' replaces old members in the new population. Selection, crossover, and mutation operations will continue on the current population until the new population is complete. Mathematical analysis of GA is as follows Genetic Algorithm dynamically changes the search process through cross-over and mutation probabilities and achieves optimal solutions. GA can modify encoded genes. GA evaluates multiple individuals and produces several potential solutions

**ROBOT**

CHAPTER 9

**ROBOT**

1. **Introducing Robot**

Robot, any machine that is automatically operated and replaces human effort, although it may not resemble humans in appearance or perform functions in a human-like manner. In extension, robotics is the engineering discipline related to the design, construction, and operation of robots.

The concept of artificial humans predates recorded history (see automaton), but the modern term "robot" originates from the Czech word "robota" ("forced labor" or "slave"), used in Karel Čapek's play R.U.R. (1920). The play depicted robots produced by humans, exploited without feelings by factory owners until they rebelled and ultimately destroyed humankind. Whether they are biological, like the monster in Mary Shelley's Frankenstein (1818), or mechanically undefined, alternative mechanics inspired generations of inventors to build electric humanoids.

The term "robotics" first appeared in Isaac Asimov's science fiction story "Runaround" (1942). Along with Asimov's later robot stories, it set a new standard for the plausible possibilities of developing intelligent robots and the technical and social problems that might arise. Runaround also contains Three.

CHAPTER 10

**CHATGPT**

**A. Introduction to ChatGPT**

ChatGPT is a natural language AI chatbot. At its most basic level, this means you can ask it any question, and it will provide an answer. Using the ChatGPT chatbot itself is quite simple, as all you have to do is type in your text and receive information. The key here is to be creative and see how your ChatGPT responds to various cues. If you don't get the desired results, try changing your command or giving further instructions to ChatGPT. ChatGPT knows the context of the previous questions you asked, so you can improve from there rather than starting from scratch every time. For example, starting with "Explain how the solar system was made" will provide more detailed results with more paragraphs than "How was the solar system made," although both questions will provide fairly detailed results. Take it a step further by giving ChatGPT more guidance on style or tone, by saying "Explain how the solar system was made as a high school teacher."

You also have the option to request more specific essay inputs with a certain number of paragraphs or Wikipedia pages. We got very detailed results with the request "write a four-paragraph essay explaining the history of the solar system."

Overall, ChatGPT is a powerful tool for answering questions and generating information, but it requires some creativity and guidance to get the most out of it.

CHAPTER 11

**SUMMARY**

Artificial Intelligence (AI) has significantly transformed the education landscape and students' learning processes through its ability to analyze large amounts of data, provide personalized recommendations, and offer interactive learning tools. Below are some key roles that AI plays in student education:

One crucial role of AI in education is personalization. By analyzing student academic performance, preferences for learning, and progress, AI-supported educational platforms can deliver tailored content, customized learning recommendations, and specific improvement suggestions. This helps students learn more effectively by receiving material suited to their level of understanding. Additionally, AI supports adaptive learning. It identifies areas where students struggle and automatically provides additional materials or practice exercises accordingly. This helps students overcome learning challenges with greater efficiency and avoid frustration. Furthermore, AI facilitates communication and interaction between students and teachers. AI chatbots can quickly answer students' questions, reducing wait times and increasing accessibility. AI also can be used to assess and give feedback on student work automatically, allowing teachers to focus on creative aspects of teaching.

While AI offers numerous benefits, there are also drawbacks due to improper use of AI. Therefore, after providing an education about AI, we hope that users will utilize AI appropriately.