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A Review on Development of software for valuation of immovable properties

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Abstract— The analytical process of establishing the current worth of assets such as residential, commercial, industrial, or agricultural property is known as valuation. The value is established by the selling price as well as the potential rent or revenue. The goal of this research is to get individuals acquainted with the broad field practice of real estate valuation in decision-making processes such as real estate sales, rent calculation, tax fixing, and so on. The manual approach was used to calculate the majority of the values in processed real estate valuation reports. The majority of the study employed ANN (Artificial Neural Network), Java programming, AI (Artificial Intelligence), Fuzzy logic, and other techniques. In India, there is virtually little software available to create value reports. As a result, new value report creation software is required.

Keyword: Valuation, Market survey, Residential, Commercial, selling price, Web Site Development.

1. INTRODUCTION

Valuation is the process of determining a property's market value. There are several factors that affect how much property is worth, including its age and condition, where it is located and how well it has been cared for. There are many financial actions that need to be valued, such as investments and purchases, loans and mortgages and so on.

Based on its current state, an appraiser determines its value. It is possible to have both immovable and moveable properties at the same time. This includes land and buildings, mines and trees as well as quarries and other natural resources.

An estate agent or an independent valuer typically conducts a property appraisal on behalf of a seller or a financing institution, depending on the circumstances. To get a mortgage or refinance, lenders (such as banks) may require a value of the property prior to the loan being granted. Buyers may also request the valuation if they are interested in purchasing a property. property's collateral value may be enough to meet the cost of the claim. If the mortgage is defaulted, they have the confidence to lend cash knowing that they can recoup the debt by selling the house.

Real estate in emerging cities is always in great demand since housing is a basic human requirement. Using real estate values is necessary in a variety of activities, including real estate transactions and taxation, which is a complex subject that requires input information from experts. A bad bargain can be made by a buyer of real estate who doesn't have a firm grasp on the current rate, the state of the market, and a thorough cost-benefit analysis. In light of the wide range of uses for real estate value data, it is vital that the process be enhanced.

Traditional methods, such as sales comparison, rental, land and building, profit, and so on, can be used by real estate appraisers to estimate a property's value. Prospective owners, developers, investors, appraisers, tax assessors, and others involved in the real estate market rely on accurate property price predictions. A forecasting model that takes into account the impact of numerous shifting factors on the property's value is consequently required. Soft computing may be the best option to meet this requirement.

1.1 The important factors influencing the value of building

- Type of the building
- Location of the building
- Expected life of the building
- Size and shape of the building
- The Present condition of the building
- Legal control of the building

2. STATE OF DEVELOPMENT

"Real Estate Valuation Using Data Mining Software" by **Eduard Hromada (2016)** A new approach to real estate valuation was described in this research paper. Cost-benefit analysis and comparisons with similar structures are the most prevalent methods for valuing real estate. "historical market price" is a novel method proposed in this article that employs mathematical, statistical, and database algorithms to value An important source of data is specialist software (EVAL), which is responsible for compiling and analysing market-related information. For every six months, we add more than 650,000 new price offers (advertisements) for the purchase or leasing of houses, apartments or other commercial real estate. If the raw data of the original transaction (especially the purchase price) are known, this method can be used to appraise real estate that was previously purchased. According to this document's methodology, the most recent purchase data has been used. Structure and technical variances in a property's state, as well as changes in the price range for a specific area, are also identified by this method (street, district, city, region, etc.). Appraiser in a tax or lawsuit context Offline management of the EVAL database facilitates retroactive valuations because it comprises both current and earlier quotes. This novel method can be used to value a wide range of properties, including those that are unusual or that are located in areas where there are few or no comparable properties. Where it is difficult to establish an objective market price, it can also be employed (eg small municipalities, border regions, parcels separated from the commercial centres of the regions). Using the offline EVAL database, it is possible to quickly process input data on a specific location's pricing level.

It was explored by **Ogban et al. (2016)**, how a computerised real estate appraisal system could be put into practise. They studied the topic of real estate valuation as part of their research. The creation of a software programme to aid real estate appraisers in their work is underway. The java programming language was used to construct the software, which covers the revenue and cost technique of property valuation. In order to receive an estimate of the value of a certain property for any of the specified techniques, the user enters a collection of relevant data into the system. The system then does the necessary computations. In order to create their desktop application, the authors use the Java platform's standard edition. As a standalone desktop application with a database module, the system is designed using object-oriented design principles and methodology. You can choose between income and cost techniques when valuing a property with this system. The purpose of this study is to provide real estate agents with a tool to help them with their valuation operations. In spite of its shortcomings, this goal has been mostly met by the tool that was produced

A valuation information model based on the Land Administration Domain Model (LADM) and its application to **Turkey by Kara et al**. A prototype for implementing the LADM pricing information model was developed, and its operability was evaluated through a case study in Turkey by the authors of the paper. Only necessary and created data in iterative valuation procedures will be used to verify the LADM valuation information model's capabilities, not to build a specific information management system for Turkey. A country profile for the Turkish LADM pricing information model is proposed using Conceptual Schema Languages (CSL) Unified Modeling Language (UML) and INTERLIS in order to implement a prototype that is compliant with LADM at the conceptual level. The methodologies used to develop the LADM profile are then investigated. LADM implementations are supported by the INTERLIS formal language and software tools. When it comes to implementing LADM for automatic ground-to-technical model transformations, the methodologies and tools are examined and employed. Property valuation information (e.g., bi-temporal elements of valuation information management) is also examined and implemented in this research. Once the technical models have been established, they are subsequently loaded with example datasets pertaining to recurring property valuations, such as valuation unit geometries and multiple-year valuation information. The LADM valuation information model is then tested using a series of queries to see if it fits the information management needs of recurrent valuations. Here, we give a comprehensive framework for developing a LADM-compliant prototype for managing asset valuation information.

Dr. N.B. Chaphalkar et al. (2013) investigated the application of artificial intelligence in the assessment of real estate. As part of their research, they analysed and summarised the numerous artificial intelligence techniques that can be applied to real estate appraisal. Artificial neural network (ANN) and fuzzy logic are more suited if the model traits and parameters are selected properly. There are a number of variables that affect the value of a piece of real estate. Property owners and investors alike are looking for the highest possible returns. Since real estate is such a large investment vehicle, it is imperative that precise returns and related risks be predicted. This necessitates the utilisation of predictive AI models. In this study, numerous strategies for value forecasting are examined and their outcomes are reviewed. The authors use cutting-edge computational methodologies like AI tools for precise and qualitative

forecasts in order to expand the number of components and their complicated relationships in real estate assessment.

"Comparison of Modern Methods Using Python Programming Language in Mass Housing Valuation" by **Gultekin Buyuk** and colleagues The authors of this report used machine learning to undertake a systematic investigation of how much a residential property would ultimately sell for. There are 73 samples and 18 arguments in this dataset. Core Python libraries such as Numpy, Pandas, Scikit–learn, Matplotlib, and Seaborn were employed in this study. The research was carried out utilising the MLR and decision tree regression methods. The application's estimation accuracy was evaluated using the adjusted coefficient of determination (r2). The multiple linear regression model outperformed the decision tree model as a consequence of the applications.

Nkolika J. Peter and colleagues (2020) Artificial Neural Networks in the Valuation of Real Estate A novel model for valuing real estate, the artificial neural network, was lauded in the authors' study for its ability to handle the complexity. valuation of real property. An artificial neural network-based real estate valuation model was offered as a solution to the study's real estate valuation challenges. Here, we provide a general summary of current views on neural network optimization in real estate valuations. A variety of topics of ANN use in real estate valuation were explored in this paper. The authors demonstrated that ANN can be used for purposes other than just price estimate or forecasting. Numerous studies on artificial neural networks (ANNs) in forecasting have provided the impetus for this project. An artificial neural network-based real estate valuation model was suggested in this research study, which studied the subject of real estate valuation. the capacity to gather tax audits in real estate firms, and the development of decision support systems for valuation and audits of the real estate valuation process can all be aided by ANN, according to the authors.

Artificial Neural Network in Property Valuation: Application Framework and Research Trend, **Rotimi Boluwatife Abidoye et al. (2017)** Artificial intelligence models like the Artificial Neural Network (ANN) have found applicability in real estate assessment studies, as explained in their study's research report. Researchers and practitioners will benefit from ANN for Real Estate Valuation's application guide and set the trend in this study field. Preliminary results of a larger research project aimed at using the ANN model to model the Nigerian residential real estate market are presented in this publication. In this study, it was discovered that there is a significant discrepancy in real estate valuation practises across developed and emerging economies, as well as between real estate professionals and university researchers. Sustainable international valuation practises could be achieved by a paradigm shift in valuation practise in underdeveloped countries.

Albert P.C. Chan et al. (2019), Deciphering the Artificial Neural Network Technique: Advanced Property Valuation Techniques and Valuation Accuracy, Authors studied the use of modern property valuation approaches, particularly the artificial neural network (ANN) method, in determining correct property values in this study article, which was published in 2013. These include but are not limited to the origins of ANN; its benefits and drawbacks in comparison to other valuation systems; the application in theory and practise; the requirements for applying it in property value and appraiser reactions to its adoption. The ANN method was found to be capable of generating estimates that were both accurate and trustworthy on average, although it has yet to be widely used in reality. There was then a discussion on how to bridge the theoretical and practical gaps in AI applications in the future. Also included are solutions to aid in this paradigm change toward a global sustainable real estate valuation methodology. The ANN methodology was examined in this study as a possible method for obtaining more precise and dependable assessments of real estate values. This research examined the history and development of ANN, as well as its current and potential uses in the field of property assessment.

Application of Artificial Neural Networks to Predict Sales Price in the Real Estate Valuation Process by **Youness El Hamzaoui et al (2011)** Research article writers created a mathematical model that predicts the price of residential properties using an Artificial Neural Network (ANN) technique. Casablanca, Morocco, Kingdom of Morocco, North Africa is the focus of the study. The initial collection of residential real estate appraisal data was used to train a forward network with a single hidden layer. An procedure known as backpropagation was used to build the neural network. The networks were constructed using Leven berg-Marquardt learning methods, hyperbolic tangent sigmoid transfer functions, and linear transfer functions. Five neurons in the hidden layer of an ANN architecture made it possible to forecast the selling price of a house using the best training data set. A high correlation coefficient (R2=0.952) indicated that the model was accurate in its predictions. Both the validation dataset simulations and the original data came out on top. The new ANN model might be used to accurately estimate sales pricing values, according to the researchers. Using the results of the neural network modelling, it was confirmed that the network does not have to follow a rigid regression

procedure in order to accurately replicate experimental data and explore for links between all variables, qualitative and quantitative. a set of guidelines

3. CONCLUSION

As a result of this research, we now understand the practical aspects of real estate appraisal. Because the property is used as collateral to secure the loan, it's critical that the lending institutions have accurate information on the market worth of the property. Estimating a property's market worth is possible with the use of property values. Having a basic understanding of valuation methodologies and terminology used in the report is a good idea for financial institutions. Decision-making processes such as real estate transactions, rent computation, tax fixing, etc. all rely heavily on the appraisal of a trained appraiser. Manual procedures were used by the majority of appraisers in the process of valuing real estate. Artificial Neural Network (ANN), Java programming, AI (Artificial Intelligence), Fuzzy logic, etc. were all used in the majority of studies. For the preparation of valuation reports in India, there is a lack of software. As a result, new software for preparing valuation reports is required. Valuation reports are currently prepared manually by appraisers. It is possible to speed up the valuation process by employing soft computing approaches.

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