

Comparison of Machine Learning Algorithms for House Price Prediction using Real Time Data

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Abstract

Adaptation and innovation are extremely important to the manufacturing industry. This development should lead to sustainable manufacturing using new technologies. To promote sustainability, smart production requires global perspectives of smart production application technology. In this regard, thanks to intensive research efforts in the field of artificial intelligence (AI), a number of AI-based techniques, such as machine learning, have already been established in the industry to achieve sustainable manufacturing. Thus, the aim of the present research was to analyze, systematically, the scientific literature relating to the application of artificial intelligence and machine learning (ML) in industry. In fact, with the introduction of the Industry, artificial intelligence and machine learning are considered the driving force of smart factory revolution.

Introduction

Over the last few years, machine learning has garnered a great deal of attention both in academic circles and in the marketplace. We now have a huge number of applicable use cases, thanks to the fact that we're living in an era where data is the new coin. Companies and universities now have access to petabytes of data, allowing them to apply machine learning to identify information that can, for example, help to increase profit. The potential for this technology is amazing, but it's essential to remember that before we approach any project, we must master the core concepts so we don't head in the wrong direction or get misinformation from a set of data.

Machine Learning is a subset that means it is subcategory of AI. AI applications can intelligently interact with their new data, environment, reading of data and extracting to find new conclusions. AI is not able to use what they "see" to update themselves without the active intervention of a programmer. On the contrary, Machine Learning systems are allowed to make changes based the on information they extract from data analysis, without direct human interaction [1].

ML algorithms are not only "instructions" to the system but it analyse dynamic models and tell how things are working, using the information they get to improve. Machine learning about understands the data and the information behind it; this mathematical understanding of the data allows the machine to create models that can be used not only for describing the existing data, but for making predictions. Most Machine Learning problems can be divided into three main categories:

AI has collected a lot of consideration both in scholastic circles and in the commercial center. We currently have an enormous number of material use cases, because of the way that we're residing in a period where information is the new coin.

Organizations and social media presently approach petabytes of information, permitting them to apply AI to recognize data that can, for instance, assist with expanding income. The potential for this innovation is astounding, yet its memorable fundamental that before we approach any undertaking, we should dominate the center ideas so we don't head off course or get deception from a bunch of information [2].

ML is a subcategory of AI. Certain AI applications can shrewdly collaborate with their current circumstance, perusing new information, and extricating ends. All things considered, they can't utilize what they "see" to alter themselves without the dynamic mediation of a developer. In actuality, Machine Learning frameworks are permitted to make changes put together the with respect to data they separate from information examination, without direct human connection.

Types of Machine Learning

ML calculations are guidelines to the PC yet unique models that dissect how well things are functioning, utilizing the data they get to improve. AI is tied in with understanding the information and the data behind it; this numerical comprehension of the information permits the machine to make models that can be utilized for portraying the current information, yet for making expectations. Most Machine Learning issues can be isolated into three fundamental classifications:

1. Supervised learning
2. Unsupervised learning
3. Reinforcement learning

1. Unsupervised learning

In unsupervised learning, the framework attempts to find the secret construction of information or relationship between factors. All things considered, preparing information comprises of occasions with no relating marks. Affiliation Rule Mining showed up a lot later than AI and is dependent upon more prominent impact from the exploration space of information bases. Bunch investigation or grouping is the undertaking of collection a bunch of articles so that items in a similar gathering (called a bunch) are more comparable (in some sense or another) to one another than to those in different gatherings (bunches). It is a fundamental undertaking of exploratory information mining, and a typical strategy for factual information examination, utilized in many fields, including AI, design acknowledgment, picture investigation, data recovery, bioinformatics, information pressure, and PC illustrations common technique for statistical data analysis, used in many fields, including machine learning, pattern recognition, image analysis, information retrieval, bioinformatics, data compression, and computer graphics [3].

2. Supervised learning

In supervised learning the framework must "learn" inductively a capacity called target work, which is a statement of a model portraying the information. The genuine capacity is utilized to anticipate the worth of a variable, called subordinate variable or result variable, from a bunch of factors, called free factors or information factors or attributes or elements. The arrangement of conceivable information upsides of the capacity, for example its space, are called instances. Each case is depicted by a bunch of qualities (properties or elements). A subset, everything being equal, for which the result variable worth is known, is called preparing information or models. To construe the best objective capacity, the learning framework, given a preparation set, thinks about elective capacities, called speculation and indicated by h . In administered learning, there are two sorts of learning undertakings: grouping and relapse. Arrangement models attempt to foresee unmistakable classes, for example, for example blood gatherings, while relapse models anticipate mathematical qualities. The absolute most normal strategies are Decision Trees (DT), Rule Learning, and Instance Based Learning (IBL, for example, k Nearest Neighbours (k-NN), Genetic Algorithms (GA), Artificial Neural Networks (ANN), and Support Vector Machines (SVM).

3. Reinforcement learning

The term Reinforcement Learning is an overall term given to a group of strategies, in which the framework endeavours to learn through direct connection with the climate to augment some idea of total award. It is vital to make reference to that the framework has no earlier information about the conduct of the climate and the best way to discover is through preliminary and disappointment (experimentation). Support learning is mostly applied to independent frameworks, because of its autonomy comparable to its current circumstance [7].

4. Semi Supervised Learning

Semi-supervised learning (SSL) is a type of Machine Learning (ML) technique. It is half-way between supervised and unsupervised learning i. e the dataset is partially labelled. The main objective of SSL is to overcome the drawbacks of both supervised and unsupervised learning. Supervised learning requires huge amount of training data to classify the test data, which is cost effective and time consuming process. On the other hand, unsupervised learning doesn't require any labeled data, which clusters the data based on similarity in the data points by using either clustering or maximum likelihood approach. The main downfall of this approach, it can't cluster an unknown data accurately. To overcome these issues, SSL has been proposed by research community, which can learn with small amount of training data can label the unknown (or) test data. SSL builds a model with few labeled patterns as training data and treats the rest of the patterns as test data.

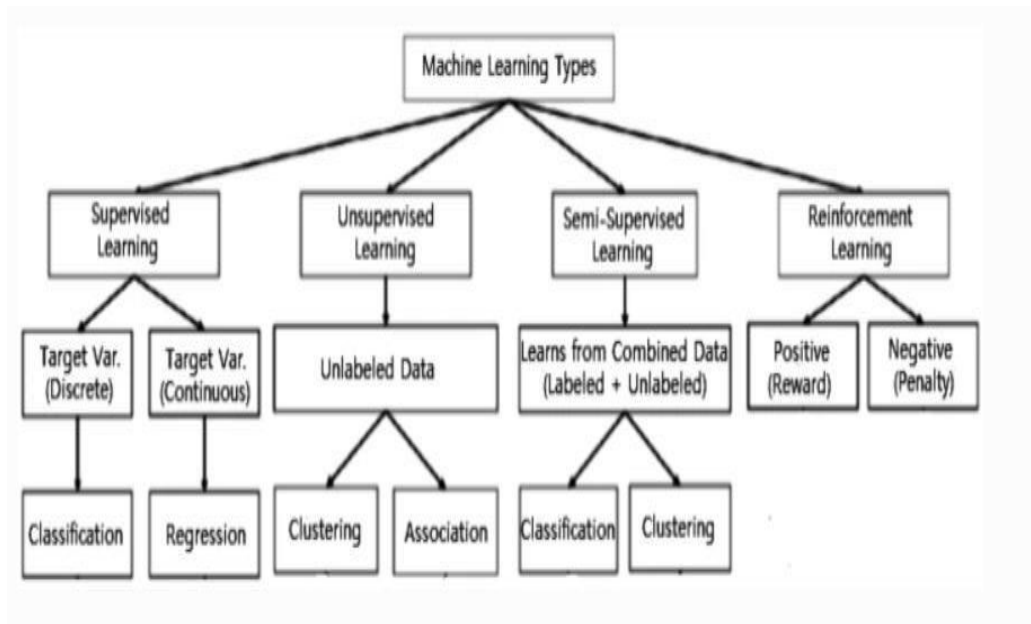


Fig: Types of Machine Learning

Scope of Machine Learning in India

The scope of Machine Learning in India is promising. Machine Learning has immense potential to change each sector of the economy for the benefit of society. There is not just one technology under AI, but there are various useful technologies such as self-improving algorithms, machine learning, big data, pattern recognition. Soon, there would hardly be any industry or sector which would be untouched by this powerful tool in India.

1. **Education** - Machine Learning can help increase the effectiveness of our instructors via numerous AI applications such as text translation systems, real-time message to speech, automating mundane and also repeated jobs such as taking presence, automating grading, customising the discovering trip based upon ability, understanding, and also experience. The scope of Machine Learning education and learning takes a look at the possibility of utilising ML ran rating machines that can evaluate unbiased solutions. The various other applications of ML in the area of education are real-time text to speech as well as text translation systems.

2. **Chatbots** - In a country as varied as India, the combination of chatbots in the digital framework or availability via the IVRS system education domain can be transformational- they might be educated on the subject matter and a great percentage of doubts of the pupils could be responded to quickly, consequently lowering the current work of educators who could focus on even more imaginative tasks.

3. **Automated grading** - On a large scale, Machine Learning methods such as Natural Language Processing might be made use of for automated grading of assessments on systems such as E-PATHSHALA, SWAYAM (Study Webs of Active Learning for Young Aspiring Minds) and DIKSHA - not simply subjective ones however objective inquiries too.

4. **Healthcare** - The Healthcare system in India is the most dynamic and challenging sector in India. There are many challenges like affordability, accessibility but particularly the shortage of doctors and services like qualified nurses, technicians, and infrastructure. With the development of Artificial Intelligence, the overall cost of healthcare would get reduced due to increased efficiency. With the ability of ML to handle large data in a speedy fashion it can help in making innovations, design, and developing medical equipment. Having an AI-enabled system helps in reducing medical errors and increases productivity. Machine Learning can also overcome the barriers to access and solve the accessibility challenge by employing early detection followed by suitable diagnostic decisions [4].

5. **Agriculture** - In India, a significant population depends on agriculture for their livelihood. The problem of farmers in India is not extremely great as they depend on conventional methods for farming. If plants are obtaining an adequate quantity of water, water usage in agricultural land can be maximised by utilising thermal imaging cameras that constantly keep track of. It can help determine proper crops to expand in a desirable environment on a productive surface as well as the sowing technique to improve performance and also minimise expenses. Artificial Intelligence can also be utilised to forecast the behaviour and also study parasites which can be useful for advanced preparation of insect control. Anticipating modelling using Machine Learning can be important in providing more precise demand-supply details as well as anticipating the need for farming produces to farmers [5].

6. **Transport** - There is tremendous scope of Machine Learning in the transportation sector as well. Particularly, there are a few areas where ML can be used. In the aircraft, ships, spacecraft they have been using autopilot since 1922 to maintain the correct course. Another area is autonomous cars. There are many companies across the globe and even in India that are researching autonomous cars or self-driving cars. The development of such vehicles is heavily reliant on artificial intelligence and machine learning. Experts believe that self-driving cars will bring many benefits including lower emissions, error-free driving.

7. **House** - We are surrounded by Machine Learning. We use devices that are based on Artificial Intelligence all the time without knowing of it. For example, we use OK GOOGLE or ALEXA or CORTANA all the time to perform the various tasks with just voice command. These smart assistants use Artificial Intelligence and Machine Learning for voice recognition. They learn from the users' commands to become more efficient. You can also use this smart assistance to perform a variety of tasks like playing a song, asking a question, buying something online.

8. **Machine Learning in Cyber Security** – Cybersecurity is another field where Machine Learning is employed. Many organisations deal with a significant amount of data. For example, in the Banking sector or government organisations which are having a huge database of people's personal data, there is always a risk of stealing, and hence a security mechanism needs to be put in place. An apt example of this field is Cognitive Artificial Intelligence. It detects as well as analyses hazards, while also giving understandings to the analysts for making better-informed decisions. By

making use of Machine Learning formulas and also Deep Learning networks, the AI obtains better and much more resilience over time.

9. Manufacturing sector - There are many Indian start-ups based on Artificial Intelligence that are serving the manufacturing industry. These companies develop Machine Learning -based solutions to increase the growth of the manufacturing industry. One unique technology of Machine Learning is to analyse the data and make future predictions. This ability of ML is used to analyse past year sales or market survey data to predict the future supply and demand and make faster decisions or amazing customer feedback of a given product to optimise the product in the coming years. AI has a wide scope in the Manufacturing industry in the coming years [6].

Conclusion

This research focused on the study of the state of the art of AI and ML applications. The idea that machines could think and perform tasks just as humans do is thousands of years old. It may be better to view these technologies as the implementation of powerful and long-established cognitive principles through engineering. The potential of AI and machine intelligence for good does not lie exclusively, or even primarily, within its technologies. It lies mainly in its users. The thought machine is the greatest blessing of AI to civilization; the fantastic entry of this self-propelled machine has swiftly altered business operational laws. Self-driving cars, automated assistants, autonomous factory workers, and smart cities have recently shown that smart machines are feasible. The Machine Learning revolution will stay with us for a long and so will be the future of Machine Learning.

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