

INFOSYS SPRINGBOARD VIRTUAL INTERNSHIP 6.0

COMPLETION REPORT



ARTIFICIAL INTELLIGENCE INTERNSHIP

NAME - HRITURAJ SAHA

BATCH NO - 3

START DATE - 18.09.2025

INTERNSHIP DURATION - 8 WEEKS

AI-BASED REAL ESTATE VALUATION SYSTEM

1) OBJECTIVE

The primary objective of the AI-Based Real Estate Valuation System was to develop an end-to-end machine learning solution capable of accurately predicting property prices based on multiple features such as location, area, number of bedrooms, amenities, and regional trends. The project aimed to empower buyers, sellers, and real estate professionals with data-driven insights for fair and transparent property valuation. The system integrates advanced ensemble learning models to enhance prediction accuracy and offers a modern, responsive web interface built with React for seamless user experience. Additionally, it includes interactive data visualizations, a geographic analysis dashboard displaying property trends across India, and an AI-powered chatbot to assist users with property-related queries.

By combining the power of machine learning, data visualization, and user-centric design, the project aligns with the organization's vision of leveraging AI technology to modernize real estate valuation and improve decision-making in the property market.

2) DESCRIPTION

The AI-Based Real Estate Valuation System is a comprehensive end-to-end machine learning solution designed to predict accurate property prices and provide insightful market analytics. The system combines data science, artificial intelligence, and modern web development to create a platform that empowers both buyers and sellers with data-driven property valuations through an intuitive and interactive interface.

a) Overview -

The system predicts property prices based on features such as location, area, number of bedrooms, and available amenities, using ensemble learning models for high accuracy. It integrates multiple modules—data preprocessing, model building, and user interface—into a unified workflow that ensures reliability, scalability, and seamless user experience.

b) Approach -

The project followed a modular development approach divided into three main phases -

1. Data Preprocessing & Visualization (Module 1) -

- Raw real estate data was cleaned by handling missing values, encoding categorical variables, and scaling numerical features.
- Exploratory Data Analysis (EDA) was performed to identify correlations and key factors affecting property prices.
- Visualizations were created using Matplotlib and Seaborn to uncover pricing patterns and trends across various regions.

2. Model Building & Evaluation (Module 2) -

- Multiple machine learning algorithms such as Linear Regression, Random Forest Regressor, and XGBoost Regressor were trained and compared.
- Techniques like hyperparameter tuning (GridSearchCV) and K-Fold cross-validation were employed to enhance performance.
- Evaluation metrics including Mean Absolute Error (MAE), Mean Squared Error (MSE), and R² Score were used to assess accuracy.
- The final model achieved an R² score above 0.85, demonstrating strong predictive capability, and was saved as regression_model.pkl for deployment.

3. User Interface (Module 3) -

- A React.js-based frontend was developed for buyers and sellers, providing real-time price predictions via the Flask API.
- Features include secure authentication, buyer/seller dashboards, interactive India map visualizations, EMI calculator, and an AI chatbot for property queries.
- The frontend communicates with the ML API using RESTful endpoints, ensuring smooth data flow and fast predictions.

c) Technology Stack -

- Programming Languages - Python, JavaScript.
- Backend Frameworks - Flask, Django (for ML API).
- Frontend Framework - React.js.
- Machine Learning Libraries - Scikit-learn, XGBoost, Pandas, NumPy.
- Visualization Tools - Matplotlib, Seaborn, Plotly.
- Database - MySQL / SQLite.
- Development Tools - Jupyter Notebook, Git.

d) Real-World Impact -

The project holds significant potential in reshaping the Indian real estate market by introducing AI-driven transparency and efficiency.

- For Buyers - Enables data-backed decision-making, affordability checks via EMI calculator, and region-wise market insights.
- For Sellers - Provides fair valuation before listing and helps optimize pricing strategies.
- For the Industry - Automates property valuation, reduces human bias, and supports financial institutions in loan risk assessment.

3) TIMELINE OVERVIEW

WEEKS	ACTIVITIES PLANNED	ACTIVITIES COMPLETED
Week 1	Project understanding and dataset collection.	Defined objectives and gathered real estate datasets.
Week 2	Data cleaning and preprocessing.	Cleaned data, handled missing values, and encoded features.
Week 3	Exploratory Data Analysis (EDA).	Visualized key trends and identified major price factors.
Week 4	Built regression models and evaluated performance metrics.	Built regression models and evaluated performance metrics.
Week 5	Model optimization and selection.	Tuned hyperparameters and finalized the best ensemble model.
Week 6	Backend API development.	Deployed model using Flask API for real-time predictions.
Week 7	Frontend development and integration.	Built React UI with dashboards, chatbot, and visualization tools.
Week 8	Testing and documentation.	Completed testing, bug fixes, and final project deployment.

4) KEY MILESTONES

MILESTONES	DESCRIPTION	DATE ACHIEVED
Project Kickoff	Initial project discussion, objective finalization, and dataset identification.	18.09.2025
Prototype/First Draft	Completed initial data preprocessing, EDA, and baseline model development.	30.09.2025
Mid-Term Review	Presented preliminary results, model performance, and received feedback.	15.10.2025
Final Submission	Delivered fully functional ML model, Flask API, and integrated React UI.	09.11.2025
Presentation	Presented final project demonstration and key findings to the mentor panel.	TBD

5) EXECUTION DETAILS

The AI-Based Real Estate Valuation System was executed through a structured and modular approach, ensuring smooth progress across all development stages—from data preprocessing to final deployment. The project was divided into three main modules: data processing, model development, and user interface integration.

1. Data Preprocessing and Exploration -

The execution began with the collection and cleaning of real estate datasets. Data inconsistencies, missing values, and outliers were handled to ensure reliability. Categorical variables such as location and property type were encoded, and numerical features were scaled for uniformity.

Comprehensive Exploratory Data Analysis (EDA) was performed using Matplotlib and Seaborn to identify key factors influencing property prices, such as location, area, and number of bedrooms.

2. Model Development and Evaluation -

After preprocessing, multiple regression models—including Linear Regression, Random Forest Regressor, and XGBoost Regressor—were trained using the processed dataset.

To improve model accuracy, hyperparameter tuning and cross-validation techniques were applied. Performance was measured using R² Score, Mean Absolute Error (MAE), and Root Mean Squared Error (RMSE).

The XGBoost ensemble model achieved the best results ($R^2 \approx 0.85$) and was saved as a serialized file (regression_model.pkl) for deployment.

3. Backend Development -

The trained model was deployed using a Flask API, which served as the backend for handling prediction requests. The API received user inputs (e.g., area, location, amenities) and returned predicted prices in real time.

Endpoints were tested for performance and reliability to ensure smooth communication between the frontend and the model.

4. Frontend Integration -

A React.js-based frontend was developed to provide an interactive user experience. Separate dashboards were created for buyers and sellers, featuring -

- Property price predictions.
- Interactive India map for regional insights.
- EMI calculator for loan planning.
- AI chatbot for property-related queries.
- Secure login and registration system.

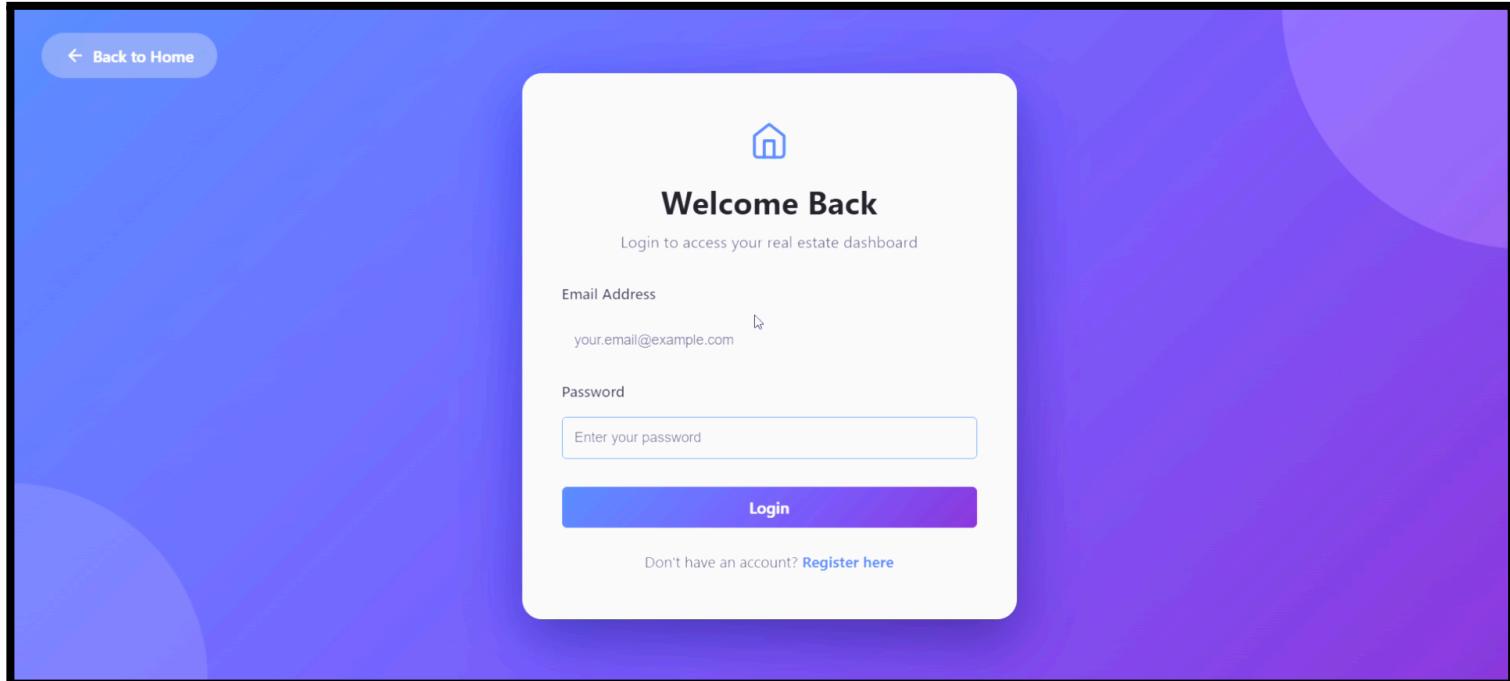
The frontend and backend were connected via RESTful APIs, enabling real-time predictions and data visualization.

5. Testing and Deployment -

Comprehensive system testing was conducted to ensure accuracy, responsiveness, and reliability. Minor issues were debugged, and the application was deployed for demonstration.

The final version showcased a fully functional AI-based valuation platform capable of delivering accurate, data-driven property price predictions and trend insights.

6) SCREENSHOTS



The home screen has a white header with the "EstateAI" logo, a "Login" button, and a "Get Started" button. The main section features a large heading "Find Your Dream Home with AI-Powered Insights". Below it is a subtext: "Discover the perfect property with intelligent price predictions, comprehensive listings across India's major cities, and direct seller connections." There are three buttons: "Start Exploring" (purple), "Sign In" (white), and "Verified Listings" (light blue). To the right is a large image of a city skyline at night. A circular profile picture is located in the bottom right corner.

The dashboard screen shows four city profiles: Bangalore, Mumbai, Delhi-NCR, and Chennai, each with listing counts, average prices, and growth rates. It also features three data visualizations: "Market Share Distribution" (bar chart), "Inventory vs. Demand" (donut chart), and "Historical Price Trend" (line graph).

City	Listings	Avg. Price	Y-o-Y Growth
Bangalore	18,500+	₹1.2 Cr	+15%
Mumbai	22,100+	₹2.5 Cr	+8%
Delhi-NCR	31,000+	₹95 L	+12%
Chennai	9,800+	₹85 L	+10%

Market Share Distribution

Category	Share (%)
Mumbai	(28%)
Delhi-NCR	(25%)
Bangalore	(20%)
Others	(15%)

Inventory vs. Demand

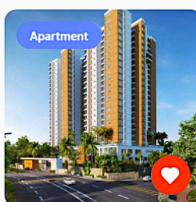
70% Demand
Available Inventory (30%)

Historical Price Trend

Prices are trending up ↗ (Last 4 Quarters)

My Favourites

Properties you've saved for later



Navami Chamara Heights

Ullal

4 BHK 2000 sqft

₹5.38 Crores

Parking gym swimming pool +1

Contact Seller

7259802546

jhonny@gmail.com

[Call](#)

[Email](#)

[WhatsApp](#)



plot 1

Jubilee Hills

2 BHK 600 sqft

₹4.67 Crores

EMI Calculator

Calculate your home loan EMI from various banks

Loan Amount

₹ 500000

₹1L

₹5Cr

Monthly EMI

₹43,391

Loan Tenure

20

years

1 year

30 years

Principal Amount

₹50.00L

Total Interest

₹54.14L

Total Payment

₹104.14L

Processing Fee

₹25,000

Select Bank

SBI
8.5% p.a.

HDFC
8.75% p.a.

ICICI
8.65% p.a.

Loan Breakdown

EstateAI - Buyer

Discover Properties

Filter Properties

City

All Cities

BHK

All

Max Area (sqft)

e.g., 2000

[Apply](#)

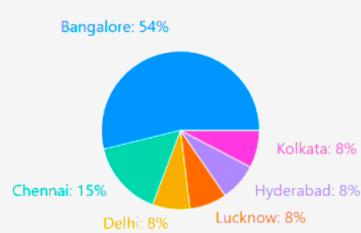
[Clear](#)

Market Insights

Price Comparison (Top 10)



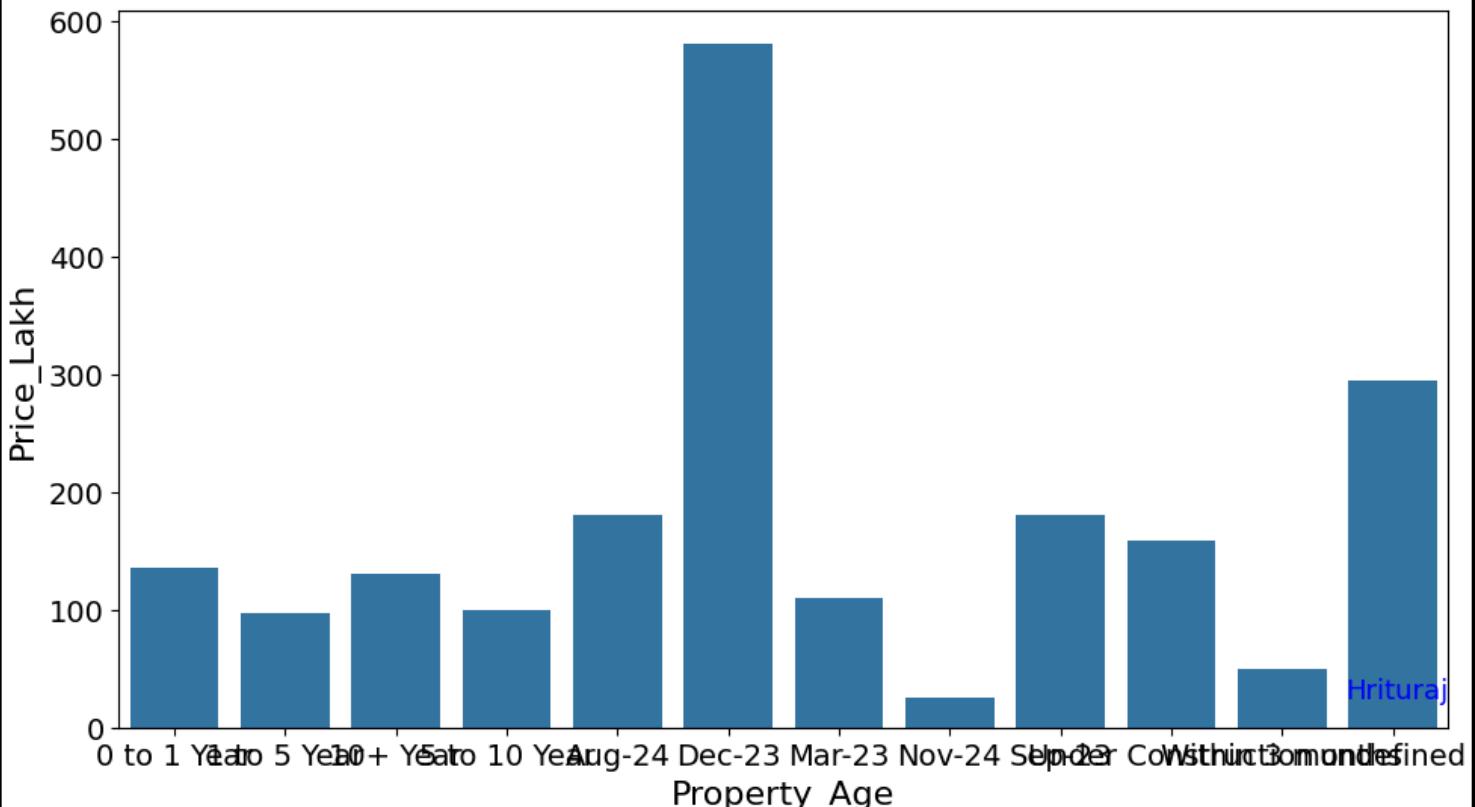
City Distribution



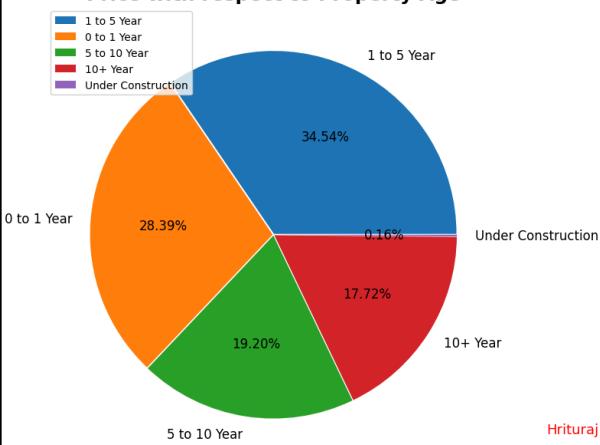
BHK Distribution



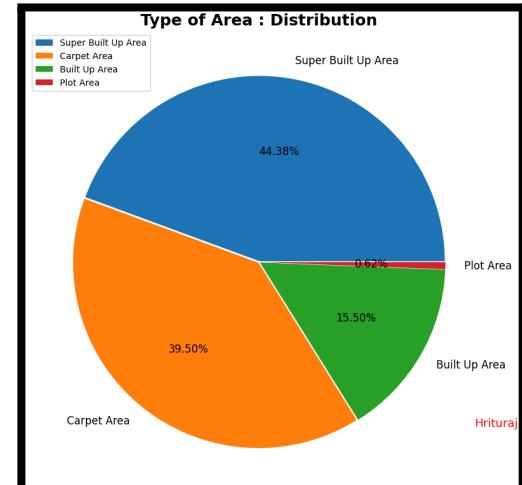
Price with respect to Property Age



Price with respect to Property Age



Type of Area : Distribution



Price with respect to Property Age



7. CHALLENGES FACED

During the execution of the AI-Based Real Estate Valuation System project, several technical, operational, and communication challenges were encountered. Each challenge was systematically analyzed and resolved to ensure smooth project progress and timely completion.

1. Data Quality and Inconsistency -

Challenge - The initial dataset contained missing values, duplicate entries, and inconsistent data formats (e.g., varying units for area).

Resolution - Data cleaning techniques were applied using Pandas and NumPy, missing values were imputed, and data formats were standardized to ensure consistency and model accuracy.

2. Feature Engineering and Model Optimization -

Challenge - Identifying the most influential features for accurate price prediction and optimizing model performance proved complex.

Resolution - Conducted correlation analysis and feature importance ranking using Random Forest and XGBoost. Applied GridSearchCV for hyperparameter tuning, improving the model's R^2 score to 0.85+.

3. Integration Between Frontend and Backend -

Challenge - Establishing seamless communication between the React frontend and Flask backend initially caused issues with API calls and data serialization.

Resolution - Implemented structured REST API endpoints and handled CORS policies correctly. JSON was used for consistent data exchange between the client and server.

4. Chatbot Implementation -

Challenge - Designing an AI chatbot that could respond meaningfully to property-related queries required natural language processing integration.

Resolution - Developed a lightweight rule-based chatbot with keyword detection, later enhanced with NLP techniques for better response accuracy.

5. Time Management and Task Coordination -

Challenge - Balancing multiple development modules (data processing, ML model, UI design) within limited time frames was difficult.

Resolution - Followed a modular development plan with weekly milestones, regular progress reviews, and version control via GitHub, which ensured smooth workflow and timely completion.

8. LEARNINGS & SKILLS ACQUIRED

The internship experience provided valuable exposure to both technical and professional aspects of real-world project development. Working on the AI-Based Real Estate Valuation System enhanced my understanding of the machine learning lifecycle, web application integration, and team-based project execution.

1. Technical Learnings -

- Data Preprocessing & Analysis - Gained hands-on experience in data cleaning, feature engineering, and exploratory data analysis using Pandas, NumPy, Matplotlib, and Seaborn.
- Machine Learning Model Development - Learned to build, evaluate, and optimize predictive models using scikit-learn, XGBoost, and ensemble learning techniques.
- Backend Development - Acquired skills in building and deploying Flask-based APIs for integrating machine learning models into web applications.
- Frontend Development - Developed proficiency in React.js, JavaScript, and CSS for creating dynamic and responsive user interfaces.
- Model Deployment & Integration - Understood how to connect frontend and backend using REST APIs, ensuring real-time prediction capability.

2. Tools and Technologies Gained -

- Programming Languages - Python, JavaScript.
- Frameworks & Libraries - Flask, React.js, scikit-learn, XGBoost.
- Databases - MySQL / SQLite.
- Version Control - Git, GitHub.
- Development Environment - Jupyter Notebook, VS Code.

3. Soft Skills & Professional Development -

- Problem-Solving - Strengthened analytical thinking by addressing real-world data challenges.
- Project Management - Improved task organization through weekly milestones and progress tracking.
- Communication & Collaboration - Enhanced teamwork and clarity in conveying technical concepts during reviews.
- Time Management - Efficiently balanced multiple modules within strict deadlines.

9. TESTIMONIALS

Participating in the Infosys Springboard 6.0 Internship was an incredibly valuable experience that helped me gain both technical expertise and professional exposure. Working on the AI-Based Real Estate Valuation System allowed me to apply machine learning and web development concepts to a real-world use case, enhancing my overall understanding of how AI can be leveraged for industry applications.

Throughout the internship, I learned how to collect, preprocess, and analyze real estate data, develop machine learning models, and deploy them through Flask and React.js integration. One of my key achievements was building an ensemble learning model that delivered an impressive R^2 score of 0.85+, ensuring accurate and reliable property price predictions.

The project also strengthened my skills in data visualization, frontend-backend communication, and API integration. I particularly enjoyed implementing additional features such as the AI chatbot, EMI calculator, and interactive India map, which made the platform more user-centric and impactful.

Beyond the technical aspects, the Infosys Springboard internship improved my time management, problem-solving, and collaboration skills. Regular mentor reviews, structured milestones, and self-paced learning modules helped me stay disciplined and efficient.

Overall, my experience with Infosys Springboard 6.0 was enriching and career-defining. It not only enhanced my technical proficiency but also prepared me for real-world challenges in the fields of Artificial Intelligence, Data Science, and Software Development.

10. CONCLUSION

The Infosys Springboard 6.0 Internship has been an immensely rewarding experience that significantly enhanced my technical, analytical, and professional competencies. Through the AI-Based Real Estate Valuation System project, I gained practical exposure to the end-to-end development of AI solutions, including data preprocessing, model building, evaluation, and web integration.

This internship provided me with hands-on experience in machine learning, Flask-based API deployment, and React.js frontend development, allowing me to apply theoretical knowledge to a practical, real-world use case. It deepened my understanding of how AI and data science can drive innovation in industries like real estate by improving transparency, efficiency, and decision-making.

Beyond technical growth, the internship also helped me develop essential soft skills such as communication, problem-solving, teamwork, and time management—skills that are crucial for success in a professional environment.

Overall, this experience has been a major milestone in my academic and career journey. It strengthened my passion for Artificial Intelligence and Machine Learning, aligning perfectly with my goal of building a career in AI-driven software development and data-driven innovation.

11. ACKNOWLEDGEMENTS

I would like to express my heartfelt gratitude to **Infosys Springboard** for providing me with the invaluable opportunity to work on the **AI-Based Real Estate Valuation System** project as part of the **Infosys Springboard 6.0 Internship**. This experience has been instrumental in enhancing my technical knowledge and professional growth.

I extend my sincere thanks to my mentor, **Ms. Thavayee Annadurai**, for her constant guidance, insightful feedback, and encouragement throughout the project. Her mentorship helped me understand complex concepts and refine my approach to problem-solving.

I would also like to thank my coordinator, **Mr. Srikanth**, for his continuous support, coordination, and motivation during the internship period.

Lastly, I am grateful to all the team members and peers who contributed directly or indirectly to this project. Their collaboration and teamwork made the entire journey both productive and enjoyable.



Thank You