**HOUSE RENT PREDICTION**

**PROJECT SYNOPSIS**

**Machine Intelligence**

**BACHELOR OF TECHNOLOGY- V Sem CSE**

## **Department of Computer Science & Engineering**

SUBMITTED BY

**Batch No:-**

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## **PES UNIVERSITY**

## **(Established under Karnataka Act No. 16 of 2013)**

## **100 Feet Ring Road, BSK III Stage, Bengaluru-560085**

**Abstract and Scope (**should not exceed 1 page**)**

* Well defined problem statement.
* Provide a basic introduction of the project and also an overview of scope it entails.

The Abstract part will include the brief introduction about the project to be developed, technology used, field of project (if specialized one), any special technical terms about the project.

**Feasibility Study**: (should not exceed 10 lines)

This will describe the need and significance of the project

**Design Approach/ Methodology/ Planning of work** (should not exceed 1 page)

Methodology will include the steps to be followed to achieve the objective of the project during the project development and the **High level architecture diagram** (work flow of the project)

### References

Specify the description of the conference/ Journal paper you have studied for the project.

## **ABSTRACT**

**Problem Statement**

Renting, also known as hiring or letting, is an agreement where a payment is made for the temporary use of a good, service, or property owned by another. In this Dataset, we have information on almost 4700+ Houses/Apartments/Flats Available for Rent with different parameters like BHK, Rent, Size, No. of Floors, Area Type, Area Locality, City, Furnishing Status, Type of Tenant Preferred, No. of Bathrooms, Point of Contact. On the basis of these indicators we are going to predict house rent values .

**Overview**

In our dataset we have we have information on almost 4700+ Houses/Apartments/Flats Available for Rent with different parameters like BHK, Rent, Size, No. of Floors, Area Type, Area Locality, City, Furnishing Status, Type of Tenant Preferred, No. of Bathrooms, Point of Contact. On the basis of these indicators we are going to predict house rent values . Firstly we perform Explanatory Data analysis to find out more information about our outliers and also information about which features play an important role in predicting house rent values and the variables which are strongly correlated . After having dealt with the outliers and removing the variables which are not importnata we are gonna split the dataset into training dataset and test dataset . We are going to train our models using 11 different Machine Learning algorithms which include linear , ridge , xgboost , catboost , lightgbm ,gradient boosting ,lasso ,random forest ,bayesian ridge , support vector and knn akgorithm . After training using different evaluation metrics we find which is the best algorithm for predicting house rent values

**FEASIBILITY STUDY**

House rent prediction finds multiple applications in the real world . The value of rent depends on multiple factors and all of them need to be factored in , manually doing this is close to impossible and hence using MI algorithms we can efficiently predict the rent of any house .

Many MI algorithms have already been implemented in the past to predict the house rent values with promising accuracy values . MI algorithms use various factors and give us accurate results taking into consideration what the user wants and according to his/her specifications . It also gives us factors which are more influential in predicting rental values and what factors play an important role .

The rental industry is a growing one and will continue to remain so . Factors influencing rental value keep changing and hence new MI algorithms help in accurate predictions with the trend and hence house rent prediction finds numerous applications .

**LITERATURE REVIEW**

The models used in each of our papers are as follows ( references are given at the end):

Paper-1 : Ridge regression, LASSO, Tree Regression, Bagging, Random Forest and Boosting.​

Paper-2 : XGBoost, LightGBM, Random Forest Technique.​

Paper-3 : Hedonic regression model with six different machine learning algorithms

Paper-4 : A combination of linear non linear and ensemble algorithms are used

Paper-5 : Random Forest ML

Paper-6 : Long Short Term Memory

Our literature survey helped us to identify which model was best suited for our dataset . we studied different algorithms and found out their advantages and limitations based on which we decided that the LightGBM algorithm was best suited for our dataset . **map**

# **IMPLEMENTATION**

After performing a thorough EDA we found out our dataset had a lot of outliers . Extreme outliers were dropped and on the others we used boxcox transforations on the rest . Our dataset had no NULL values present so we did not have to deal with missing data . Correlation between variables was found to analyse which of the variables were strongly related using correlation heatmap and the variables which were not important were dropped . The dataset was then divided into training anf test data .

As mentioned earlier we trained our models using 11 different algorithms which are

* Linear algorithm
* ridge algorithm
* xgboost algorithm
* catboost algorithm
* lightgbm algorithm
* gradient boosting algorithm
* lasso algorithm
* random forest algorithm
* bayesian ridge algorithm
* support vector algorithm
* knn trained algorithm

**REFERENCES**

Paper1: https://www.researchgate.net/publication/349227005\_Predicting\_the\_rental\_value\_of\_houses\_in\_household\_surveys\_in\_Tanzania\_Uganda\_and\_Malawi\_Evaluations\_of\_hedonic\_pricing\_and\_machine\_learning\_approaches

Paper 2:

(PDF) Housing Price Prediction via Improved Machine Learning Techniques (researchgate.net)

Paper 3:

[Monitoring housing rental prices based on social media:An integrated approach of machine-learning algorithms and hedonic modeling to inform equitable housing policies - ScienceDirect](https://www.sciencedirect.com/science/article/abs/pii/S0264837718316429?fr=RR-2&ref=pdf_download&rr=769f3365f87e1d95)

Paper 4:

[Monitoring housing rental prices based on social media:An integrated approach of machine-learning algorithms and hedonic modeling to inform equitable housing policies - ScienceDirect](https://www.sciencedirect.com/science/article/abs/pii/S0264837718316429?fr=RR-2&ref=pdf_download&rr=769f368d196c32af)

Paper 5:

<https://paperswithcode.com/paper/house-price-prediction-using-lstm>

Paper 6:

(PDF) House Price Prediction Using Random Forest Machine Learning Technique. (sciencedirect.com)

Dataset used :

https://www.kaggle.com/datasets/iamsouravbanerjee/house-rent-prediction-dataset