

Car Fleet Management System

Functionality Flows Documentation

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1 User Authentication & Dashboard Access

Actors: FleetManager, Driver

1. A **User** logs in using the `login()` method.
2. On success:
 - **FleetManager** accesses the Fleet Dashboard via `viewDashboard()`.
 - **Driver** accesses the Trip Dashboard using the same method.

2 Car Lifecycle Management

Actors: CarFleetManagementSystem, FleetManager

1. Add new car with `addCar(carDetails)`.
2. Update details with `updateCarInfo(carID, details)`.
3. Remove car using `removeCar(carID)`.
4. Use:
 - `updateMileage(newMileage)`
 - `updateStatus(status)`
 - `updateLocation(location)`

3 Real-time GPS & IoT Data Integration

Actors: CarFleetManagementSystem, GPSData, ExternalAPIs

1. GPS/IoT devices send data using `receiveGPSData(gpsData)`.
2. System uses `ExternalAPIs.processIoTData(data)` for analysis.
3. Data updates:
 - `viewCarLocation(carID)`
 - `Car.currentLocation`
 - `Car.currentStatus`

4 Maintenance & Repair Tracking

Actors: FleetManager, CarFleetManagementSystem, Car

1. Add records using:
 - `trackMaintenance(carID, record)`
 - `trackRepair(carID, record)`
2. View history via:
 - `getMaintenanceHistory()`
 - `getRepairHistory()`
3. Predictions via `ExternalAPIs.predictMaintenance(carData)`.
4. Reminders through `sendMaintenanceReminder(carID)`.

5 Trip and Driver Operations

Actors: Driver, CarFleetManagementSystem

1. Trip assigned with `receiveTripAssignment(tripDetails)`.
2. Driver actions:
 - `updateTripStatus(status)`
 - `viewTripDetails()`
 - `communicateWithDispatch(message)`
 - `reportCarIssues(issueDetails)`

6 Fleet Monitoring & Cost Analysis

Actors: FleetManager, CarFleetManagementSystem

1. Use `viewFleetOverview()` for current status.
2. Monitor traffic via `monitorTraffic()`.
3. Analyze costs using `analyzeCosts()`.
4. Optimize dispatch through `optimizeRoutes()`.

7 Reporting and Analytics

Actors: FleetManager, CarFleetManagementSystem, ExternalAPIs

1. Call `generateReport(type, filters)`.
2. Use `requestReport(type)` for predefined reports.
3. Display reports with `Report.display()`.
4. Advanced analytics via `ExternalAPIs.performAnalytics(dataQuery)`.

8 Optimization Suggestions

Actors: CarFleetManagementSystem, ExternalAPIs

1. Run `getOptimizationSuggestions(criteria)`.
2. Examples:
 - Replace vehicles
 - Adjust schedules
 - Optimize routes
3. Justification generated by AI/ML systems.

9 External Service Integration

Services: Google Cloud, Azure APIs

- `getMapData(query)` – route and traffic info
- `analyzeText(text)` – feedback processing
- `sendNotification(message)` – alerts

10 User and System Administration

Actors: `CarFleetManagementSystem`

- Manage users via `manageUser(user)`