Course: Software Design

Report: D1- Requirements and use cases

Code: CMP5354

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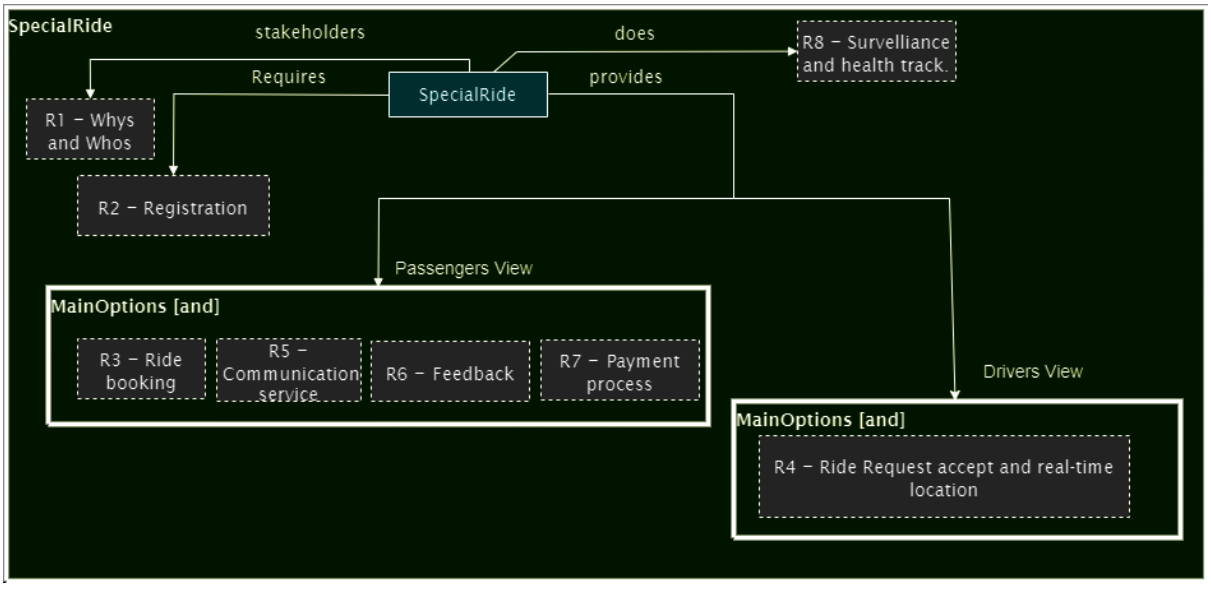
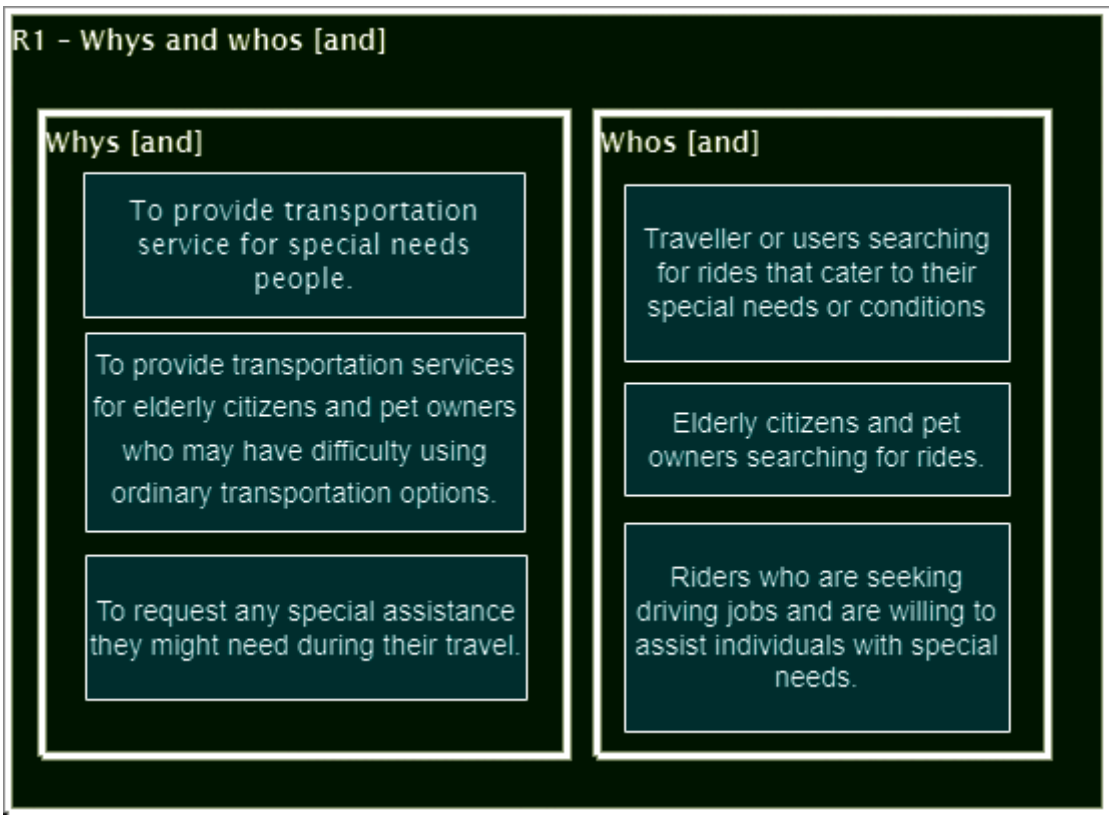
1. Ethical and Legal (EL) Issues Table:

EL Identifier	Description	Justification
EL1: Data Protection	Personal, medical, and location data of users must be safeguarded, as any unauthorised access or data leaks violate privacy regulations such as GDPR.	Prevents security breaches while ensuring compliance with privacy laws, safeguarding users' sensitive data.
EL2: Driver Information Checks	The app should conduct background checks on drivers, including their driving records and any criminal history, to guarantee safety.	This guarantees rider safety by screening drivers, which is also a legal requirement for determining driver eligibility.
EL3: Surveillance and Emergency Response	The app should have surveillance and emergency features for tracking health and ensuring security during rides.	It addresses safety concerns and enables quick emergency responses, while balancing privacy with security needs.
EL4: Right to Review and Appeal	Users must have the ability to review their ride assignments and contest decisions if needed.	Ensures transparency and compliance with consumer protection laws.
EL5: Non-Bias and Equal Access	The app must be accessible to all, regardless of disabilities, age, gender, or personal characteristics.	Complies with anti-discrimination laws and promotes inclusivity and equal access to transportation services.

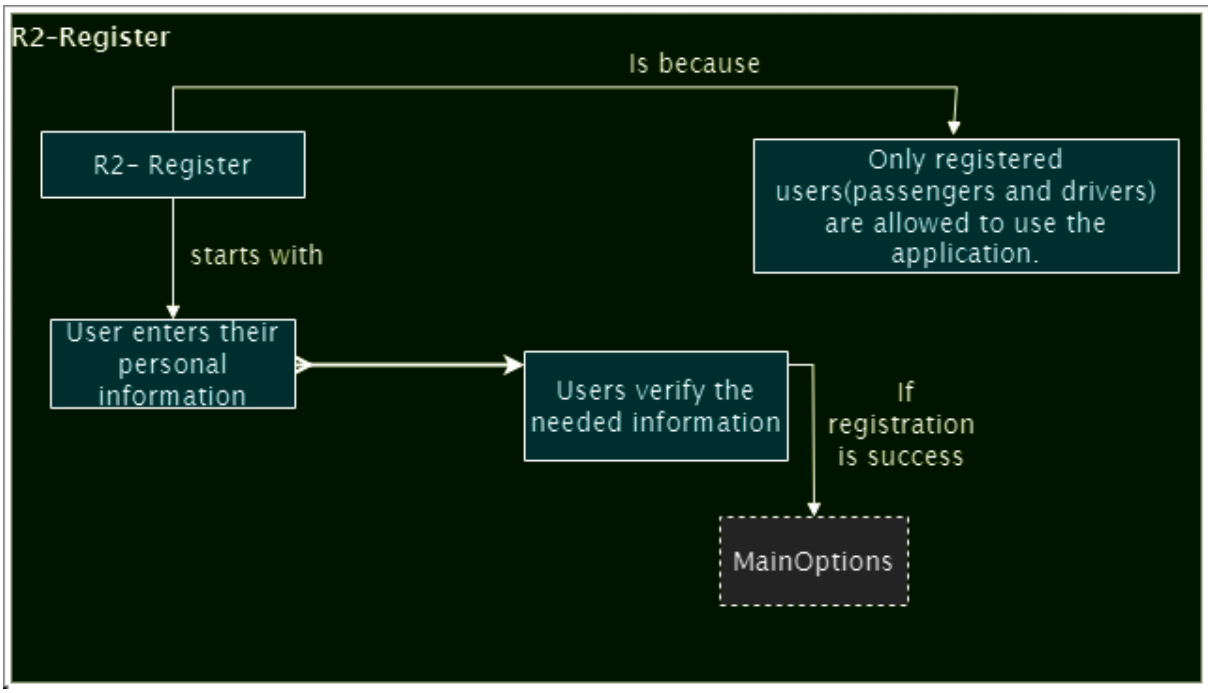
2. Foldable Concept Map (FCM) Model:



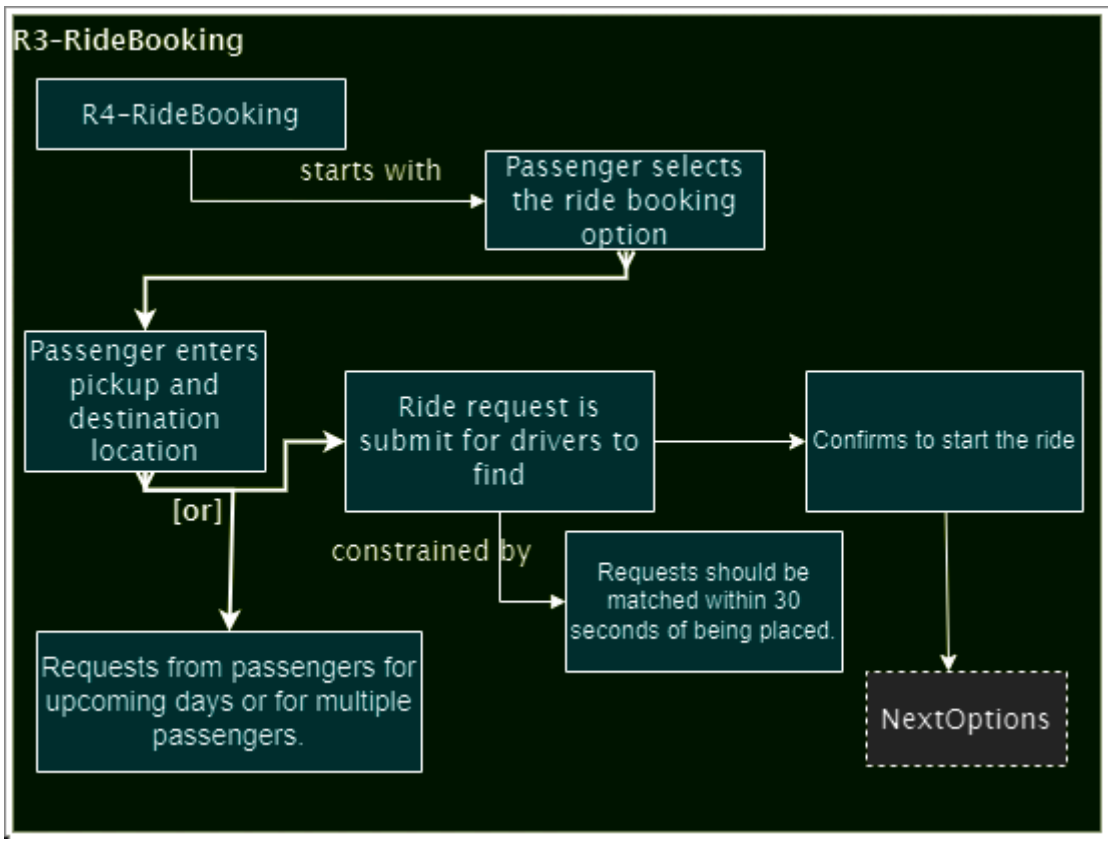
Fig(1): SpecialRide



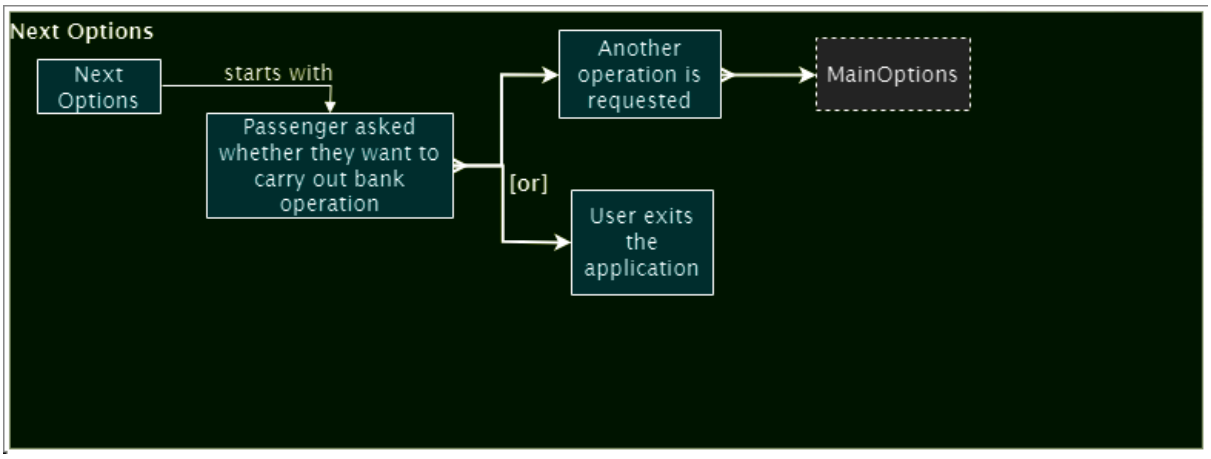
Fig(2): R1 - Whys and whos[and]



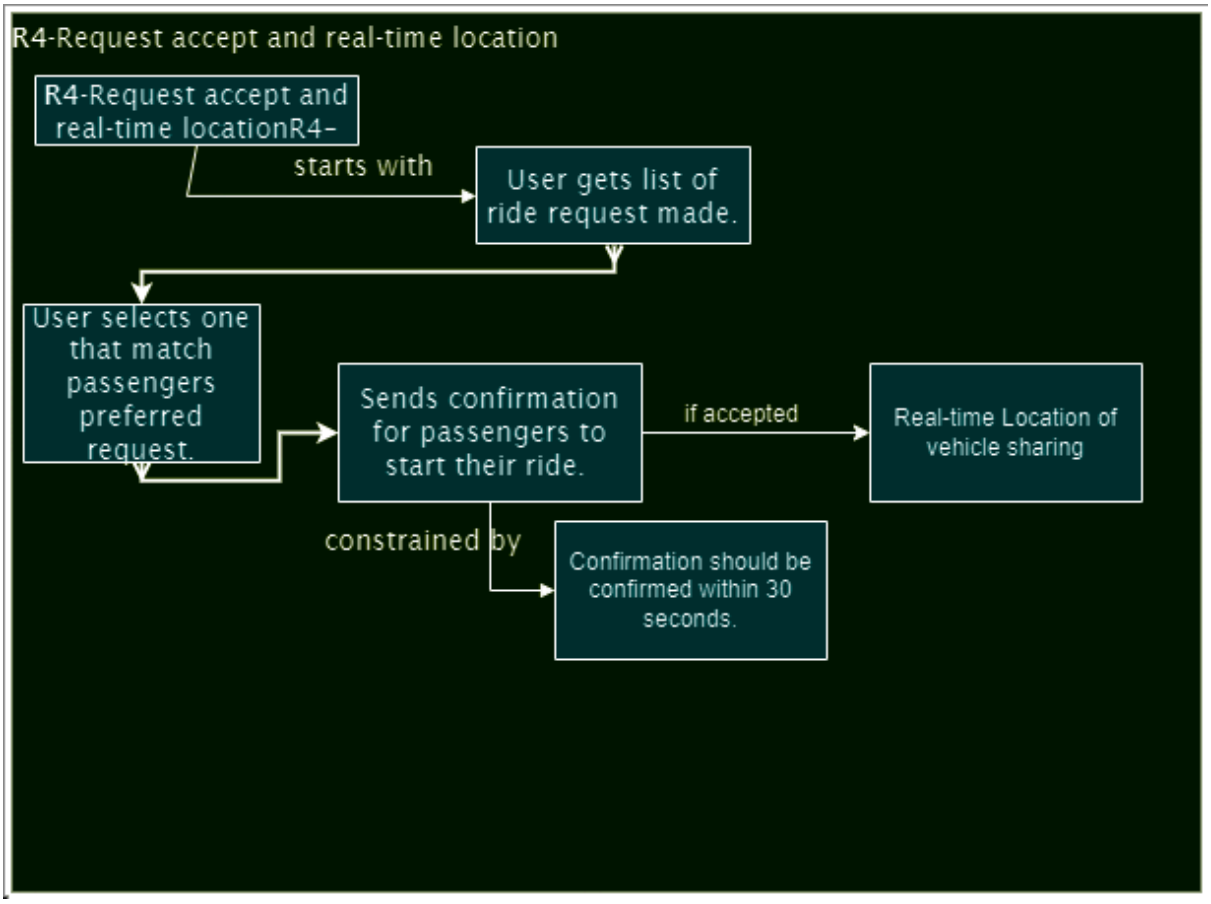
Fig(3): R2 - Register



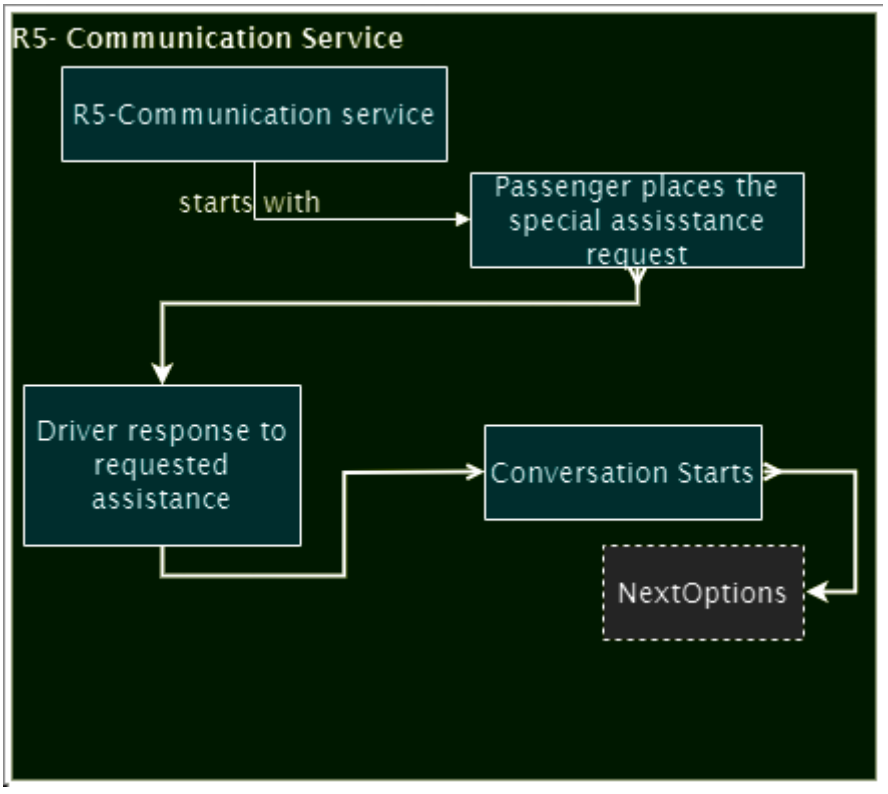
Fig(4): R3 - RideBooking



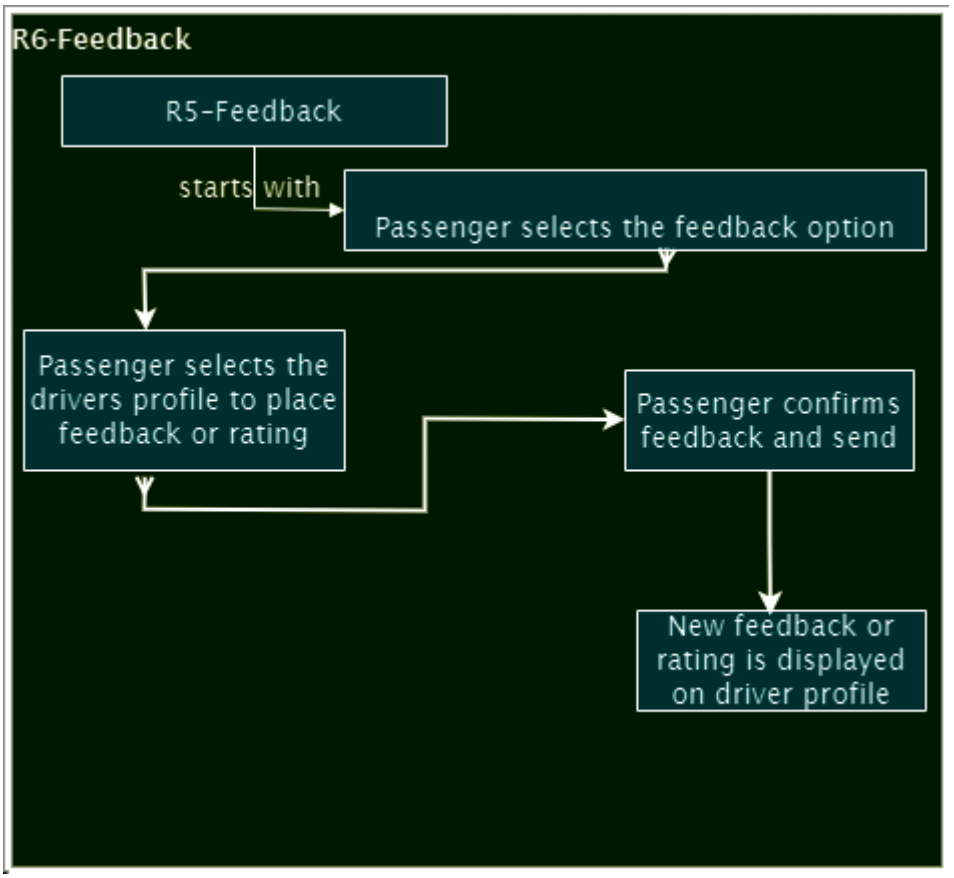
Fig(5): Next Options



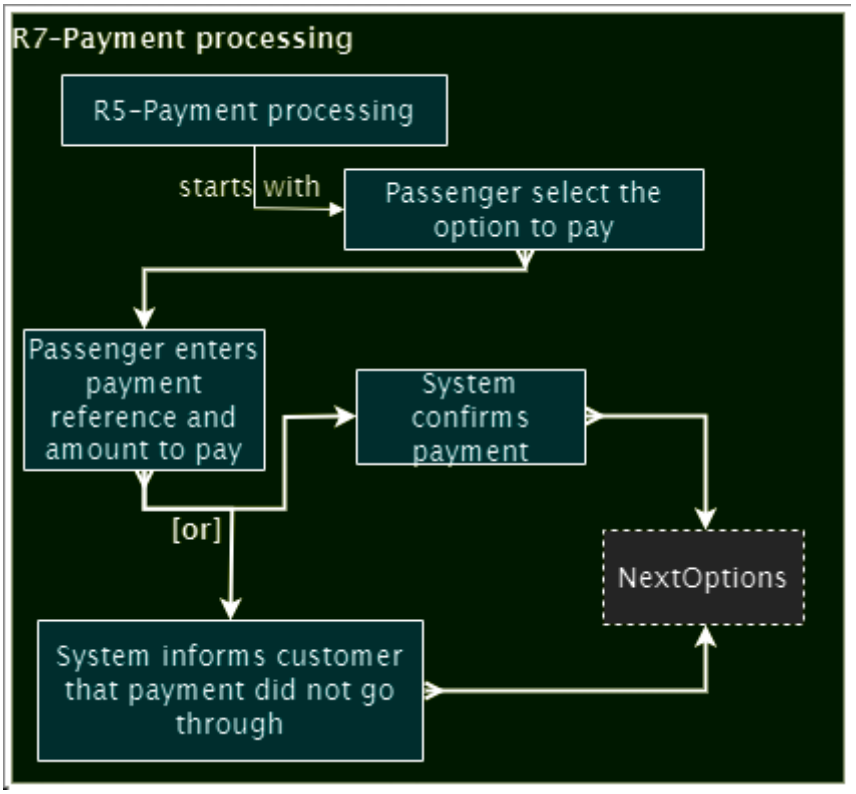
Fig(6): R4 - Request accept and real-time location



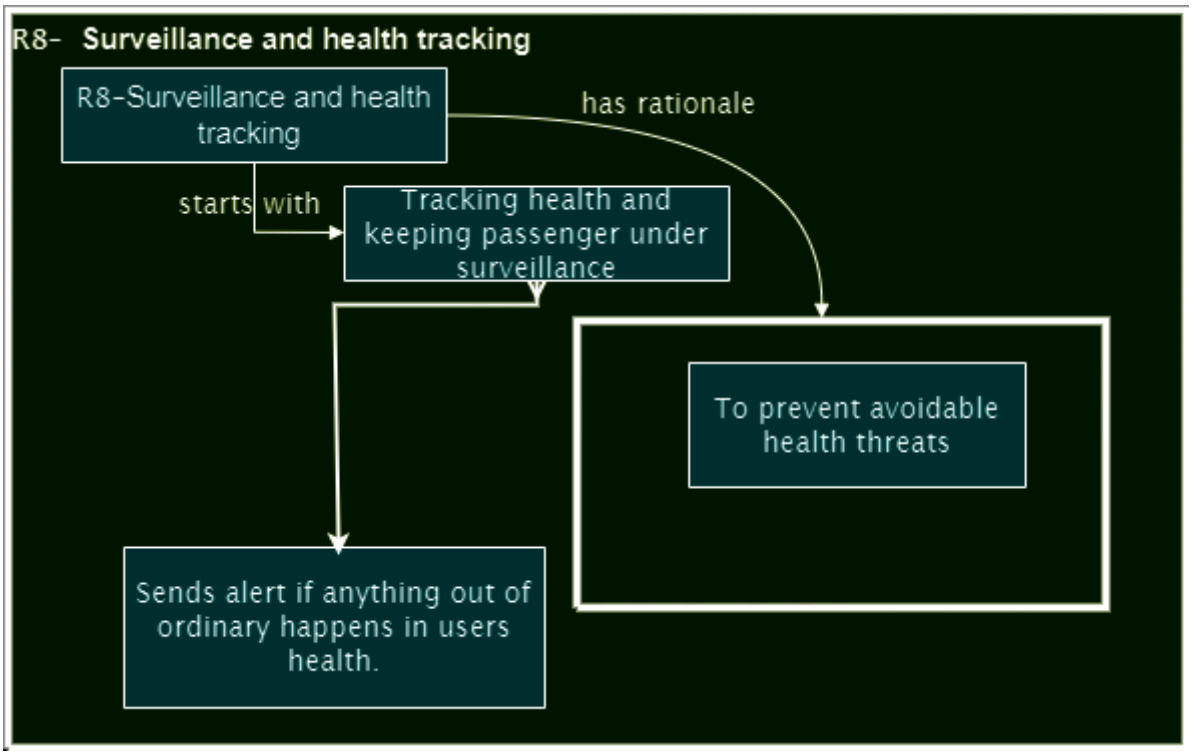
Fig(7): R5 - Communication Service



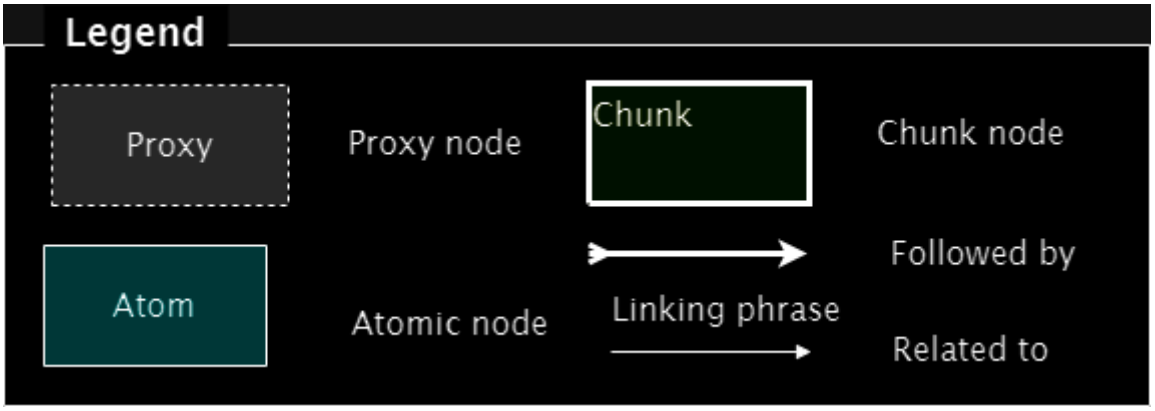
Fig(8): R6 - Feedback



Fig(9): R7 - Payment processing



Fig(10): R8 - Surveillance and health tracking



Fig(11): Legend

3. UML-based Use-Case Model:

a. Use Case BookRide:

Name	Book Ride
Purpose	To allow users to book rides using the application.

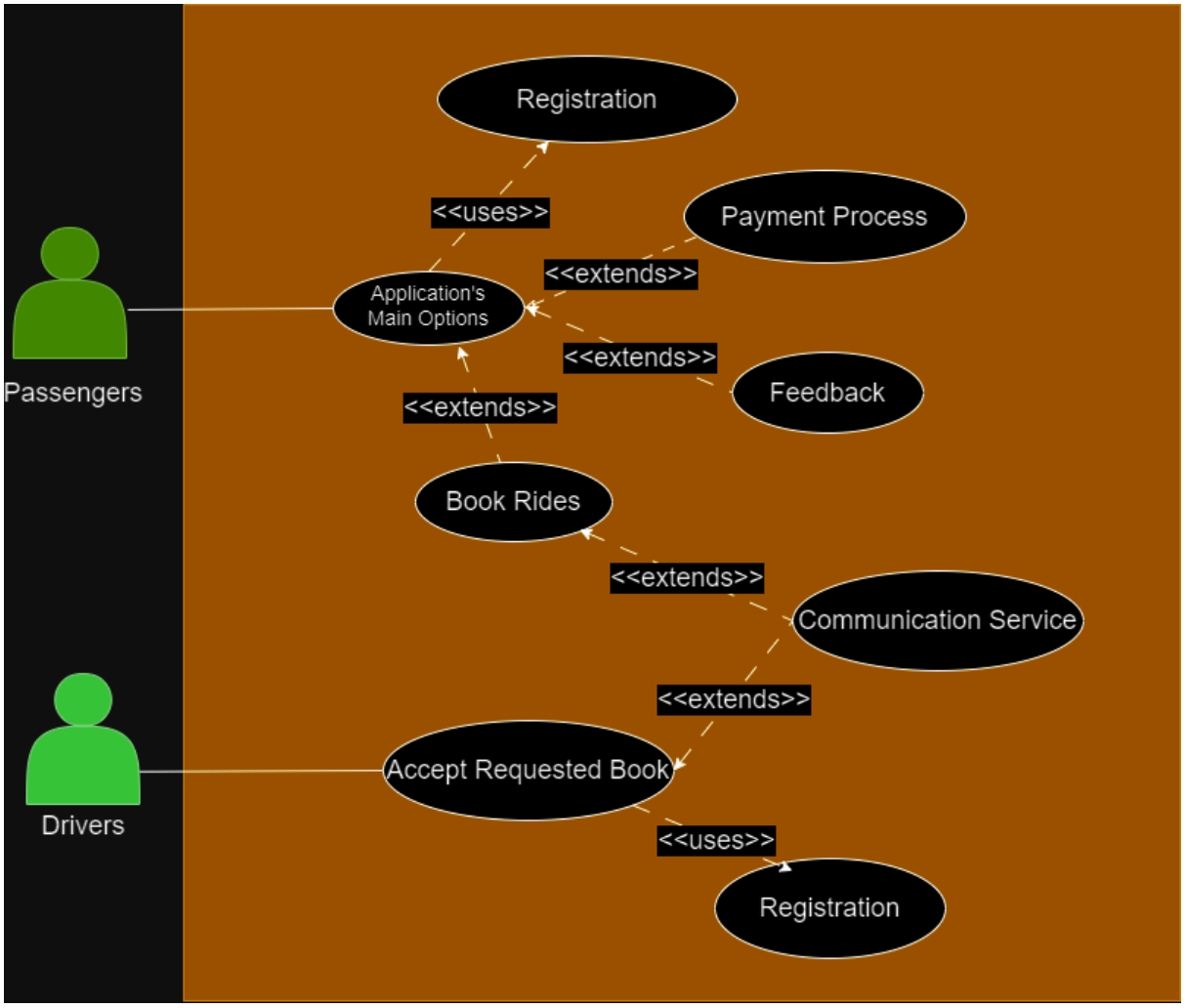
Prerequisites:
1. Users is registered through use-case ‘REGISTRATION’
Main Narrative:
1. User selects the booking options. 2. User enters the pickup and destination locations. 3. Users can choose to book in advance and select multiple passengers. 4. User specifies/selects their preferred vehicle and driver. 5. User submits the request.
Alternatively:
In step 5, if there is no response to the submitted request (i.e., no driver is currently available to fulfil the request) within the first 30 seconds, the system will notify the user to continue searching until a match is found or return them to step 1."
Outcome:
1. The ride request is successfully placed in the application. 2. The system notifies drivers about the new request.
Alternative narrative:
1. Cancel the ride request.
Outcome:
1. The system removes the request from the list of available ride requests.

b. Use case Ride requests accept and Real-time location:

Name	Ride requests accept and Real-time location
Purpose	Accept the ride request from passengers in need and provide them with the real-time location of the vehicle.
Prerequisites:	

1. Users are registered through use-case ‘REGISTRATION’ for drivers. 2. A list of available ride requests must be accessible for selection.
Main Narrative:
1. View the list of available ride requests. 2. Select a request that meets the criteria for the ride. 3. Wait for confirmation from the passenger.
Alternatively:
In step 3, if the confirmation takes more than a minute, the driver can cancel the ride.
Outcome:
1. If the passenger confirms, the ride is initiated, and the real-time location of the vehicle is sent to the passenger.

c. UML-use case diagram (UCD):



Fig(12): Use Case Diagram

4. Requirements Table:

Requirement Identifier	Description
R1	The app should provide specialised transportation services designed to accommodate individuals with disabilities, pet owners, and senior citizens.
R2	Users must register to use the application.
R2.1	Users must provide certification proving they are 18+ years old.
R2.2	Drivers/riders must provide medical, criminal, and background information for verification.
R3	Users shall be able to submit ride requests, indicating pickup location, destination, and special needs.

R3.1	Users can schedule rides in advance and book for multiple passengers.
R3.2	The system must notify users if a ride cannot proceed due to any issue.
R4	The app provides driver details and estimated arrival time once a match is found.
R4.1	The app must show real-time vehicle location after the ride request is accepted.
R5	The app must facilitate communication between rider and driver to address specific needs.
R6	Users must be able to rate and provide feedback on rides.
R6.1	Requests must be completed within a minute of user actions.
R7	The app must support payment processing directly within the app.
R7.1	Payments must be completed within 30 seconds.
R7.2	Users must be notified if payment fails due to technical issues.
R8	Real-time health tracking and surveillance must be installed in 4-wheel vehicles.
NR1	The app must have 99.5% uptime.
NR2	The data must be protected to ensure privacy and prevent ethical/legal issues.

5. Risk Assessment Table:

Risk ID	Description	Severity Level	Mitigation	Related EL Issue
Ri1	Data breach leading to the exposure of users' personal and medical information.	Serious	Implement strong encryption, regular security audits, and ensure compliance with GDPR and other data protection laws.	EL1: Data Protection

Ri2	Driver vetting failure results in an unsafe driver being assigned to a rider.	Moderate	Conduct thorough background checks and continuously monitor driver records for any criminal activity or driving violations.	EL2: Driver Information Checks
Ri3	Inability to assist riders during an emergency due to failure of health tracking or surveillance systems.	Catastrophic	Implement redundant emergency response systems, regular maintenance checks, and clear emergency protocols for both riders and drivers.	EL3: Surveillance and Emergency Response
Ri4	Discrimination or bias in providing services to individuals with disabilities or based on other personal characteristics.	Tolerable	Implement non-bias training programs for drivers, along with strict app policies that promote equal access. Continuously monitor user feedback for signs of discrimination.	EL5: Non-Bias and Equal Access
Ri5	System downtime causes users to be unable to book or pay for rides.	Moderate	Implement high-availability infrastructure, regular system health monitoring, and backup systems to ensure minimal downtime.	NR1: Availability