

# Researchers create real estate market assessment tool

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A group of UBC Okanagan researchers is trying to take the mathematical mystery out of what could be a person's biggest investment—buying a home.

While the [real estate](#) market changes rapidly and is connected to the fluctuations of the economy, there are many other considerations to make when purchasing a property, says UBCO School of Engineering Professor Zheng Liu.

Dr. Liu and his doctoral student Junchi Bin, along with Faculty of Management Associate Professor Eric Li, have created a regional house price mining and forecasting framework (RHPMF) and recently published research that tests the tool they created. The research was published recently in *Information Fusion*.

"Real estate is always one of the largest expenses throughout a person's life," says Dr. Liu. "Before making decisions on house transactions, people consult real estate agents to obtain knowledge of the market. And these days, people are more cautious than ever about costly failures such as a real estate investment."

The idea behind the RHPMF is to help people understand the population, growth and historical background of a specific community or even a neighborhood based on real-world housing data including history, [social dynamics](#) and housing costs.

"The [real estate market](#) has a significant influence on people's daily life," adds Bin, who notes there is not a lot of empirical research about the real estate industry. "Therefore, it is crucial to understand real estate from both the spatial and historical perspectives. What's going on in the neighborhood where you want to buy?"

To fully understand a [local market](#), Bin says people must "mine" the area for data—learn about supply, the location of expensive or affordable houses, the history and current dynamics of an area, including [crime rates](#)—before they can assess and forecast the [house prices](#) and then finally determine if the area is right for them.

Specifically, the RHPMF framework introduces a series of filtering algorithms to extract spatial and historical factors about a particular neighborhood. For example, the users can input a street address into the web-based or mobile matrix tool. The algorithm can analyze the data and release a comprehensive report to users with all the corresponding information. The result, explains Bin, is to assist estate brokers in visualizing, analyzing and forecasting the spatial and progressive evolution of estate prices from multi-source information.

The researchers tested their matrix using exploratory trials and experiments in Virginia Beach, Philadelphia and Los Angeles. Dr. Li says the forecasting accuracy of the matrix worked well and their series of tests demonstrate the RHPMF's considerable capability and robustness.

"These [case studies](#) indicate that the RHPMF framework can accurately capture the market's spatial distribution and evolution and then forecast future regional house prices compared with recent baselines," says Dr. Li. "The results suggest the great potential of the proposed RHPMF in real estate industries."

Dr. Liu says the proposed framework can help [decision-makers](#) in the real estate industry as it can forecast future regional house prices and also provide explainable price factors for in-depth analysis.

"The RHPMF successfully integrates exploratory analysis and price forecasting as a framework," he adds. "With accurate and explainable analysis, the clients can make smart and reliable decisions related to the estate market."

**More information:** Junchi Bin et al, RHPMF: A context-aware matrix factorization approach for understanding regional real estate market, *Information Fusion* (2023). [DOI: 10.1016/j.inffus.2023.02.001](https://doi.org/10.1016/j.inffus.2023.02.001)

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