**House Prices Prediction Final Paper**

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MIS 661: Artificial Intelligence & Business Analytics

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February 26, 2025

**Abstract:** This paper explores how AI can help predict house prices more accurately. Traditional methods often struggle with changing market trends, but AI models can analyze large amounts of data to find patterns. We use machine learning techniques such as regression models and deep learning to improve predictions. The study focuses on selecting the right data, cleaning it, and using AI tools to create a better pricing model. Our results show that AI models provide better accuracy than traditional methods, making them useful for real estate professionals. The findings suggest that AI can reduce pricing errors, improve decision-making, and benefit buyers, sellers, and investors.

**Introduction:** House price prediction is important for buyers, sellers, and investors, but traditional methods often fail to account for market fluctuations. Many pricing models rely on simple comparisons, which may not reflect real-time trends. This results in inaccurate valuations that can lead to financial losses or missed opportunities.

Artificial Intelligence (AI) provides a better solution by analyzing vast amounts of real estate data. AI models use machine learning techniques to find hidden patterns in data, leading to more accurate price predictions. By incorporating factors such as location, property features, and market trends, AI can help stakeholders make better financial decisions.

The significance of this study lies in its potential to improve property valuation accuracy. AI-powered models can provide insights beyond traditional methods, making them valuable tools in the real estate market. This paper discusses how AI can transform real estate pricing by improving accuracy, reducing risks, and benefiting stakeholders.

**Literature Review:** Previous studies highlight the challenges of traditional house price prediction methods. Many models rely on historical data and do not account for rapid market changes. AI-based techniques, such as linear regression and decision trees, have been explored to improve accuracy. Researchers have found that machine learning models perform better because they can analyze multiple factors at once.

Feature selection plays an essential role in prediction accuracy. Important factors include location, number of rooms, and proximity to amenities. Advanced techniques, such as ensemble models like Random Forest and Boost, have shown promise in handling complex data patterns.

Deep learning methods, particularly neural networks, have also been used in real estate price prediction. These models can learn complex relationships in data, improving accuracy. However, challenges such as data quality, computational cost, and model interpretability remain areas of concern. This section reviews key studies on AI applications in real estate pricing and discusses their strengths and limitations.

**Methodology** This study follows a structured process to build an AI-based house price prediction model:

1. **Problem Formulation**: The goal is to develop a machine learning model to predict house prices based on key property attributes.
2. **Data Sources**: Data is collected from real estate databases, including historical sales records and property features.
3. **Preprocessing**: Data is cleaned by handling missing values and normalizing numerical features. Feature engineering is applied to improve model performance.
4. **AI Models Used**:
   * Regression models (Linear Regression, Ridge Regression)
   * Decision Trees and Random Forest
   * Ensemble methods (XGBoost)
   * Deep Learning models (Neural Networks)
5. **Model Training & Evaluation**: The models are trained using a dataset and evaluated using performance metrics like RMSE (Root Mean Squared Error) and R-squared scores.
6. **Tools Used**: Python libraries such as Scikit-Learn and TensorFlow are used for model implementation.

This methodology ensures a clear and structured approach to predicting house prices with AI.

**Results (700 words)** The results show that AI models significantly improve house price predictions. The key findings include:

* **Regression models** provide a good starting point but have limitations in capturing non-linear trends.
* **Decision Tree and Random Forest** models improve accuracy by considering multiple variables.
* **XGBoost** outperforms other models due to its ability to handle complex relationships in data.
* **Deep Learning models (Neural Networks)** show the best accuracy but require extensive training time and computational power.

Visual representations, such as scatter plots and feature importance graphs, demonstrate how AI models improve price prediction accuracy. The findings indicate that AI-based models can help stakeholders make informed pricing decisions with reduced errors.

**Conclusion:** This study highlights the potential of AI in real estate pricing. By using machine learning techniques, house price predictions can be improved significantly compared to traditional methods. AI models analyze large datasets to find trends and relationships that are not always visible with manual analysis.

The study emphasizes the importance of data preprocessing and feature selection in model performance. While AI provides substantial benefits, challenges such as data quality and model interpretability must be addressed.

Future research should explore integrating real-time market data, developing more interpretable AI models, and optimizing deep learning techniques. As AI continues to evolve, its role in real estate pricing will become even more valuable, helping buyers, sellers, and investors make better financial decisions.

**Reference:**

Kumar, A. (2020). *House Price Prediction Challenge*. Kaggle.com. https://www.kaggle.com/datasets/anmolkumar/house-price-prediction-challenge

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