

# Artificial Intelligence in Real Estate Industry

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## Abstract

Artificial intelligence is taking the world by storm. It's already powering self-driving vehicles, pinpointing ideal retail store locations, and detecting cancer cells at an early stage. The real estate industry has not been left behind in this revolution. AI is making inroads in the industry, with realtors adding algorithms and data pipelines into their decision-making processes. The application of AI in the real estate industry is opening new opportunities for agents, brokers and clients alike. While agents are becoming more efficient and effective, brokers are getting more strategic and consumers are feeling empowered. AI-powered bots help brokers and agents find the perfect match for people looking to buy, rent or sell their properties. Also, AI-based chatbots can operate 24\*7 and help real estate website visitors find answers to their queries even during the odd hours.

## 1. Problem Statement

Real Estate is one of the most rising fields where AI applications can be used at a large scale. The first of the myriad uses of AI in real estate occurred back in 2018 after an AI-powered real estate deal. The outcome of this transaction was the acquisition of two properties in Philadelphia valued at \$26 million. The buildings were acquired using an AI algorithm called “soon to market detection”. Today, AI in real estate has graduated from the shadows into the mainstream. According to Deloitte, spending on artificial intelligence will reach \$97.9 billion by 2023, which marks a big leap from the previous years. Deloitte also foresees a scenario where AI technologies will in a little while become the standard. This means that those companies that have already adopted AI will enjoy a good competitive edge, while those that haven't will make giant strides in that direction.



## 2. Market / Customer/ Business Need Assessment

According to the CRE Innovation Report 2020, around 49% of commercial real estate executives acknowledge the fact that AI can produce operational efficiencies and massive budget savings. On the other hand, 43% believe it can generate a hugely disruptive impact.

Among the key benefits that come with AI-driven real estate technologies include:

- Process improvements
- Fine-tuning existing products and services, and
- Gaining a competitive advantage

These benefits contribute significantly to revenue generation and overall business performance. In fact, a survey by McKinsey & Company, reported that 63% of companies (in whichever industry) record an increase in revenue generation from AI implementation.

## 3. Target Specifications and Characterization

Few of the main purposes of using AI in Real Estate are:

1. **Property Analysis and Future Evaluation:** What is the right price to buy a house today to sell it at a profit tomorrow? This is a question on the mind of every investment-centric property company. Conducting a valuation of an existing property and predicting its future market value is a tough job. The price is dependent on myriad factors and can change all at once. And thus, a realtor may not be able to keep track of all the small details. This is where AI in real estate comes in handy.
2. **House Search and Recommendation:** House searching apps use advanced search filters such as location, price, number of bedrooms, and size, among others. But it's still hard to find a house because of the many unsuitable filters. AI in real estate can help prospects make suitable choices by narrowing down their search to fewer and key criteria. This is because AI real estate suggestion engines work in the same way as other product suggestion engines such as the recently launched Amazon Personalize. They evaluate your property preferences and offer the best available options.
3. **Property Management:** Rental property management is a demanding task. There's a lot involved in the process, including rental applications and transactions, generating lease agreements, and disclosure statements. AI technologies can help streamline property management in various ways. These includes: Creating documents automatically, hence allowing realtors to focus on other tasks. AI may also scan property documents for mistakes like empty fields, missing signatures, and so on.
4. **Virtual Tours:** The covid-19 pandemic curtailed movement across the globe, and the real estate industry was hugely affected. As such, it was forced to adopt AI technology to stay in business. Virtual tours are a new technological development in the real estate industry.

## 4. External Searches

- <https://jpm.pm-research.com/content/45/7/43/tab-pdf-disabled>
- [A Comprehensive List of Artificial Intelligence Business Ideas](#)
- [Dataset from different online source](#)

## **5. Benchmarking alternate products**

As discussed earlier in the Target Specifications and Characterization section, the use of AI/ML model can bring a new revolution in the Real Estate Industry because it has an upper hand to the existing brokers and agents in this industry. By giving 24\*7 and accurate information to the customers more and more companies have started using AI. Companies like Nobbas, PropertyNest, HomeLuv are already using AI in this industry and have found to be really successful.

## **6. Applicable Patents**

Currently not required.

## **7. Applicable Regulations (Government and Environmental)**

1. Laws controlling data collection of users and house details.
2. Must be responsible with the scraped data : It is quintessential to protect the privacy and intention with which the data was extracted.
3. Customers data should be protected from an unauthorized access.
4. Documents of a customer should be checked properly while finalizing the deal of a property.
5. A proper record should be maintained of the property's previous and the current owner.

## **8. Applicable Constraints**

- 1) Requires highly skilled people like ML engineers and web developers.
- 2) Real time data Availability is the main concern because datasets are like the building blocks for any ML model.
- 3) With the most advanced technologies being used the cost structure will linearly increase simultaneously.
- 4) Data Privacy is also one of the major concerns in this technology.

## **9. Business Opportunity**

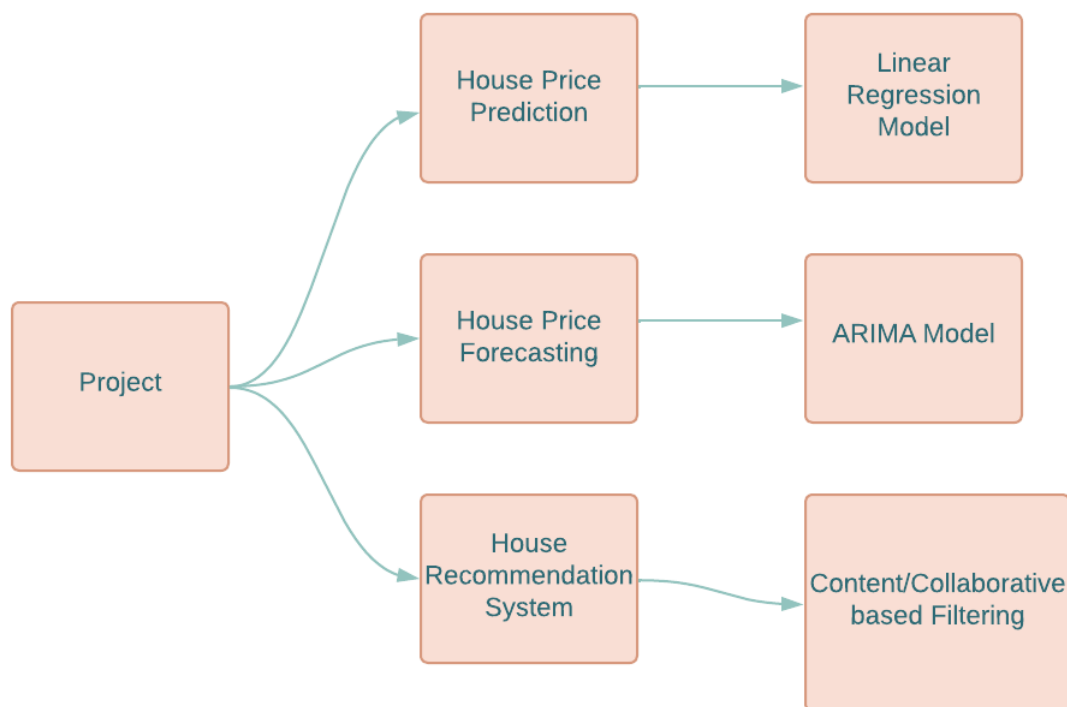
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## 10. Concept Generation

Our goal is to develop AI app where customers can buy, rent or sell properties with very simple steps and can get 24\*7 guidance. By using ML model, a customer can predict the future evaluation and also can get the recommendations of the properties which attracts their interests.

## 11. Concept Development

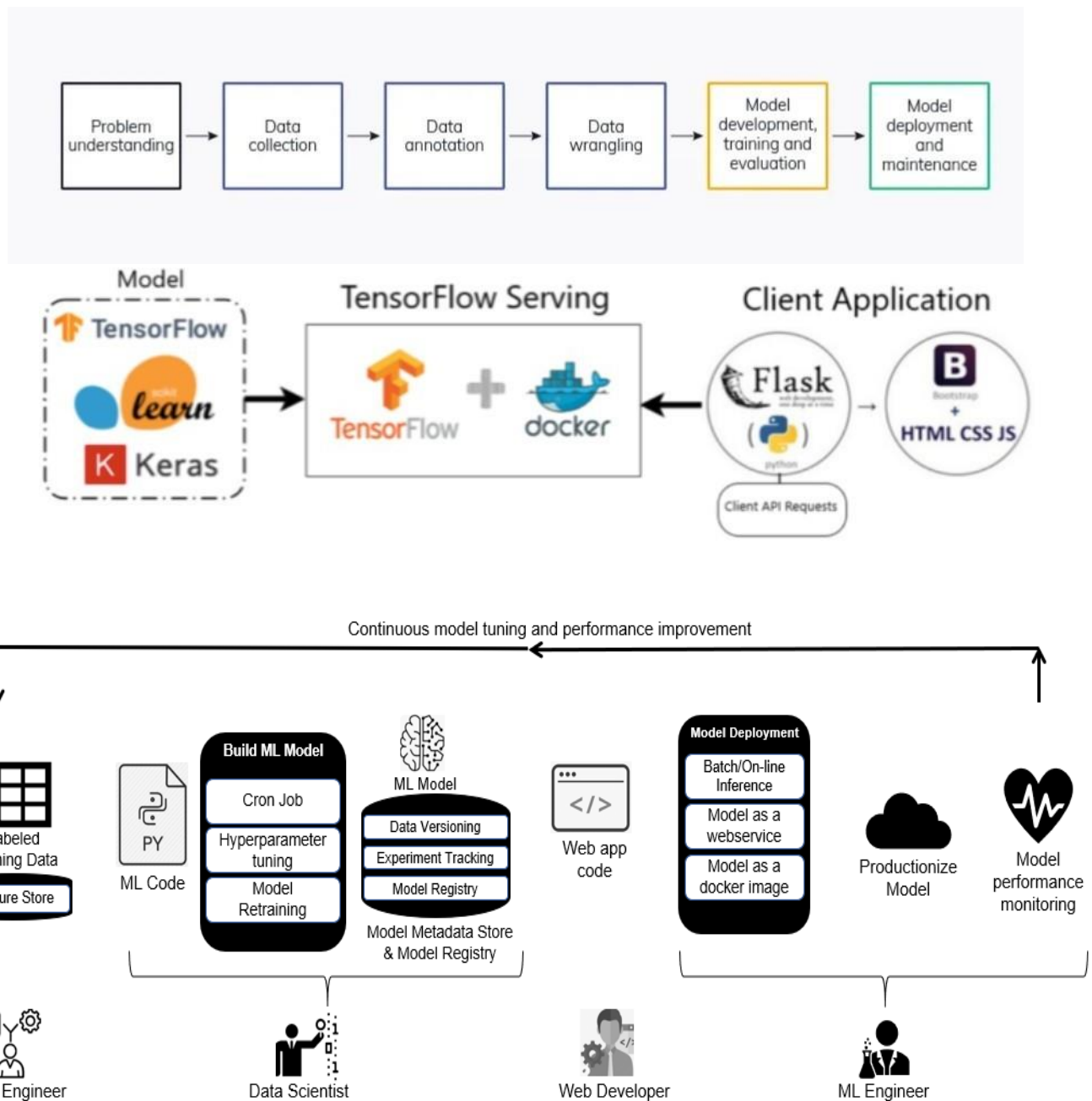
1. Gathering of data.
2. Feature Engineering.
3. Creation of a model that predicts the price of a property in the future.
4. Creating a Recommendation model by using Collaborative, Content based filtering.
5. Creating a Chatbot to assist the customers.
6. Finally outputting the whole model at one place for the ease of accessibility of the user.



## 12. Final Product prototype

The product to be develop requires the following steps:

- Define the problem and collect the data
- EDA (Exploratory Data Analysis) and Feature Engineering
- Select and train the model
- Fine tuning and model testing
- Deploy the model and maintenance
- Enter the new data and check the results



## **13. Product details**

### **1. How does it work?**

This web/android app consist of two sections 1. Future price prediction of a property. 2. House recommendation system. Based on the requirement we select the required model. For example, if a user wants to buy/sell a property, he/she can use our prediction model to predict the price of that property in the future and on the basis of that price the user can make a decision. Also, if a user wants to search properties to buy/rent, he/she can use our recommendation system to get the best possible deals on the properties which interests the user and lastly there is our chatbot which can assist the user 24\*7.

### **2. Data sources**

- Real Estate Dataset (Kaggle)
- USA Real Estate Dataset (Kaggle)
- Bangalore Houses dataset(Kaggle)

### **3. Algorithm And Frameworks**

- Programming language: (Python, HTML, CSS, JavaScript)
- Algorithm: (LSTM/Random Forest, KNN (Collaborative Filtering), Linear/Logistic Regression)
- Frameworks: (Sklearn, Tensorflow, Flask/Django)

### **4. Team required to develop**

- Data Analyst/ Business Analyst
- Machine Learning Engineer
- Software Developer

## **14. Code Implementation**

Github Link: [https://github.com/Aamir2709/Real\\_Estate-Bot](https://github.com/Aamir2709/Real_Estate-Bot)

## **15. Conclusion**

It's evident that the adoption of AI in real estate is picking pace every single day. Realtors can now use AI algorithms to identify better leads and close deals. And for investors, AI can help determine the right time to buy or sell a property. If you operate in the real estate sector and you want to up your game with AI-driven solutions, see our [AI consulting](#) services and contact us today!