A REVIEW PAPER ON PYTHON FOR DATA SCIENCE AND MACHINE LEARNING

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ABSTRACT

This paper is based on machine learning activities using the Python programming language. There are different machine learning algorithms, including supervised learning, unsupervised learning, and reinforcement learning. They already exist in the field of computer programming. In addition to these algorithms, there is another deep learning algorithm that plays an important role in machine learning devices and is part of machine learning methods. Deep learning can be used to intelligently analyze data at scale.

This paper examines how Python can be applied to ML methods. A comprehensive overview of affected subjects was published in the study. His current research paper examines the history of machine learning, the methods used in machine learning, and its applications in various areas of AI. The purpose of this study is to impart his machine learning knowledge in various areas of AI. Knowledge of artificial intelligence (AI) is very important in machine learning (ML).

Keyword:

Python, Machine Learning (ML), Machine Learning Algorithms (MLA), Artificial Intelligence (AI), Supervised Learning, Unsupervised Learning, Reinforcement Learning, Framework, Django.

[1] INTRODUCTION

Artificial Intelligence (AI) is a broad term that is very widely used in social media, medical, agriculture, programming languages, and other automated devices. Machine learning is a science he founded and developed in as a subfield of artificial intelligence. Machine learning was first introduced in his in the 1950s (Çelik, 2018). The first steps in machine learning were done in his 1950s, but no significant research on ML was done. ML Scientific progress has slowed. However, in the 1990s, researcher resumed work in this area and developed important contributions to ML. Now the science will continue to improve in the years to come. Machine learning is a branch of artificial intelligence (AI) and computer science that focuses on using data and algorithms to mimic how humans learn, with incremental improvements in accuracy. This is an important part of the growing field of data science. Artificial Intelligence (AI) is a subfield of computer science that focuses on developing computer programs and machines that can perform tasks that humans are naturally good at, such as natural language understanding, language comprehension, and image recognition. In the mid-20th century, machine learning emerged as a subset of AI, inspired by a conceptual understanding of how the human brain works, and brought new directions to AI design. Today, machine learning is still closely intertwined with AI research. However, ML is often seen more broadly as a scientific field focused on designing computer models and algorithms that can perform specific tasks, including pattern recognition, without the need for explicit programming.

Python is an object-oriented scripted and interpreted language for both learning and real-world programming. Python is a powerful high-level language developed by Guido van Rossum. This document introduces the leading Python software tools used for data science, machine learning techniques, and IoT. In short, this paper first introduces Python as his language, introducing data science, machine learning, and IoT. Next, we'll cover packages popular in the data science and machine learning community, including NumPy, SciPy, TensorFlow, and Keras, Matplotlib, etc. From there, it shows the importance of Python for

[1]Naveen Kumar Kedia, [2]HiteshaKumari, [3]SonalMundra

building IoT applications. Various code examples are used throughout. To aid in your learning experience, run the following examples included in this document interactively in your Jupiter notebook. Rapidly growing digital information moves very fast across the Internet infrastructure and consists mostly of unstructured data.
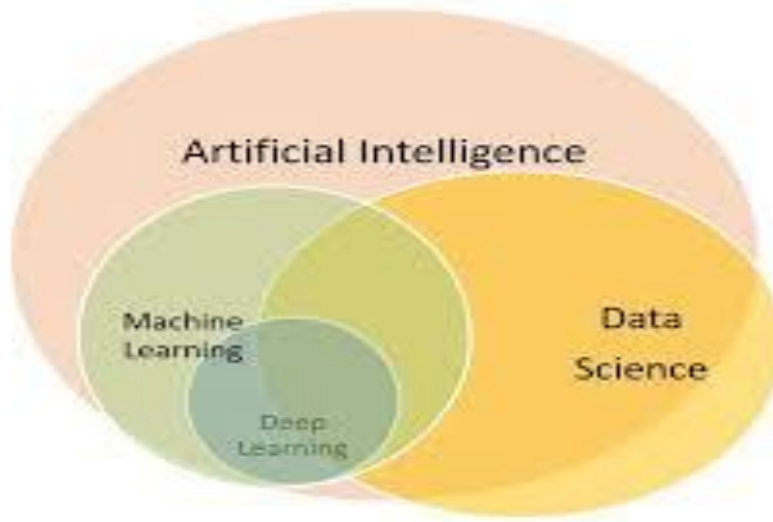

Fig.1 Artificial Intelligence

The traditional approach to processing such a complex and unstructured large amount of data is a big challenge for the software industry. For applications such as big data, data science, social media analytics, and market research, software professionals use Python, which provides a set of dynamic standard libraries for efficient machine learning and data analytics

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A literature review is a systematic and comprehensive analysis of books, scholarly articles, and other sources of information related to a particular topic, providing a knowledge base on the topic. A literature review is an overview of previously published work on a particular topic. A literature review helps identify and critique the existing literature on a topic that justifies your research by highlighting gaps in current research. The concept of machine learning is not new to us. To date, multiple studies have been conducted. Because the

[1]Naveen Kumar Kedia, [2]HiteshaKumari, [3]SonalMundra

machine learning process is a multidimensional problem, there are multiple aspects that can be used to design and analyze web-based machine learning applications in Python. Some of the included studies are described below.

[2] RELATED WORK

Artificial intelligence refers to machines, mostly computers that function like humans. In AI, machines perform facial recognition, learning, and problem-solving tasks. Devices can work and behave like humans if they have sufficient knowledge of the task. Therefore, knowledge engineering plays an essential role in artificial intelligence. Object-property relationships are accepted to implement knowledge engineering. describes one of the familiar artificial intelligence techniques. Machine learning is a branch of artificial intelligence (AI) and computer science that focuses on using data and algorithms to mimic the way humans learn, with incremental improvements in accuracy. As mentioned earlier, machine learning algorithm has the ability to self-improve through training. The operations performed by the computer based on the algorithm have no room for error and the operations follow a specific procedure. Unlike instructions written to produce output based on input, computers may make decisions based on pattern data at hand. In this situation, computers, like humans, can make mistakes in the decision-making process.

Supervised learning is a machine learning process. Supervised learning is a relatively simple learning method. This learning method refers to a person setting appropriate learning goals before learning. During the machine's initial training, the machine relies on information technology to learn its learning needs. Complete the required learning content step-by-step in a supervised environment to collect basic data information. Compared to other learning methods, supervised learning can fully stimulate the generalized learning potential of the machine itself.

[1]Naveen Kumar Kedia, [2]HiteshaKumari, [3]SonalMundra

Fig.2 supervised Learning

Corresponding to supervise learning is called unsupervised learning. So-called unsupervised learning means that machines rely on themselves to complete the analysis of data information rather than marking content in a particular direction throughout the learning process. In practice, the method of operation is sufficient to let the machine learn the basic concepts and content, and then have the machine learn various content, including concepts and content similar to the basic principles. freedom. B. Tree roots. In general, continuous improvements in learning in stage have broadened the breadth of machine learning content. In, unsupervised learning includes algorithms such as deep belief networks and autoencoders.
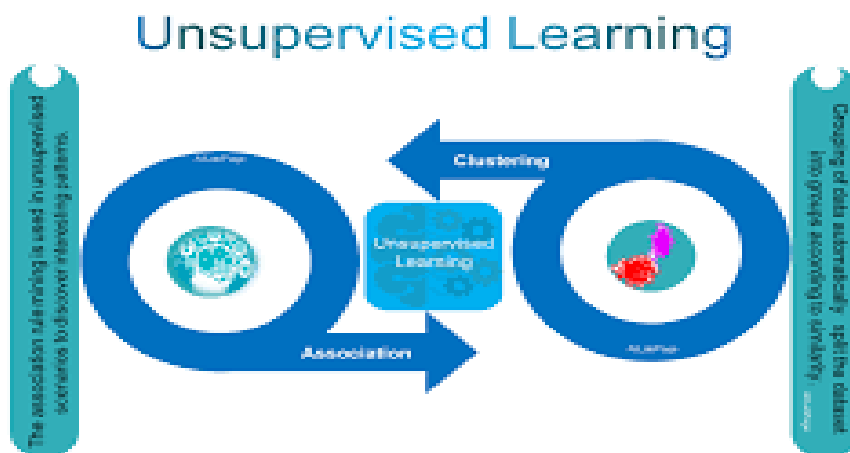

Fig.2 Unsupervised Learning

In addition to supervised and unsupervised learning, there are also applications of reinforcement learning in machine learning. So-called reinforcement learning is the systematic learning of specific content. data collected in the previous period is used by certain application processes. It organizes the and processes certain pieces of feedback

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information to form a closed data processing loop. Broadly speaking, reinforcement learning is a type of learning method that extends statistically-based data collection and dynamic learning. Such methods are mainly used to solve   control problems of robots. His representative learning methods include the Q-Learning Algorithm and the Temporal Difference Learning Algorithm (Jin, 2020). Reinforced machine learning is a behavioural model of machine learning, similar to supervised learning, but algorithm is not trained on sample data. This model is learned by trial and error while he walks. A series of successful results are consolidated to develop the best recommendations or policies for a particular problem.
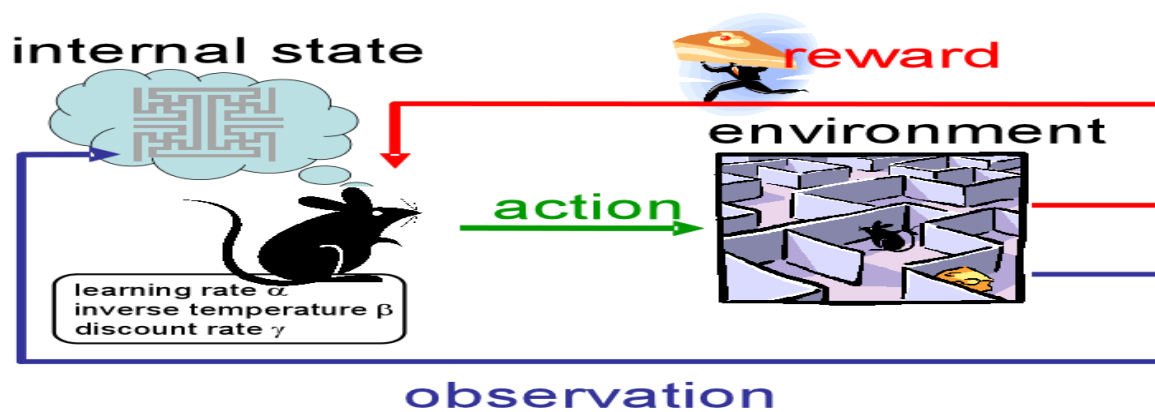

Fig-3 Reinforcement learning

A subset of machine learning that consists of algorithms that train software to perform tasks such as speech recognition and image recognition by exposing multilayer neural networks to vast amounts of data. Deep learning uses neural networks that pass data through many processing layers to interpret the properties of the data, and deep learning, governed by algorithms, analyzes the data once it goes into production. Sometimes they are mostly autonomous. Some deep learning algorithms can accept tabular data as input, but most modern methods for finding the best predictive performance are general purpose, extracting salient information from the raw data in some way. you can extract an automated path. This automatic feature extraction is an essential component of optimization tasks and modeling architectures. For this reason, deep learning is often called representation learning or feature learning. However, the main drawback of deep learning is that it is not well suited for small tabular datasets. Also, DNN parameterization may require a larger dataset, and effective training may require between 50,000 and 15,444,400 training examples. The following sections describe the early development of GPU and Python-based deep learning libraries. It focuses on computational power with static graphs, convergence to dynamic graphs to improve usability, and recent efforts to improve computational efficiency and scalability. It corresponds to an increase in the size of the dataset and architecture.

[1]Naveen Kumar Kedia, [2]HiteshaKumari, [3]SonalMundra

3. Conclusion

Python plays an important role in our daily life. Therefore, there is a need to increase its use and development. The reason for this development is the difficult analysis and processing of rapidly increasing data volumes. Thanks to this growing data, machine learning is based on the principle of finding the best model for new data out of previous ones. Therefore, machine learning research continues in parallel with growing data. We work with several parts of Django Framework to get this working: View, Models, Forms, and Templates.

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[1]Naveen Kumar Kedia, [2]HiteshaKumari, [3]SonalMundra