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Chapter 5 — Conclusion and Future Work

5.1 Introduction

The purpose of this chapter is to present the final conclusion of the entire research. The chapter gives the major conclusions that have been drawn during the course of the research and it also gives recommendations for future research which can be done to improve the proposed system.

5.2 Research Summary

The current research proposed a novel approach called Clarivision AI, which is an Explainable AI system for residential property valuation based on structured property attributes and deep visual features of the property pictures. This proposed method utilizes both prediction capability of the XGBoost regression model and deep image representations derived by ResNet50 CNN.

Clarivision AI framework was created using the real estate dataset consisting of 15,474 residential properties and their respective images. Exploratory data analysis, data preprocessing, feature engineering and hybrid model creation were performed to build the proposed valuation framework.

From the experimental study, it can be seen that the performance of the proposed model was promising since it achieved $R^2 = 0.6737$ with minimal prediction error. Moreover, the robustness and generalizability of the proposed framework have been confirmed through cross-validation. An intelligent application named Clarivision AI has also been successfully developed to provide property valuation, property similarity search, image analysis, market dashboard and automatic PDF report generation.

In addition to property valuation, the proposed framework also offers explainable predictions, similar property search, market visualization, and automated reporting, thus constituting a complete intelligent decision support system.

5.3 Research Contributions

- Proposing an Explainable Hybrid Approach to Residential Valuation.
- Combining structure-based numeric features and visual features of images.
- Designing an Intelligent Decision-Support Application (Clarivision AI).
- Applying Explainable Machine Learning Techniques for Transparent Property Valuation.
- Incorporating Similar Property Retrieval via Deep Image Similarity.
- Creating a Real Estate Dashboard for Market Analysis.
- Introducing a Reliability Score to increase users' confidence in AI-based property valuation.

5.4 Future Work

The following approaches can be adopted for future expansion of the above work:

- Inclusion of more structured information like age, orientation, quality, etc. of the properties.
- Considering use of many interior and exterior images of the property instead of just one image.
- Exploration of other vision transformers like Vision Transformer (ViT), ConvNeXt, etc.
- Development of multimodal deep learning systems that learn together using both images and structured data.
- Adaptation of the approach for valuing industrial or commercial real estate properties.
- Deployment of the proposed system as a cloud-based web application linked to live real estate databases.
- 5 • Integration of Large Language Models (LLMs) to generate natural-language valuation explanations and market insights.
- Validation of the proposed model through use of actual data obtained from various countries so as to determine the extent to which the proposed model is generalizable.

5.5 Conclusion

Thus, it can be concluded that the presented research managed to demonstrate how effective combination of structured property attributes and deep visual images significantly improves the prediction performance in real estate valuation as compared to traditional techniques. The presented Clarivision AI framework delivers high prediction performance along with explainability and usability of the solution due to the interactive decision support system. These findings coincide with the results of recent studies that prove the importance of multimodal learning and XAI in real estate valuation (Deng et al., 2025; Maselli & Nesticò, 2025) [3][2]. Nevertheless, in contrast to previous studies, the presented framework implements hybrid prediction, explainable AI, similar property retrieval, interactive visualization, and automated reporting into a single intelligent decision-support system. Thus, the presented framework can be considered as a promising development in the area of intelligent and explainable real estate valuation systems.

It is expected that the proposed Clarivision AI framework will become a foundation for next-generation intelligent real estate valuation systems.

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