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Property Value Determination

Software Requirement Engineering

Sec: **A**

Project submitted

By

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1. PROBLEM DOMAIN

1.1 Background to the Problem

1.1.1 Problem statement:

In today's real estate market, determining the fair market value of a property is essential but often challenging. Various parties, including buyers, sellers, investors, and intermediaries, may have conflicting interests, leading to discrepancies and confusion over accurate property values. Sellers may inflate prices, while intermediaries might manipulate data for personal gain, leaving prospective buyers uncertain and lacking trustworthy information to make informed decisions.

This lack of transparency in property valuation can result in buyers overpaying, sellers struggling to set appropriate prices, and investors missing out on profitable opportunities or making poor decisions. Additionally, policymakers may find it difficult to create effective housing regulations due to inconsistent property data.
To solve this, a system is needed to provide a transparent and comprehensive method for determining property values. The proposed "Property Value Determination System" will use machine learning models to predict accurate property prices. By analyzing historical data and considering factors like property type, location, size, condition, and market trends, the system will offer reliable and objective pricing information.
This solution aims to give users—whether buyers, sellers, investors, or policymakers—access to accurate property valuations, reduce market manipulation, and foster fairer transactions. Ultimately, it will help all stakeholders make better-informed decisions in real estate, with greater transparency and confidence.

1.1.2 Importance of the problem:

Accurately predicting property prices is crucial for a variety of stakeholders, including buyers, sellers, investors, and policymakers. Developing a robust and reliable model for estimating property prices plays a vital role in facilitating informed decision-making and providing key insights. The importance of accurate property price prediction can be summarized as follows:

1. **Informed Decision Making**: Buyers and sellers depend on precise price estimates to make well-informed choices regarding property transactions. Accurate predictions help determine fair market values, guide negotiations, and enable individuals to evaluate investment opportunities effectively.
2. **Investment Strategy**: Investors require accurate price predictions to identify lucrative opportunities, optimize their portfolios, and minimize risks. Accurate forecasts allow investors to allocate resources efficiently and maximize returns on real estate investments.
3. **Policy Formulation**: Policymakers rely on precise property price predictions to develop housing policies and regulations. These predictions assist in evaluating the effects of various policies, tracking market trends, and addressing concerns such as housing affordability and market stability

1.2 Solution to the Problem

1.2.1 Proposed Solution

To address the challenges of property price prediction, we propose the development of a Property Determination System Value that utilizes machine learning to predict property prices with accuracy and transparency. The machine learning model will be trained on a comprehensive dataset of property transactions, which includes key factors such as property type, location, size, age, condition, and sale price. By learning from these historical data points, the model will be capable of accurately predicting the market value of properties based on their specific features.

1.2.2 Why This Solution is Appropriate

The machine learning approach is particularly suitable for this problem because it offers a powerful and flexible way to handle the complexity inherent in property price prediction. Property prices are influenced by numerous factors, many of which interact in non-linear ways. Machine learning models can capture these interactions and continuously improve as more data becomes available. This ensures that the system remains relevant and effective as market conditions change. The solution also aligns with the business objective of providing accurate, reliable, and transparent price estimates, meeting the needs of buyers, sellers, investors, and policymakers.
Feasibility

1.2.3 The proposed solution is highly feasible because:

1. Data Availability: There is an abundance of historical property transaction data available, which is crucial for training the machine learning model.
2. Proven Effectiveness: Existing machine learning models have been shown to work well for predictive tasks, including property valuation.
3. Scalability: The solution can be scaled to handle different regions and property types, making it adaptable to various real estate markets.

1.2.4 Solution Description

The Property Determination System Value will be a machine learning-based software designed to predict property prices. The primary purpose of the software is to provide users with transparent, accurate, and reliable price estimates for properties. The system will benefit a wide range of users, including:

- Buyers and Sellers: Helping them make informed decisions about property transactions.
- Investors: Enabling them to assess potential investment opportunities.

- Policymakers: Assisting in the formulation of housing policies by providing insights into market trends and pricing.

The software will feature a user-friendly interface, allowing individuals without technical expertise to easily input property details and obtain price predictions. The system will also provide insights into the factors that influence property prices, making it a valuable tool for understanding market dynamics.

1.2.5 Benefits, Objectives, and Goals

- **Benefits:**
  - Accurate price predictions for informed decision-making.
  - Transparency in the real estate market, reducing the risk of fraud.
  - Increased accessibility through a user-friendly interface.
- **Objectives:**
  - Develop a machine learning model that can predict property prices with a high degree of accuracy.
  - Ensure the system provides clear and understandable insights into the factors affecting property prices.
  - Make the system widely accessible to individuals, businesses, and government agencies.
- **Goals:**
  - To offer a transparent and reliable solution for property price prediction.
  - To enhance financial literacy among users by providing clear and accurate property valuation.
  - To contribute to the scientific community by advancing research in the field of
  - machine learning applied to real estate markets.

2. SOLUTION DESCRIPTION

2.1 Input Value for Determine Value

Functional Requirements:

2.1.1. The software shall allow some search-related value. There is all input is required but some input value will be “ZERO” in default. If the apartment has no “Balconies” then the user can use the default value.

2.1.2. Input the Property value. In this User Input section User must input property value, which was known by the previous owner, agency or broker.

2.1.3. Input the Size in square feet. In here User Input the Size Of Apartment or House, If Apartment size is 1550 sf than user input this size or A House Size is 2.5 kata (Measurement of land) than user have to convert is measurement in sf (1 kata = 720 sf) so, 2.5*720 = 1800 sf.

2.1.4. Input the Number of Bedrooms. Users must input in here the number of bedrooms and there is a must value of "one". Otherwise, the system does not give a determined value, and system will show a massage "Please Input minimum One Value for Determine"

2.1.5. Input the Number of kitchens room. Users must input in here the number of Kitchens and there is a must value of "one". Otherwise, the system does not give a determined value, and system will show a massage "Please Input minimum One Value for Determine"

2.1.6. Input the Number of Washrooms. Users must input in here the number of Washrooms and there is a must value of "one". Otherwise, the system does not give a determined value, and system will show a massage "Please Input minimum One Value for Determine"

2.1.7. Input the Number of the hall room. This section is not mandatory but in this section the value will be "ZERO". If, user has a hall room then they can use this section.

2.1.8. Input the Number of balconies. This section is not mandatory but in this section the value will be "ZERO". If, user has a hall room then they can use this section.

Priority Level: High

Precondition: Subscriber (If User Want) But User's must need Internet Connection.

2.2 Category Select for Determine Value

Functional Requirements:

2.2.1 Select House Option. (Required For Any One Option) If User Searching for House Determine Value, then User select this. Then the user can get the value for the house, and it will be determined by provided user input values.

2. 2.2 Select Apartment Option. (Required For Any One Option) If User Searching for Apartment Determine Value, then User select this. Then the user can get the value for the house, and it will be determined by provided user input values.

Priority Level: High

Precondition: Subscriber (If User Want) But User's must need Internet Connection.

2.3 Determination from Dataset (A Button)

Functional Requirements:

3.1.1 After selecting and inputting all information then click the “predictor or Determine” button. Which will predict the value for us! But If any user missed required input values then the user can show a message for “Something Wrong Please Check All of your Input”.

Priority level: High

Pre-condition: User must input all required information.

2.4 UML Diagrams

1. Use case

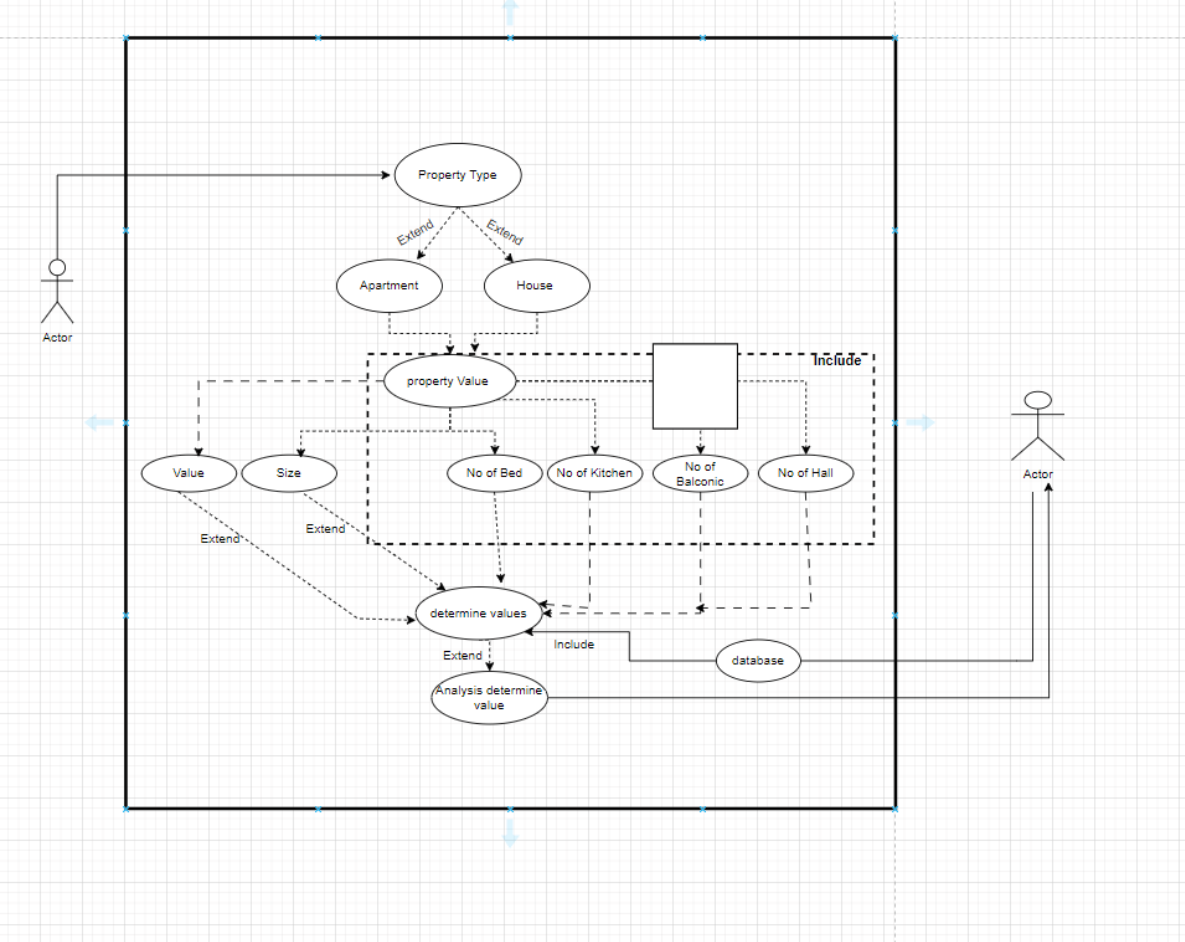


Fig 1 : Diagram 1

2. Class diagram:

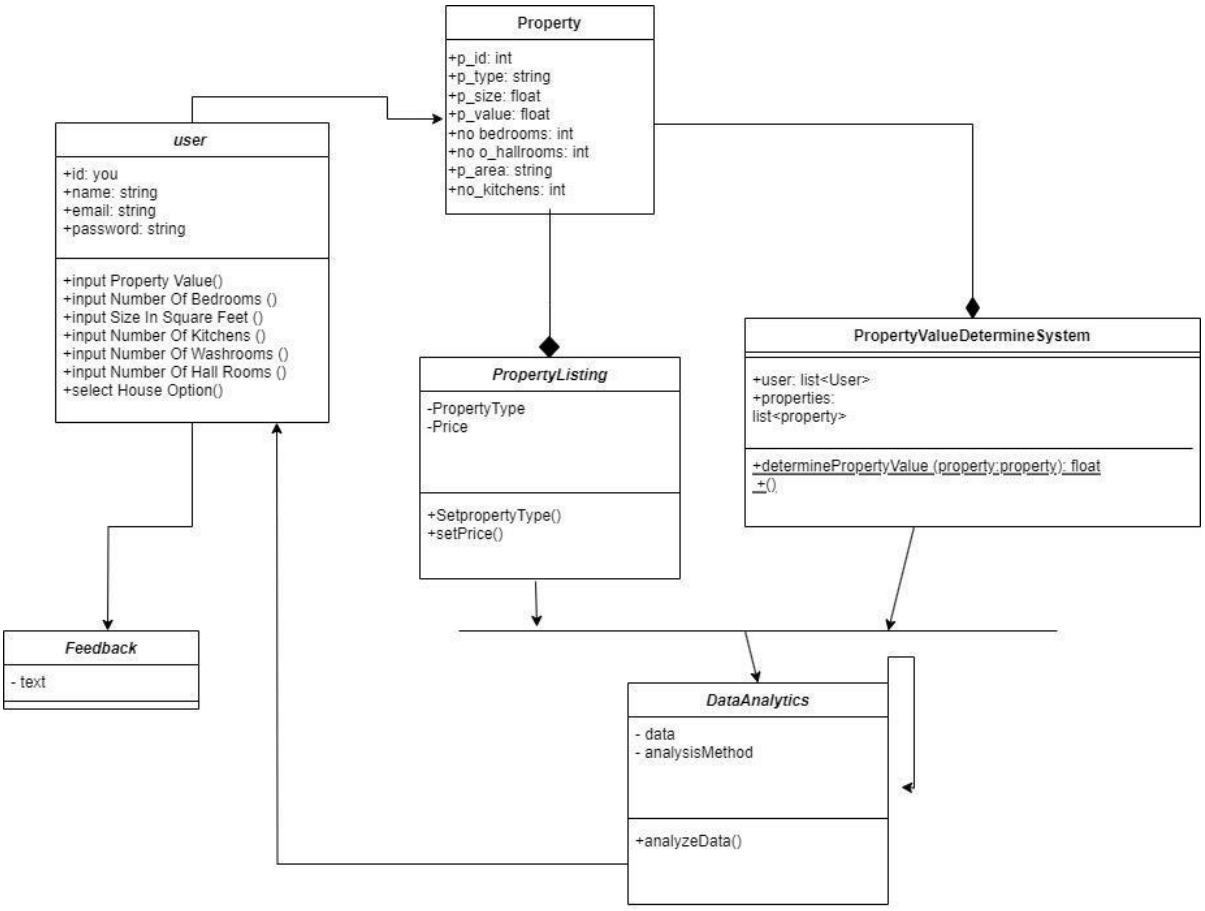


Fig 2: Diagram 2

3. Activity diagram:

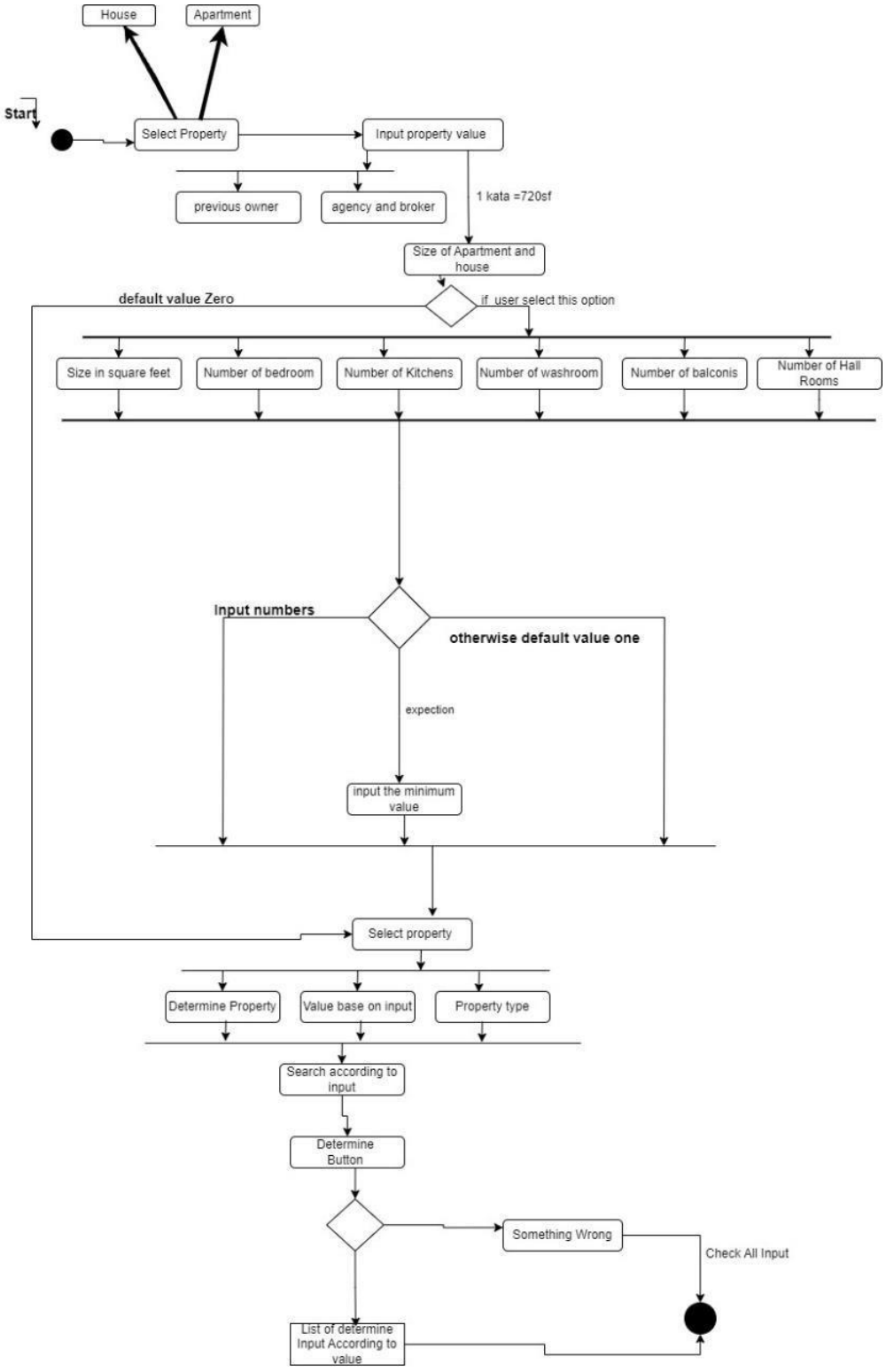


Fig 3: Diagram 3

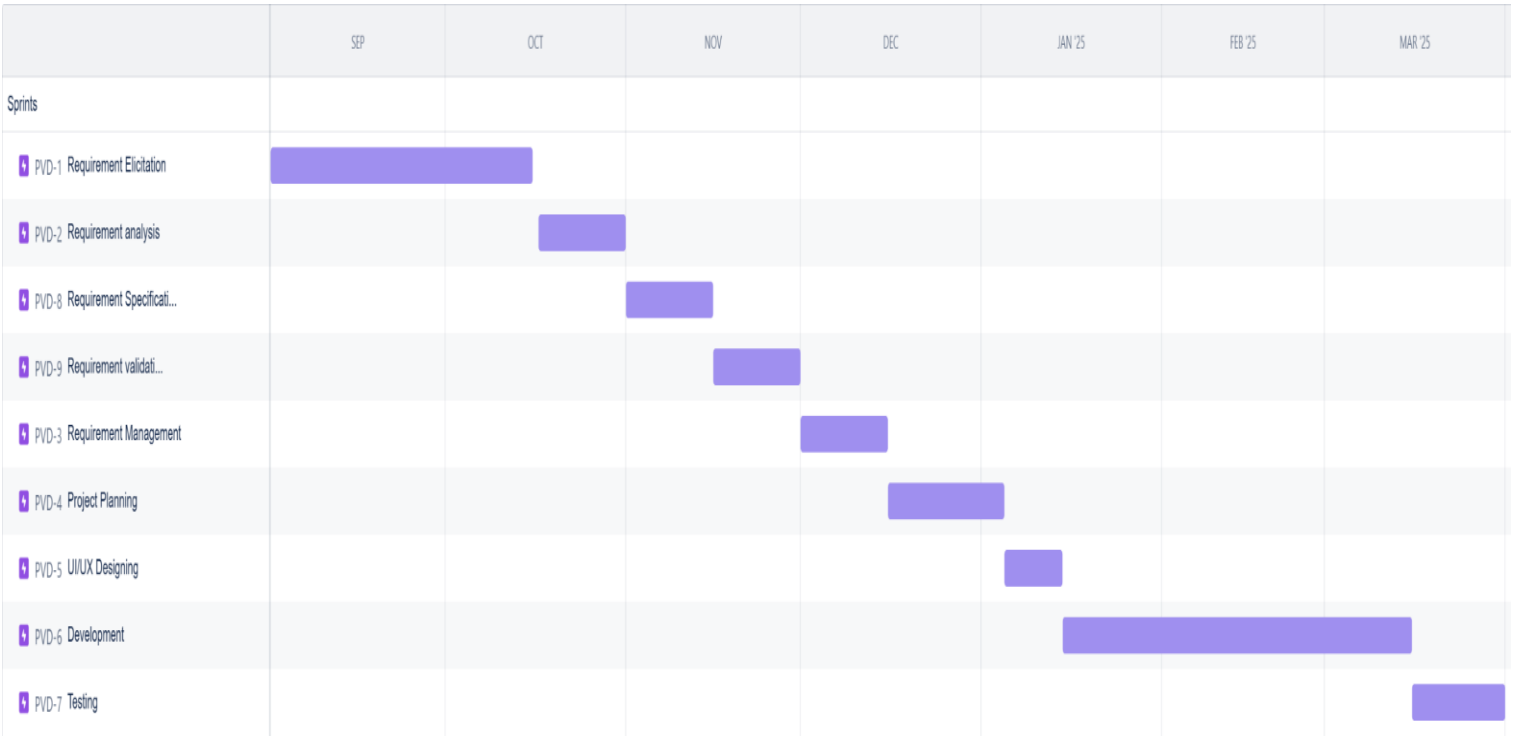
3. SOCIAL IMPACT

The **Property Determination System Value** will create a positive impact by addressing key challenges in the real estate market. By offering precise and transparent property price estimates, the system will provide several societal benefits:

1. **Reducing Fraud and Manipulation**: The system will offer an objective and trustworthy method for property valuation, minimizing the risks of overpricing or underpricing caused by intermediaries or dishonest practices. This will promote a fairer, more transparent market where stakeholders can transact with confidence.
2. **Financial Empowerment**: With clear and accessible property value information, individuals will be empowered to make better financial decisions. Buyers, sellers, and investors will gain a better understanding of market values, enabling them to negotiate, assess investments, and make informed real estate choices.
3. **Promoting Fair Housing Practices**: By eliminating biases in the valuation process, the system can help reduce discrimination and foster fair housing. The machine learning model ensures all properties are evaluated based on objective criteria, promoting equity in property transactions.
4. **Supporting Policymakers**: Accurate property valuations will provide policymakers with the insights needed to create informed housing policies, manage taxation, and regulate the market. This system will help address challenges like housing affordability and monitor market trends more effectively.
5. **Improving Market Efficiency**: Transparency in property valuations will enhance the overall efficiency of the real estate market. Buyers and sellers can save time and resources with reliable data, reducing the need for lengthy negotiations or third-party assessments. Investors can quickly identify opportunities, contributing to a more efficient and dynamic market.

In conclusion, the **Property Determination System Value** will benefit society by making the real estate market more transparent, fair, and efficient, while empowering individuals and supporting sound policymaking.

4. DEVELPOMENT PLAN WITH PROJECT SCHEDULE



5. MARKETING PLAN

1. Target Audience:

- **Homeowners**: People looking to understand the current value of their property.
- **Real Estate Investors**: Investors seeking accurate property valuations for potential investments.
- **Real Estate Agents:** Professionals who can use the tool to provide better service to their clients.
- **Financial Institutions**: Banks and mortgage lenders who require reliable property valuations for lending.
- **Developers and Urban Planners**: Those who need to assess property values for development projects.

2. Short-Term Plan (0-6 months):

2.1 Branding & Positioning:

- Create a strong brand identity that conveys trust, accuracy, and innovation. This includes a memorable logo, color palette, and a clear message across all platforms.
- **Develop a positioning statement**: “Get precise, real-time property valuations with data-driven insights.

2.2 Product Launch & Awareness:

- **Website Launch:** Develop a sleek, SEO-optimized landing page that clearly communicates the benefits of PVDS. Include a demo feature or a free trial.
- **Social Media Presence:** Build social media profiles (LinkedIn, Twitter, Instagram, Facebook) to promote awareness. Post valuable content related to real estate, home buying tips, and industry trends.
- **Leverage Real Estate Forums and Communities:** Join real estate and property investment forums like Bigger Pockets and Reddit. Provide value through insights and soft promotion.
- **Press Release:** Announce the launch of the system with a press release in real estate-related online media and local news outlets.

2.3 Lead Generation:

- **Google Ads & Facebook Ads:** Run targeted ads towards individuals and businesses searching for property valuation tools.
- **Referral Program**: Encourage users to refer new users through an incentive program (e.g., discounts, extended free trials).

2.4 Networking & Partnerships:

- **Partner with Real Estate Agents:** Offer real estate agents a special subscription plan. They can promote the tool in return for discounts.
- **Influencer Marketing:** Identify key real estate influencers or bloggers to review and recommend PVDS to their audience.

3. Long-Term Plan (6-24 months):

3.1 Establish Authority in the Market:

- **Content Marketing (Blog & YouTube):** Create high-quality blog posts and video tutorials related to property valuation, real estate market trends, and financial advice for home buyers and sellers. Content will help drive organic traffic and build trust.
- **Webinars & Online Workshops:** Host free webinars for homeowners, real estate investors, and agents on topics like "How to Accurately Determine Property Value in 2025." This builds credibility and educates the audience.
- **Search Engine Optimization (SEO):** Implement a long-term SEO strategy targeting keywords such as property value determination, real estate valuation tools and home price estimate tools.

3.2 Customer Loyalty Program:

- **Retention Strategy:** Develop a loyalty program where users who subscribe long-term get exclusive benefits like additional features or premium support.

- **Email Campaigns:** Send regular emails featuring product updates, market insights, and valuation tips to retain and engage existing users.

3.3 Expansion & Diversification:

- **New Features:** Plan to add new features, such as neighborhood insights, future value predictions based on market trends, and integration with local real estate databases.
- **International Expansion**: After achieving local success, consider launching in other real estate markets globally. Adapt marketing and tool features to cater to international audiences.

4. Continuous & Ongoing Strategy:

4.1 User Experience Enhancement:

- **Customer Support:** Maintain an efficient and friendly customer service that handles user queries and feedback.
- **Continuous Feedback Loop:** Regularly gather customer feedback through surveys, live chats, and social media engagement to keep improving the tool.

4.2 Paid Advertising & Promotion:

- **Retargeting Ads:** Use retargeting campaigns to reach users who have visited the website but haven't converted. Offer discounts or limited-time promotions to nudge them towards a purchase.
- **Affiliate Marketing Program**: Partner with real estate websites and bloggers to promote PVDS in exchange for commissions.

4.3 Public Relations & Reputation Management:

- **Engage with Industry Experts:** Regularly connect with industry thought leaders to mention your product in industry-related podcasts, interviews, and events.
- **Attend Real Estate Events & Conferences:** Sponsor or attend real estate events to network and promote PVDS among professionals and potential clients.

4.4 Data-Driven Marketing:

- **Monitor Analytics:** Use tools like Google Analytics and social media analytics to track performance, measure user engagement, and optimize strategies.

5. Metrics for Success:

- **Short-Term Metrics:**

- ❖ Website traffic and user engagement.
- ❖ Number of trial sign-ups or demo requests.
- ❖ Social media engagement and followers.

- ➢ **Long-Term Metrics:**
  - ❖ Customer acquisition cost (CAC) and lifetime value (LTV).
  - ❖ Monthly active users and retention rates.
  - ❖ Revenue growth and market penetration.

6. COST AND PROFIT ANALYSIS

COCOMO:

Based on SLOC characteristic, and operates according to the following equations for organic:

- Effort = PM = Coefficient$_{<\text{Effort Factor}>}$*(SLOC/1000) ^P
  = 2.4*(20000/1000) ^1.05=35.75
- Development time = DM =2.50*(PM)^T
  =2.50*(55.75) ^.32=5.94
- Required number of people =ST = PM/DM=55.75/5.94=9.38=10

Role	Number of people	Monthly Salary (Taka)	Working Time	Total Cost (Taka)	Key Responsibilities
Project Manager	1	65000	6 months	390000	Oversee project, manager timelines, coordinate team
Data Analyst	1	55000	2 months	110000	Develop machine learning models, data analysis
Frontend Developer and(UI/UX Designer)	2	30000	2 months	120000	Design and implement user interface
Backend Developer	2	30000	2 months	120000	Develop server-side logic, database management
DevOps Engineer	1	45000	10 days	15000	Manage deployment, CI/CD pipelines, server maintenance
Business Analyst	1	60000	6 months	360000	Gather requirements, liaise with stakeholders
Marketing Team	1	20000	1 month	20000	Product marketing, product advertisement
Total				**1135000**	

Domain and Hosting cost for one year is 20000 TK.

Maintenance cost for one year is 50000 TK.

After including Domain and Hosting and Maintenance cost, Cost is 1205000 TK.

By company policy **profit margin** is 25%,

Total cost including profit margin is 1506250TK

7. References

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Md Maruf
MD. SHIHAB SHORKAR
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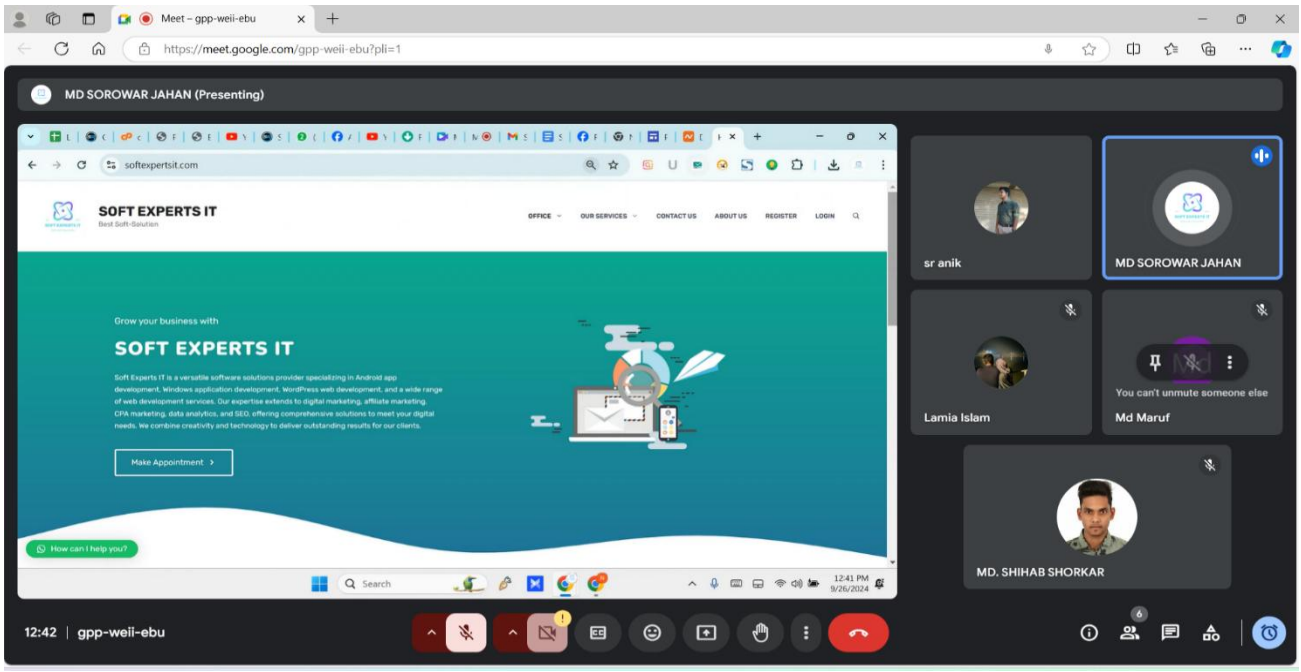
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