

Application of artificial intelligence in Real Estate; research from end-users and investors
perspective

Name

Affiliation

SAMPLE

1. INTRODUCTION

Initially, the real estate sector was not considered an advanced trading industry. The informatization of the real estate sector and the association of real estate with the financial industry, financial investment market, and implementations, like real estate funds, real estate investment trusts (REITs), and non-performing loans (NPL), have become rapidly increasing. The advancement of artificial intelligence has encouraged experts to explore the real estate sector as an advanced financial area. The real estate sale has played a crucial role in the progression of the real estate sector. Borrowers, investors, and stockholders are the main factors of the real estate sale; they are deeply involved in the sale market and increase real estate sales in finance and investment areas (Kang et al., 2020).

In past years, real estate advancement has attracted substantial financial investments globally, and an upsurge has been observed in real estate technology-based companies. Real estate technology can be described as electronic devices, virtual platforms, and computer resources used by lenders, owners, stakeholders, brokers, and real estate industry managers. Real estate technology also allows the customers to gather and distribute stats related to the industry. Unlike its commercial counterparts, about one-third of the \$11 trillion international real estate industry is run on spreadsheets; revolutionary information technology (IT) techniques are absent. Still, innovative and revolutionary innovations are a fundamental part of today's world. Disruptive technologies are transforming the industrial world, and on the other hand, they pose a threat to conventional industries like construction and real estate. While these innovations are critical for an industry's growth, their acceptance and use are frequently challenged, possibly due to their dynamic nature.

Various studies have been reviewed and evaluated the disruptive technologies in different industries. Previously, the researchers provide valuable information about how disruptive technologies could use, but their introduction to real estate has yet to be examined (Taffese, 2006).

The contemporary research investigated the possible usage of different disruptive technologies in real estate to emphasize their significance, existing applications and uses, and how these technologies can serve real estate shareholders' expectations. A growing concern of the real estate sector is the upsurge of post-purchase or post-rental regrets. A rapid number of customers have been reporting post-purchase shame or their decision guilt. The leading cause of these regrets is an absence of property details and the buying process's difficulty, concealing essential information such as fees. Buyers' regrets worsened when they learn those details or prices later. Disruptive technologies can reduce these regrets by providing adequate and complete information to customers before deciding on the real estate sector. It can tackle the issue of post-purchase regrets (Ullah et al., 2018). As a result, this research aims to look into the implementation of various disruptive technologies and their feasible utility in delivering comprehensive evidence to customers and reducing regrets.

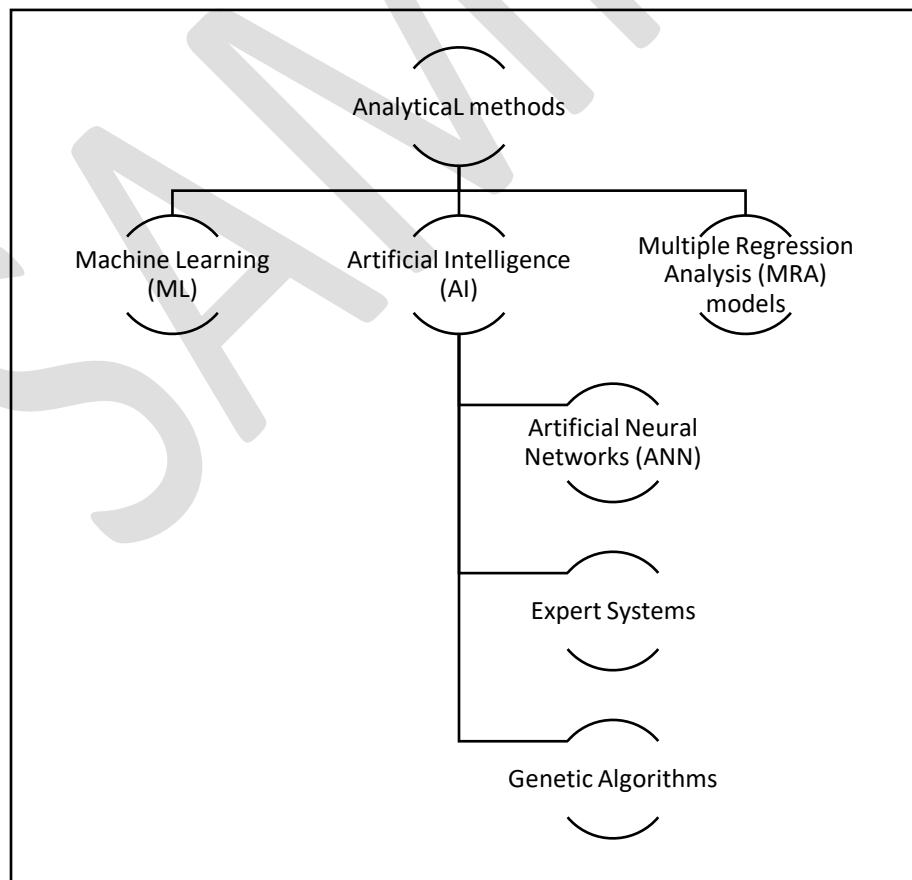
This study explored the real estate sector's capacity for disruptive technologies and employed Big9 innovation to fix real estate stakeholders' main regrets. Regrets resulting from a lack of awareness have given particular concern since they can be removed by implementing Big9 advancements. As a result, the article defines SRE and examines the main factors that lead to converting the conventional real estate to SRE, emphasizing technologies and internet platforms. The critical components of intelligent real estate management (SRE), the revolutionary Big9 innovations, and their practice for tackling an absence of evidence available to customers, shareholder needs, and information broadcasting through a conceptual system are all addressed in this article.

2. LITERATURE REVIEW

Many prior types of research are associated with real estate estimation using artificial intelligence, mainly with ANN and statistical investigation (Kang et al., 2020). Different considerations are held in mind when looking for investment opportunities or buying an asset as an end-user in the Real Estate market. Before any step can be taken, it is necessary to evaluate the property (Ullah et al., 2018). When customers request a fast-paced, simple, and transparent process to conclude, technology plays a vital role (Taffese, 2006).

Artificial Intelligence (AI) has played a critical part in the advancement of the industry. Numerous studies have been conducted previously to determine the most successful technique for identifying openings in this business, such as:

Figure 1: different analytical techniques applied in the field of real estate.



In this sector, the Multiple Regression Analysis models were applied to determine costs and forecast future outcomes. However, it has since been replaced by Artificial Intelligence-based systems such as Artificial Neural Networks (ANN), Expert Systems, and Genetic Algorithms (Guo et al., 2014).

2.1 Artificial Neural Networks:

Researchers have been attentive to Artificial Neural Networks because they function much like a human mind by interpreting information and handling data to produce the most satisfactory and most reliable outcomes when statistical approaches and human brains fail. (Taffese, 2006). ANN is utilized for statistical investigation and representation. Artificial Neural Network (ANN) is used in problems concerning organization and prediction. The effort to apply ANN expertise to estate valuation dates back to the early 1990s. Typically, these researches take the form of comparative analysis, with experts separating the findings and comparing the efficacy of ANN models against more proven and accurate methods. The ANN's learning mechanism is similar to how an infant learns to identify patterns, forms, and sounds and distinguishes between them. (Taffese, 2006). ANNs are frequently applied in statistical investigation and representation, and their function is seen as a complement to nonlinear regression and cluster analysis practices. As a result, they are often utilized in glitches involving organization or forecasting. (Taffese, 2006).

The appeal of ANNs is correspondingly informative. There are both benefits and drawbacks of using ANN in real estate appraisals. The most helpful feature of ANN is its adaptability, which allows the Neural Network (NN) to perform well even though the setting or system under control changes over time. Since it has time-dependent characteristics, applying ANNs for real estate assessment for potential openings is beneficial. One of the most challenging aspects of ANN is its lack of clarity. (Baldominos et al., 2018)

For all investors, including the government, developers, final consumers, and taxing authorities, real estate appraisal is critical. The actual price of the property is of concern to both buyers and sellers. On the other hand, stockholders want to see new development prices, including manufacture, final, and taxation on collected income. (Guo et al., 2014). Researches and empirically checks for changes in the approximation process for auction and allocated agreement sales for domestic trade instruments from an assessment standpoint. They investigated whether managers use various standards when getting ready to put costs for sold housing, including an aspect of underselling to help in the marketing of the possessions, and discovered that managers do change estimates for auctions to appeal to more possible buyers. (Kang et al., 2020).

2.2 Machine Learning Technologies:

Machine Learning technologies are often applied to find capital funds in trading centers where enlists overlook various aspects in online trading avenues. They end up listing their assets higher or lower than their initial price, which can be exploited by potential investors, fans, and financial backers. (Ullah et al., 2018). According to the authors, traditional forecasting has always depended on the data submitted in annual reports, monetary statements, and management statistics, often issued with considerable intervals and do not deliver adequate facts. A periodic autoregressive representation was used to evaluate the association to test their theory. Finally, they can forecast home prices and the house price index, and demand for home machines using an online search (Baldominos et al., 2018).

2.3 Smart Real Estate (SRE):

Artificial Intelligence can also assist final consumers customers in finding their dream houses by using filters to help them reduce their search standard based on their requirements (Ullah et al.,

2018). Big9 looked at how they could be used in a property. According to the investigator, viability, consumer- efficacy, and creative tools were identified as the core components of SRE. It besets the Big9 troublemaking tools for transmitting information to real estate consumers among progressive types of equipment. Clients, brokers, and trade unions were the Smart Real Estate (SRE) shareholders in focus, harmonizing corporations, management, and observing administrations. A comprehensive and well-organized analysis of the Big9 was conducted to show how these Big9 advancements could meet the needs of the four significant landowners. (Ullah et al., 2018).

As a result, various methods are used in real estate finance, forecasting, and estimation. Artificial Neural networks and Machine Learning techniques are most commonly used to assess properties and the acquisition of real estate ventures. Many of the sources listed focused their research on investors rather than end-users.

3. DISCUSSION

This current research study has discussed Artificial Intelligence (AI) in the real estate industry and its benefits. Questions such as how we can analyze the data and the procedures used to implement artificial intelligence in the landholding business have efficiently been answered throughout the research. An extensive literature review is being adopted on artificial intelligence (AI) and its application in the real estate business. The collective findings illustrate the current status of each technique and application in the real estate industry.

Real estate assessment is a fundamental and challenging task, and it is no longer solely dependent on opinions and interpretations. Artificial Neural Networks (ANN) and Expert Systems are used to assess real estate (ES). These approaches allow stockholders, developers, and end-users to

obtain a more precise and timely valuation (Taffese, 2006). Initially, the real estate industry was not considered a progressive industrial sector (Kang et al., 2020). Many studies have examined artificial intelligence fusion in the real estate industry, mostly ANN technique and statistical analysis (Baldominos et al., 2018; Stevenson et al., 2010).

Meanwhile, techniques based on ANN have been creatively used to identify regulation parameters and norms; implementing modern, and standard costing involves using high-performance computers to work with accurate market analysis, which may upsurge the difficulty of the assessing process (Guo et al., 2014). In contemporary analysis, ANN and ES systems are the two most competent real estate valuation methods. Comparing the results of various researches concluded that ANN gives better accuracy than the ES system. Conversely, some studies show the dominance of ES over ANN, whereas other analyses reached unsettling results.

The real estate industry must transform from antiquated practices to Smart Real Estate (SRE). There are nine revolutionary developments in real estate that can potentially be endorsed. They are stated as Big9, which includes 3d scanning, Artificial Intelligence (AI) and Robotics, Drones, and software as a service (SaaS) (Ullah et al., 2018). Multiple Big9 techniques were explored to see how they could be used to meet the needs of the stakeholders. In addition to generating much-needed creativity in the real estate market, Big9 innovations can also effectively meet the needs of stakeholders.

Compared to the standard critical situation, when technical advances meet these criteria, uncertainties will be minimized to a more feasible extent. Thus, real estate worries, particularly those associated with the absence of facts or the delivery of inaccurate or inconsistent details, can be quickly addressed and reduced to a minimum, if not entirely abolished. While it is widely agreed that buyers experience natural guilt after having a large purchase, the availability of valuable and

high-quality details would allow buyers to make more good and intelligent choices due to more interactive and understandable descriptive statistics. Such well-informed decisions would eliminate existing concerns while also encouraging more consumers to use web real estate platforms, resulting in a win-win scenario for all parties involved. This study delivers a medium for sensing and propagating Big9 technology-based data to key stakeholders, genuine estate consumers. This concept is among the first moves toward Big9 techniques being accepted in the real estate industry, particularly for web or internet real estate management. It is supposed to spark a much-needed discussion about the impending transformation of the online real estate market, which will turn it from conventional to "modish" real estate. The method can be extended in the future, and digital networks such as real estate websites and mobile smartphone applications can be thoroughly examined for their innovation adoption capabilities, paving the way for technological innovation in the property and real estate market. Machine learning contributes to seeking investment opportunities by applying four online listing platforms to seek the properties listed at a lower price than their original market value.

This study has potential limitations. The main methods viewed in this study focused on the ANN and ES system. This study also steps towards assuming technological innovations in the real estate sector and is limited to the Big9 emerging innovations. The study could be extended by researching the other methods that can be adopted to get future forecasts of the demand and supply of the real estate business's shareholders and consumers concerning artificial intelligence. The study can also be improved by reaching new computer programs and web extensions that can enhance the "value" of real estate and display the traditional value and position. Based on this research, a future effort can be made in the Property Management Software (PMS) tool to address many property-related challenges.

CONCLUSION

The present study proposed a conceptual structure for real estate stakeholders embracing and accepting online real estate networks. This study looked at the real estate industry's potential for transformative technology and used Big9 technology to address property investment investors' biggest complaints. The current study showed that the real estate sector, like any other sector, is starting to adopt AI in its everyday work. It has made life simpler for property managers and buyers by allowing them to gather, evaluate, and benefit from a large amount of data. It can make dealers more productive and competitive, brokers more proactive, and clients encouraged to navigate the purchase and sale system with even less confusion. Various AI approaches that are now being used in the real world demonstrate that AI technology is no longer a futuristic term. It is expected to spark a much-needed discussion about the impending transformation of the online real estate market, which will turn it from conventional to "smarter" property development. The study can be extended in the future. Online channels such as real estate websites and online phone apps can be studied in depth for their technology embracing strengths, paving the way for technology acceptance in the real estate business.

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