TP Requirements Specification

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1 Introduction

We, Fatima Ezzahra and Zineb, are working together on a reverse engineering study of Google Maps with the goal of building a clear requirements model. Our work focuses on the main features of the application, such as map search, route calculation, navigation, and geolocation. We also consider exceptional cases like errors and unusual inputs, and translate aspects such as performance, security, and usability into non functional requirements. To support our analysis, we will create use case diagrams, make explicit assumptions where needed, and rely on both practical testing and official documentation.

2 Functional Requirements

2.1 User Account Management

FR1. The system shall allow users to register with an email and password.

FR2. The system shall provide secure login with valid credentials.

FR3. The system shall allow password recovery via registered email.

FR4. The system shall enable profile updates (name, email, preferences).

FR5. The system shall allow saving and managing favorite locations.

2.2 Location Search

FR6. The system shall allow searches by name, address, or category.

FR7. The system shall rank search results by relevance and proximity.

FR8. The system shall show detailed place information (address, phone, hours, reviews).

FR9. The system shall allow filtering by rating, “open now,” or distance.

FR10. The system shall support voice-based searches.

2.3 Route Planning

FR11. The system shall calculate the fastest or shortest route.

FR12. The system shall present alternative routes when possible.

FR13. The system shall support driving, walking, cycling, and public transit.

FR14. The system shall provide travel time and distance estimates.

FR15. The system shall update routes dynamically when traffic or user path changes.

2.4 Real Time Navigation

FR16. The system shall provide turn-by-turn navigation with voice guidance.

FR17. The system shall display real-time traffic conditions.

FR18. The system shall issue alerts for incidents, closures, or delays.

FR19. The system shall recalculate routes when the user deviates.

FR20. The system shall support offline navigation for downloaded maps.

2.5 Map Display and Interaction

FR21. The system shall allow smooth zoom and pan.

FR22. The system shall support map views (standard, satellite, terrain, street view).

FR23. The system shall display markers for saved places and points of interest.

FR24. The system shall allow users to contribute reviews .

FR25. The system shall allow users to upload Photo .

2.6 Sharing and Notifications

FR26. The system shall allow sharing of routes and live location.

FR27. The system shall send notifications for route changes or alerts.

FR28. The system shall allow subscription to place/route specific alerts.

3 Exceptional Requirements

ER1. The system shall show an error for empty or invalid search input.

ER2. The system shall lock an account after 5 failed login attempts.

ER3. The system shall switch to offline mode if the connection is lost.

ER4. The system shall notify the user if a location cannot be found.

ER5. The system shall handle and log server/map data failures.

ER6. The system shall block route creation outside supported areas.

ER7. The system shall revert to the last valid state if map rendering fails.

ER8. The system shall validate all input to prevent injection/malformed requests.

ER9. The system shall estimate the position using cached data when the GPS is incomplete.

ER10. The system shall prevent location sharing if permission is denied.

4 Non Functional Requirements

4.1 Security

NFR1. The credentials shall be encrypted during transmission and storage.

NFR2. Multifactor authentication shall be required for sensitive actions.

NFR3. Location sharing shall occur only with explicit user consent.

NFR4. Compliance with data protection laws.

NFR5. The access logs shall be audited regularly.

4.2 Performance

NFR6. The map tiles must load in 2 seconds under normal conditions.

NFR7. Traffic data shall be refreshed every 30 seconds.

NFR8. Routes shall be calculated within 3 seconds in urban areas.

NFR9. The system shall support at least 10,000 concurrent users per region.

4.3 Usability

NFR10. Voice guidance shall use clear, natural pronunciation.

NFR11. Accessibility features shall support visually impaired users.

NFR12. The interface shall be simple and intuitive for route planning.

NFR13. The system shall cover at least 50 languages.

4.4 Reliability

NFR14. The system shall maintain 99.9% uptime for core services.

NFR15. User data shall be backed up daily with recovery mechanisms.

NFR16. The system shall degrade gracefully during high load.

4.5 Maintainability

NFR17. Updates shall be delivered automatically without user action.

NFR18. Usage and error logs shall be collected for continuous improvement.

5 Use case diagrams for the Google Maps

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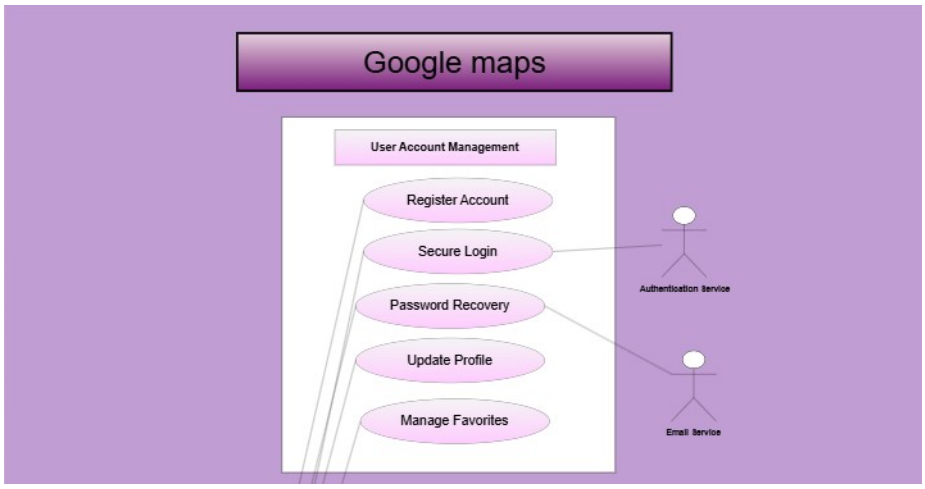

Figure 1: The user account management module show how users register, log in, recover passwords, update profiles, and manage favorites.

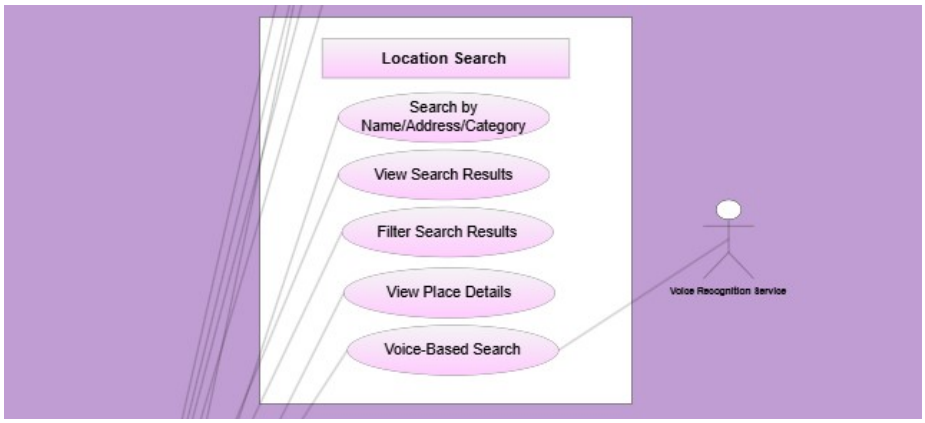

Figure 2: This module allow users to efficiently search for places by name, address or category filter results and view detailed information, making location discovery intuitive and user friendly.

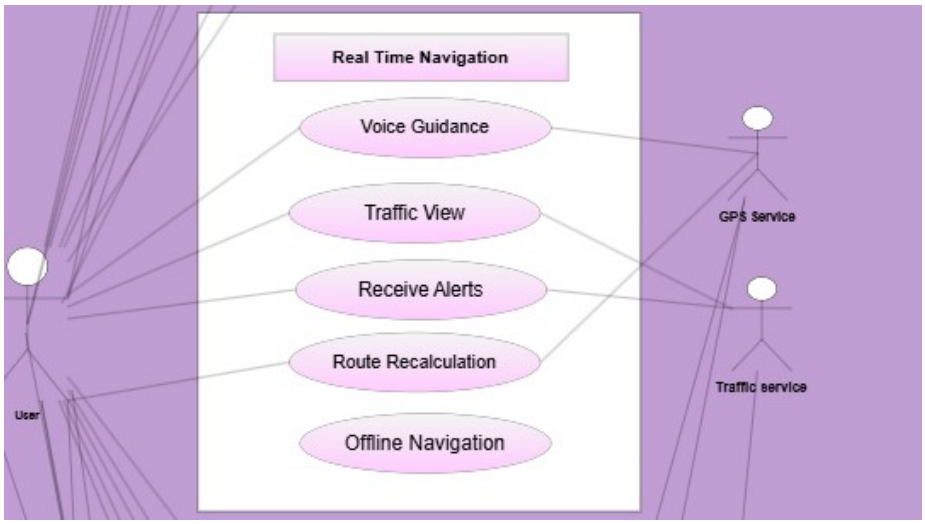

Figure 3: This module helps users calculate the fastest or shortest routes, explore alternative paths, choose different transport modes like driving, walking, cycling or public transit and get travel time and distance estimates .

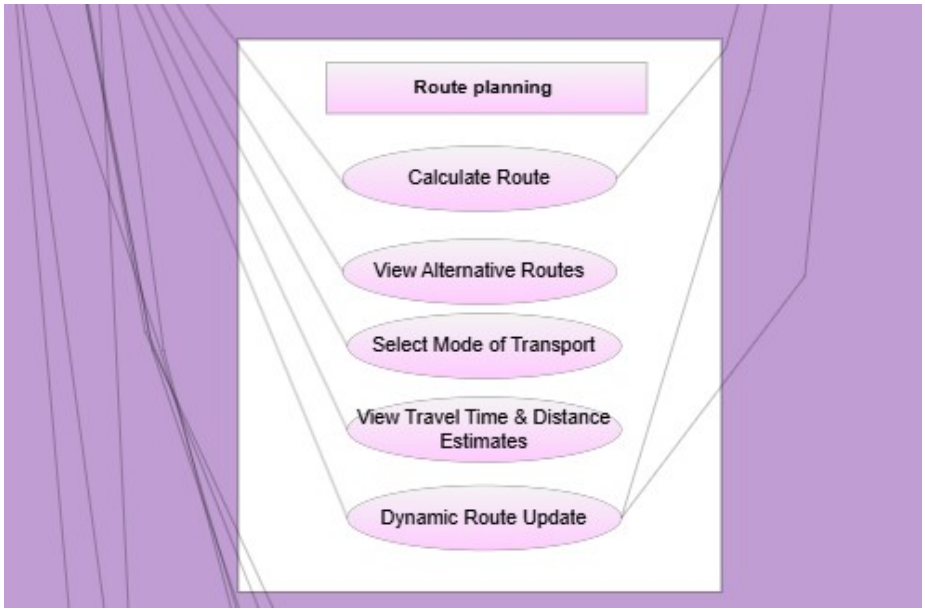

Figure 4: This module gives turn by turn guidance, shows live traffic, sends alerts, recalculates routes and works offline.

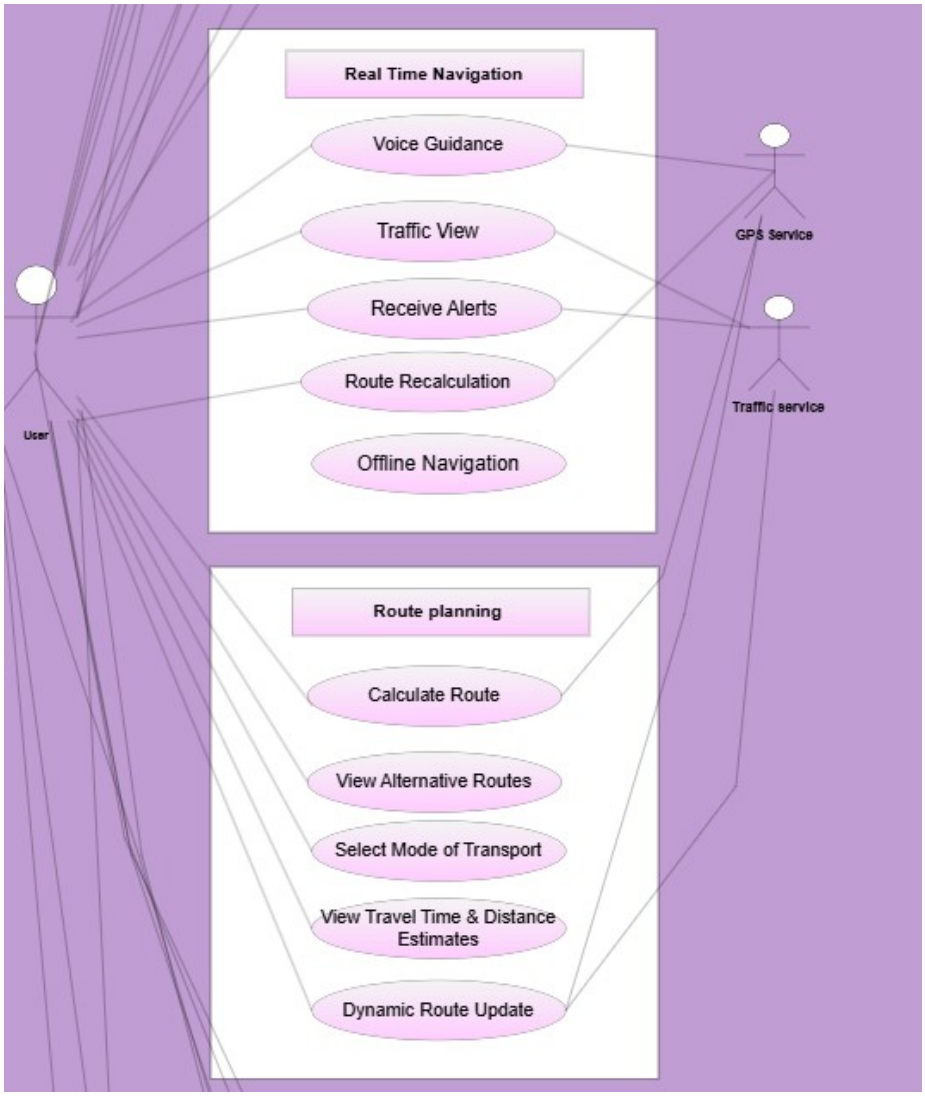

Figure 5: This Figure illustrate modules 3 and 4, highlighting how the GPS and traffic services interact with both the account management and location search modules.

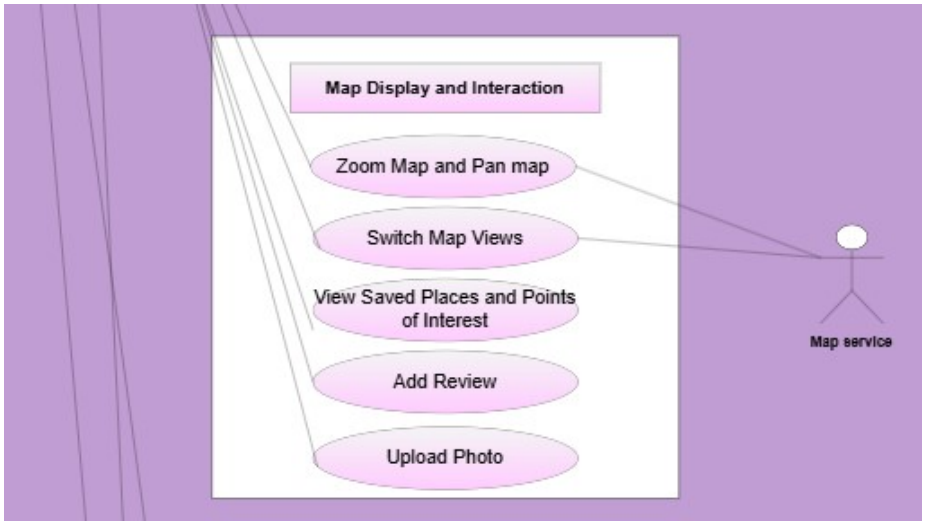

Figure 6: This module allows smooth map navigation, switching views, viewing saved places and adding reviews or photos .

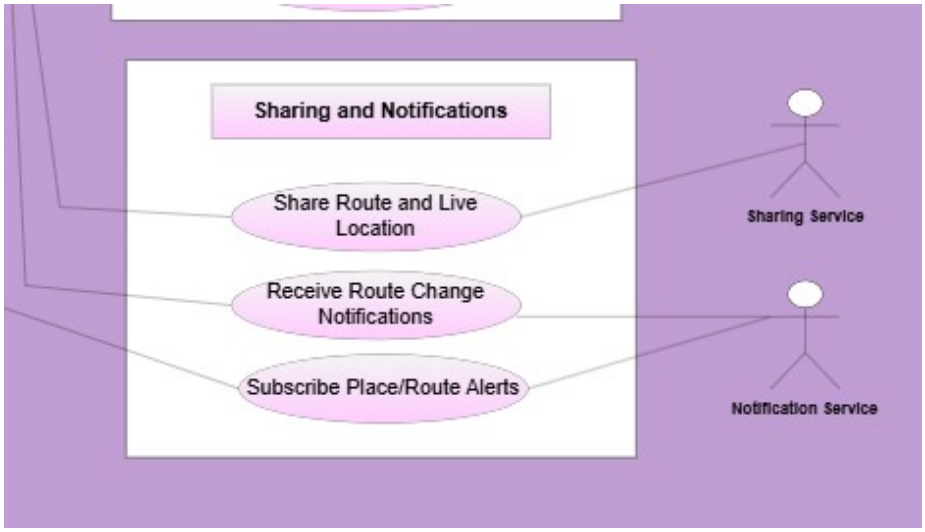

Figure 7: This module allows users to share routes or live locations with others, receive notifications for route changes or alerts and subscribe to specific places or routes for updates.

6 Conclusion

During our practical use of Google Maps, we created accounts, logged in, and tested password recovery to understand how user account management works We searched for different locations and looked at detailed information, like addresses, phone numbers, opening hours, reviews, and categories such as restaurants and public transport. We planned routes between locations using different ways to travel by car bike public transit and walking checking travel times alternative routes and live traffic updates. We also tried saving our favorite places, using Street View, and sharing routes with others. https://share.google/9MUe2UIZPdyDiqVOh https://share.google/OeJCaib7CBU0XFxek https://share.google/HjduY2TBWUle63WfW https://youtube.com/@googlemaps?si=cGyqrpdAZADgi1nj https://share.google/TsHkmxgMpjNLR2VCU

Note :

You can view the Google Maps use case in our GitHub repositories, shared by Me and Fatima Ezzahra.