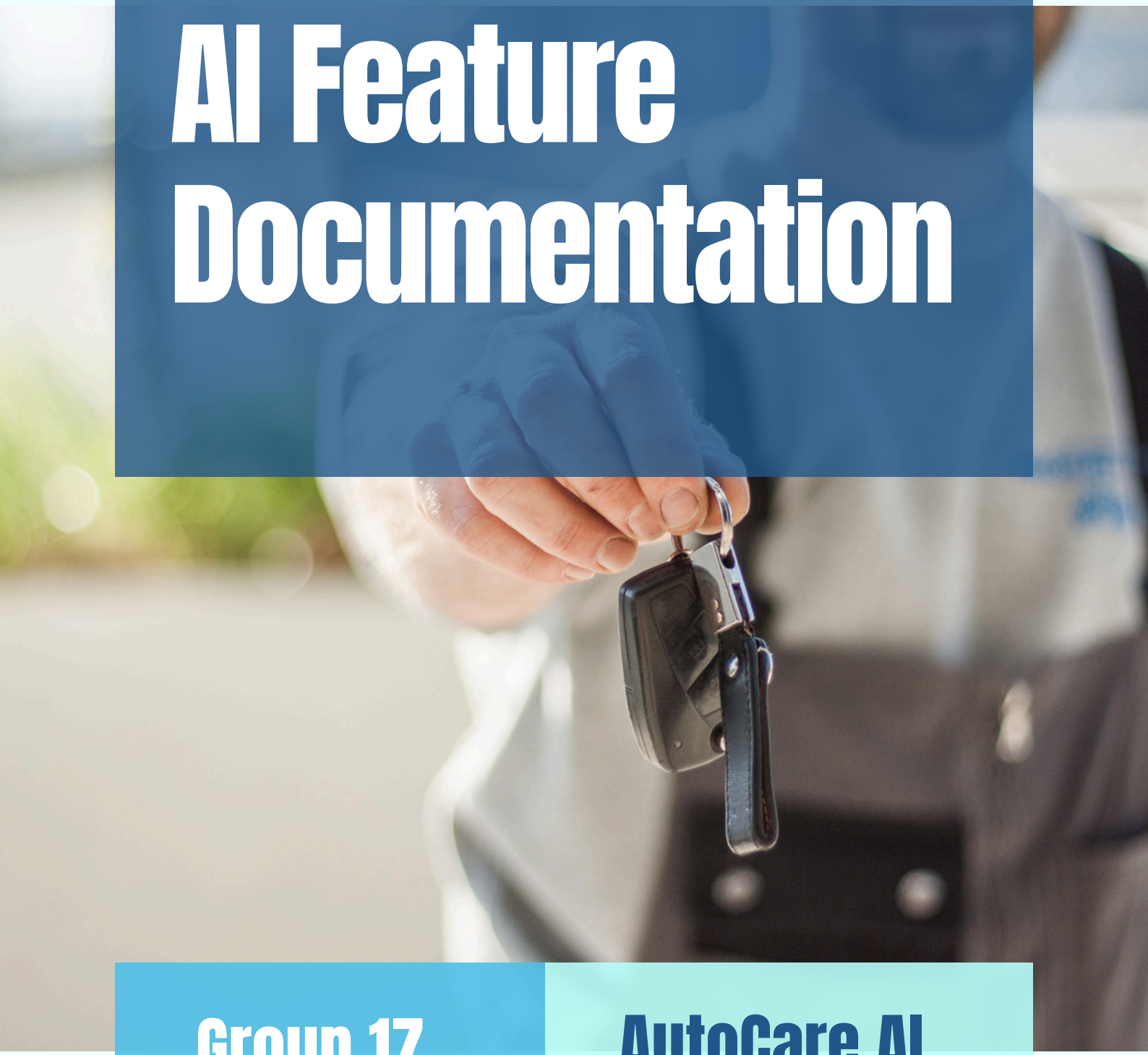
AI Feature Documentation



Group 17

AutoCare AI

CAR SERVICE BOOKING SYSTEM

Introduction

The AI feature in the Smart Car Service Booking System is designed to provide personalized service recommendations to users based on their car's details, history, and driving patterns. By leveraging machine learning algorithms and AI models, the system enhances user experience by suggesting the most relevant car services, predicting potential issues, and optimizing service bookings.

AI Implementation

The AI component is developed using a combination of pre-trained models and custom algorithms. The primary technologies utilized include:

- scikit-learn for predictive modeling and classification.
- TensorFlow/Keras for deep learning-based analysis.
- OpenAI GPT for the AI-powered chatbot.
- Geolocation APIs for nearest service center recommendations.

Data Inputs

The AI model requires the following data points to generate accurate recommendations:

- Car Details: Make, model, year, and mileage.
- Service History: Previous maintenance records and completed services.
- Driving Patterns: Data inferred from mileage updates and service frequency.
- User Location: GPS or manually entered location for suggesting nearby service centers.
- Industry Data: Standard service intervals and manufacturer recommendations.

AI-Driven Functionalities

4.1. Personalized Service Recommendations

- The system uses a classification model to analyze car details and mileage.
- Example output: "Based on your car's mileage (10,000 km), we recommend a full engine check-up and oil change."

4.2. Predictive Maintenance

- Regression models analyze historical service data to predict potential car issues.
- Example output: "Your car has a history of frequent brake pad replacements. It is recommended to check them at your next service."

4.3. Nearest Service Center Recommendation

- AI uses geolocation algorithms to suggest the closest authorized service centers.
- Example output: "The nearest service center to your location (5 km away) is ABC Auto Care."

4.4. Service Package Optimization

- AI compares historical service records with industry standards to create a cost-effective package.
- Example output: "A full service package (oil change, tire rotation, brake check) is recommended based on your car’s history."

4.5. AI Chatbot for Instant Guidance

- A Natural Language Processing (NLP)-based chatbot provides maintenance advice.
- Example output: "Your car’s check engine light is on? This might indicate a faulty sensor. We recommend a diagnostic check."

4.6. Cost Estimation

- AI analyzes previous service invoices and market prices to estimate costs.
- Example output: "Estimated cost for the recommended service package is LKR15,000."

4.7. Explanation of Recommendations

- AI provides transparency by explaining the rationale behind suggestions.
- Example output: "This recommendation is based on your last oil change being 6 months ago, and your mileage exceeding 5,000 km."

Model Training & Optimization

- The system uses supervised learning with labeled service data.
- Unsupervised learning techniques help identify patterns in service history.
- Continuous retraining occurs as new data is collected.

Conclusion

The AI-powered features in the Smart Car Service Booking System significantly enhance user experience by providing timely, accurate, and personalized service recommendations. By integrating machine learning models and AI-driven analytics, the system ensures efficient vehicle maintenance and minimizes unexpected breakdowns.

References

- scikit-learn Documentation
- TensorFlow/Keras Official Guide
- OpenAI GPT API for Chatbot Integration
- Geolocation APIs for Service Center Suggestions