WELCOME TO THE NAAN MUDHALVAN PROJECT

THE HOUSE PRICE PREDICITON

TEAM ID: NM2023TMID19767

TEAM MEM:5

TEAM DETAILS

- **TEAM LEADER: GOKULAKANNAN K**
- **TEAM MEMBER1: GOKULAKRISHNAN S**
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- **TEAM MEMBER4: HARIHARAN B**

Project Report Format

1. **INTRODUCTION**

1.1 Project Overview

The main objective of this project is to build a robust and accurate house price prediction model that can assist in estimating property values. The model will enable users to make informed decisions regarding property investments, pricing strategies, and negotiations.

Key Steps:

- Data Collection
- Data Preprocessing
- Feature Selection and Engineering
- Model Training and Validation
- Model Selection
- Hyperparameter Tuning
- Model Evaluation

1.2 Purpose

The purpose of the House Price Prediction project is to provide valuable insights and accurate predictions regarding residential property prices. The project aims to serve multiple stakeholders, including homeowners, real estate agents, and potential buyers, by fulfilling the following purposes:

- Informed Decision-Making
- Pricing Strategies
- Market Analysis
- Investment Opportunities
- Risk Mitigation

2. IDEATION & PROPOSED SOLUTION

2.1 Problem Statement Definition

Description:- House price prediction is a common problem in the real estate industry and involves predicting the selling price of a house based on various features and attributes. The problem is typically approached as a regression problem, where the target variable is the price of the house, and the features are various attributes of the house

The features used in house price prediction can include both quantitative and categorical variables, such as the number of bedrooms, house area, bedrooms, furnished, nearness to main road, and various amenities such as a garage and other factors that may influence the value of the property.

Accurate predictions can help agents and appraisers price homes correctly, while homeowners can use the predictions to set a reasonable asking price for their properties. Accurate house price prediction can also be useful for buyers who are looking to make informed decisions about purchasing a property and obtaining a fair price for their investment.

2.2 Empathy Map Canvas

An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviours and attitudes.

It is a useful tool to helps teams better understand their users.

Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user's perspective along with his or her goals and challenges.

2.3 Ideation & Brainstorming

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and

all participants are encouraged to collaborate, helping each other develop a rich amount of creative solutions.
Use this template in your own brainstorming sessions so your team can unleash their Imagination and start shaping concepts even if you're not sitting in the same room.

2.4 Proposed Solution

When working on a house price prediction project, there are several solutions and approaches you can consider. Here are some common techniques used in the field:

- Linear Regression
- Decision Trees
- Neural Networks
- Support Vector Regression (SVR)
- Feature Engineering
- Regularization
- Cross-Validation
- Hyperparameter Tuning

Ensemble Methods

3. **REQUIREMENT ANALYSIS**

3.1 Functional requirement

To provide useful functionality in a house price prediction project, consider the following features

- House Price Prediction
- Historical Data Analysis
- Comparison and Benchmarking
- Property Search
- Property Data Visualization

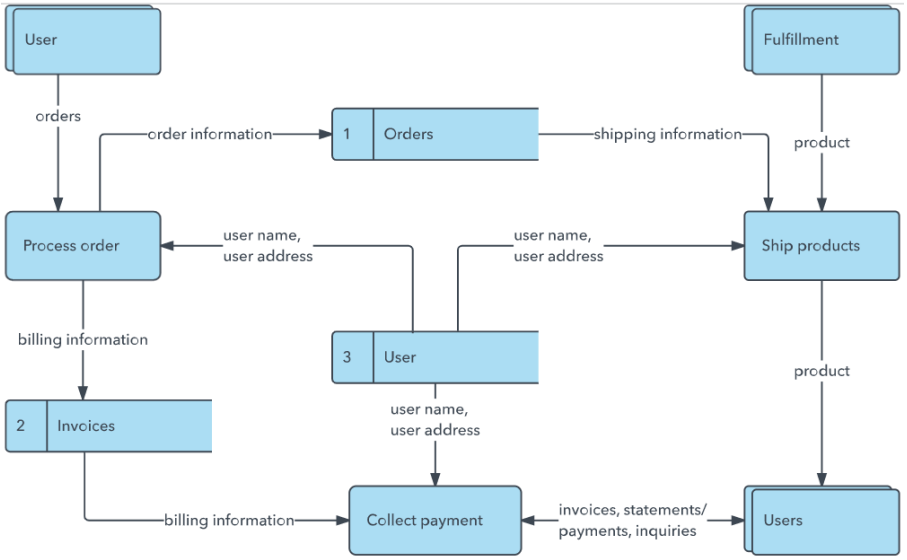
3.2 Non-Functional requirements

Non-functional requirements for a house price prediction project refer to aspects that describe the qualities and constraints of the system rather than its specific functionality. Here are some non-functional requirements to consider:

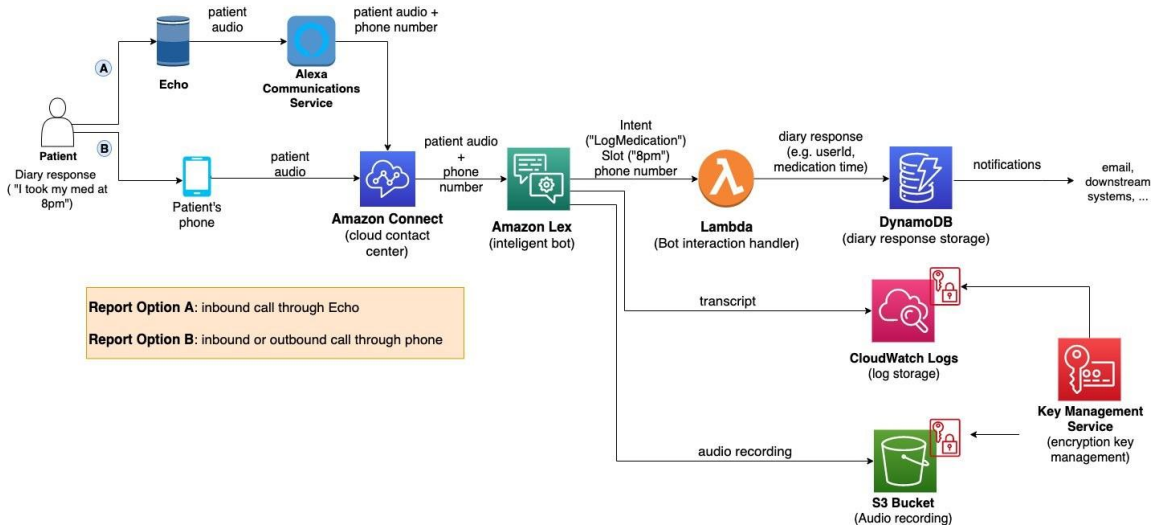
- Performance
- Scalability
- Reliability
- Usability
- Compatibility

4. PROJECT DESIGN

4.1 Data Flow Diagrams



4.2 Solution & Technical Architecture



4.3 User Stories

User Story: As a home buyer, I want to be able to get an estimated price for a house based on its features, so that I can make informed decisions during my property search.

Acceptance Criteria:

The system should allow me to input various features of the house, such as location, size, number of rooms, amenities, and other relevant factors.

The system should use machine learning algorithms to predict the price of the house based on the provided features.

The predicted price should be displayed to me along with a measure of confidence or uncertainty.

The system should provide explanations or insights into the factors that influenced the predicted price, helping me understand the key drivers behind the estimation.

5. CODING & SOLUTIONING (Explain the features added in the project along with code)

5.1 Feature 1

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Ensemble Methods

5.3 Database Schema (if Applicable)

To ensure good performance in a house price prediction project, consider the following factors:

- Data Preprocessing
- Feature Selection
- Model Selection and Optimization
- Cross-Validation
- Performance Metrics

- Model Regularization

6. RESULTS

6.1 Performance Metrics

in a house price prediction project, consider the following factors:

- Data Preprocessing
- Feature Selection
- Model Selection and Optimization
- Cross-Validation
- Performance Metrics
- Model Regularization

7. ADVANTAGES & DISADVANTAGES

Advantages of House Price Prediction:

Informed Decision Making

Time and Cost Savings

Market Insights

Risk Assessment

Disadvantages of House Price Prediction:

Data Limitations

Complex Factors

Market Volatility

Individual Property Variations

Human Element

8. CONCLUSION

conclusion, house price prediction can be a valuable tool for individuals and businesses involved in the real estate market. It offers several advantages, including informed decision making, time and cost savings, market insights, and risk assessment. By leveraging historical data, market trends, and predictive models, users can gain valuable information about property values and market dynamics.

However, it's important to be aware of the limitations of house price prediction. Data limitations, such as incomplete or biased data, can affect the accuracy of predictions. Factors like market volatility, complex variables, individual property variations, and subjective factors can introduce uncertainties and deviations from actual prices.

To make the most of house price prediction, it's crucial to supplement the predictions with human judgment, local market knowledge, and expert advice. Using house price predictions as a starting point and considering other factors specific to the property and market conditions can lead to more informed and accurate decisions.

Ultimately, house price prediction can serve as a valuable tool to guide users in their property search, investment decisions, and market analysis. It can provide insights, save time, and aid in risk assessment. However, it should be used as part of a comprehensive approach that considers both the strengths and limitations of the prediction models.

9. FUTURE SCOPE

The future scope for house price prediction is promising, with several potential areas for further development and improvement. Here are some future directions and advancements in house price prediction:

Integration of Big Data: Incorporating larger and more diverse datasets, including socio-economic indicators, crime rates, transportation accessibility, and environmental factors,

can enhance the accuracy and granularity of house price predictions. Analyzing a wider range of data points can provide more comprehensive insights into property values.

Advanced Machine Learning Techniques: Advancements in machine learning algorithms, such as deep learning and ensemble methods, can improve the accuracy of house price prediction models. These techniques can better capture complex relationships between input features and house prices, resulting in more precise predictions.

Real-time Market Updates: Integrating real-time data feeds and market updates into house price prediction models can provide users with the most up-to-date information on price trends and market conditions. This enables users to make timely decisions based on the latest market dynamics.

Spatial Analysis and Geospatial Data: Incorporating spatial analysis techniques and leveraging geospatial data can help identify spatial patterns and spatial dependencies in house prices. Analyzing factors such as proximity to amenities, transportation infrastructure, and neighborhood characteristics can provide valuable insights for accurate predictions.

Automated Valuation Models (AVMs): AVMs can be further developed and refined to provide automated and instant property valuations based on a combination of market data, property features, and predictive models. AVMs can help streamline the property valuation process and provide more efficient pricing estimates.

10. APPENDIX

Source Code

```
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
```

```
# Load the dataset
data = pd.read_csv('house_data.csv')

# Split the data into features (X) and target variable (y)
X = data.drop('price', axis=1)
y = data['price']

# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

# Create a linear regression model and fit it to the training data
model = LinearRegression()
model.fit(X_train, y_train)

# Make predictions on the testing set
y_pred = model.predict(X_test)

# Print the predicted prices
print("Predicted prices:")
print(y_pred)

# Evaluate the model
score = model.score(X_test, y_test)
print("Model accuracy:", score)
```