Institute of Information Technology
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Software Requirement & Specification Analysis(SE-406)
MotoMart APP

Submitted by
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Elicitation of MMA

The main task of the elicitation phase is to combine the elements of problem solving, negotiation and specification.The collaborative working approach of the stakeholders is required to elicit the requirements.The following tasks have been finished for eliciting requirements of MMA:
- Collaborative Requirements Gathering
- Quality Function Deployment
- Usage Scenarios

Collaborative Requirements Gathering

We have met with the stakeholders in the inception phase of MotoMart Services.By talking to them several times, we were able to gather and negotiate their requirements.
The stakeholders are -

- Manager
- HR
- Accountant
- Store Manager

- Service partners (Alizamart , RM Motors, Hridoy Motors)
- CRE (Customer Relation Executive) X 2
- Technicians
- Customers

These are the people who are playing a vital role in the whole process.

Quality Function Deployment(QFD)

Quality Function Deployment (QFD) is a technique that translates the needs of the customers into technical requirements for software. Ultimately the goal of QFD is to translate subjective quality criteria into objective ones that can be quantified and measured, and can then be used to design and manufacture the product. It is a methodology that concentrates on maximizing customer satisfaction from the software engineering process. So, we have followed this methodology to identify the requirements for the project. The requirements which are given
below, are identified successfully by the QFD.

Normal Requirements

Service Management System

- **Online Service Booking:** Customers will be able to book services online by filling out a "Job Card." This feature streamlines the service booking process and ensures customer convenience.
- **Service History Tracking:** Maintains a record of all services performed on each customer's motorcycle, enabling better tracking of maintenance needs and providing personalized service recommendations.
- **Notification System:** Sends automated reminders to customers for upcoming service appointments, helping to reduce no-shows and improve customer engagement.

- **Feedback Mechanism:** Provides a platform for customers to provide feedback on their service experience, facilitating continuous improvement and enhancing customer satisfaction.
- **Warranty Management:** Tracks warranty information for parts and services, ensuring compliance with warranty terms and simplifying warranty claims processing.
- **Service Packages:** Offers pre-defined service packages with bundled services at discounted rates, incentivizing customers to opt for comprehensive servicing
- **Continuous Progress:** Enables tracking of service progress to ensure timely completion and efficient workflow management.

- **Service Schedule Integration**: Integrates service schedules to provide special services for customers referred by partners, enhancing partnerships and customer loyalty.

HRM service

- **Technician Categorization**: Technicians will be categorized based on their skills . This ensures that customers' vehicles are serviced by skilled technicians, enhancing quality and customer satisfaction.
- **Performance Evaluation:** Implements a system for evaluating technician performance based on key metrics such as service completion time, customer satisfaction ratings, and technical proficiency.

Additional Feature:

1. **Multiple Language Availability:** Supports both Bangla and English languages, catering to a diverse customer base and enhancing accessibility.

2. **Mobile Banking Integration:** Allows customers to pay for services via online banking, adding convenience and flexibility to the payment process.

Store management System

1. **Available Parts Showcasing:** Offers a menu showcasing all available parts to customers, administrators, and technicians, promoting transparency.
2. **Parts Buying Option:** Enables customers to purchase parts directly through the system, enhancing convenience and efficiency in procurement processes.
3. **Inventory Management Integration**: Integrates with inventory management systems to automatically update parts availability based on service bookings and purchases.
4. **Sales Analytics:** Provides insights into parts sales trends and customer preferences, informing inventory stocking decisions and marketing strategies.

Accounts Management

1. **Sales Data Integration:** Integrate with the sales module of the software to access transactional datCustomer Loyalty Program: Implements a loyalty program where customers earn points for every service visit or purchase, redeemable for discounts or free services, fostering customer retention and loyalty.a, including service revenues, parts sales, and other sources of income.
2. **Expense Tracking:** Incorporate expense tracking functionality to capture all relevant costs associated with service operations, such as labor, parts procurement, overhead, and other operational expenses.
3. **Data Aggregation and Calculation:** Aggregate revenue and expense data over defined time periods (e.g., monthly, quarterly, annually) and calculate net profit or loss for each period and graphically represent them.

Expected Requirements

1. **Account Creation:**
   - Admin Account: The system will provide a predefined account for the admin, allowing them to manage the system.
   - HR, Accountant, Store Manager Accounts: Assigns specific roles and permissions to different stakeholders within the organization, allowing them to perform their respective duties.
   - Technician and Partner Accounts: The admin will have the capability to create accounts for technicians and partners, enabling them to access specific functionalities tailored to their roles.
   - Digital Receipts via SMS: Customers will receive digital receipts for their transactions via SMS, providing them with a convenient and paperless way to keep track of their service history.

2. **Home Page:**
   - Easy and Interactive UI/UX: The home page of the system will feature an intuitive and user-friendly interface, ensuring that users can easily navigate and interact with the system's functionalities.
   - System Backup and Protection: The system will be backed up regularly to prevent data loss and ensure continuity of operations. Additionally, robust security measures will be implemented to protect sensitive data and safeguard against unauthorized access or breaches.

3. **Service Package Customization:** Allow customers to customize service packages based on their specific needs and preferences, with options to add or remove services and adjust pricing accordingly.

4. **Partner Referral System:** Develop a mechanism to track customers referred by partners, such as dealerships or motorcycle manufacturers, and provide them with special services or discounts as part of partnership agreements.

5. **Customer Database Integration:** Integrate with a customer relationship management (CRM) system to store and manage

customer information, service history, and preferences for personalized service recommendations.

6. **Chatting System:** Integrate real-time chat functionality between customers and technicians/administrators for quick issue resolution and improved customer satisfaction.

7. **Attendance:** Implement a fingerprint-based attendance system for technicians to ensure accurate tracking of attendance, promoting accountability and task management efficiency.

Exciting Requirement:

1. **24/7 Customer Support:** The chatbot can provide round-the-clock support to customers, answering frequently asked questions, assisting with service inquiries, and providing basic troubleshooting guidance even outside of regular business hours.

2. **Customization Studio:** Offer customers a virtual customization studio where they can digitally modify and personalize their motorcycles. This feature could include options to change colors, add decals or graphics, and preview aftermarket parts or accessories before making a purchase.

Use Case Scenario of MMA

1.Registration:

To ensure seamless interaction with MotoMart's automated system, every user's availing services must possess a distinct profile. There are four types of profiles within MotoMart:

Customer Account:

Customers seeking services must initiate their profile creation process. Upon opening the App, they will get two options. 1.Register. 2.Login.The registration page will ask which type of account the user wants to create, Admin or Customer. To create a new customer account the user needs to click on the customer option and provide essential details such as Name, Email ID, Phone number, and Address. Then they have to set up a password for their account.

Upon furnishing accurate information, the customer's signup process concludes, redirecting them to the Homepage.

Admin Account:

The Manager primarily assumes the role of the system administrator. He selects the Admin option in the registration page. There will be a predefined admin ID for the admin to register with. He provides his ID and sets up a password. His account creation is complete. The HR, Accountant, CRE, Store manager will use this account along with the manager.

Technician Account:

The Admin dashboard will have a section called HRM (Human Resource Management). Entering this section, the HR will be able to add new technicians to the apps database and will also be able to create technician accounts using their names and phone numbers. He will provide them with a primary password which they can change later.

Partner Account:

Manager can add new partners in the app. He can create partner accounts using their names, phone number and an email id. He will set a primary password. When a partner account is created the partner will get notified via email with a message that says -"Partner account X has been created successfully

 -MotoMart".

2. Login

Users can log in using their registered credentials as either an admin, customer, partner or technician.After logging in as admin the app will want to know the users role.Manager,CRE,Store Manager,Accountant or HR.After selecting the role he has to provide the specific code for that role which will be provided earlier to them.Different roles will have access to different sections and features that other roles can't access. A "Keep me logged in" feature is available for returning users, ensuring seamless login experiences. In case of forgotten passwords, a recovery mechanism is provided.

Password Recovery:

When a user forgets the password of his account, he can click on the 'Forget Password? . It will redirect him to an OTP interface where he will provide the registered phone number, and an OTP will be sent to the phone number. When he enters the correct OTP in the interface, a password reset interface will appear where he will be asked to provide a new password and confirm this newly provided password. Then the system will store the new password in the corresponding database. Once the password reset is completed, a message saying "Password reset successfully" will be displayed, and the user will be redirected to the login interface.

Dashboards:

3.Customer Dashboard

The customer dashboard will have the following features:

1.   Profile-Customers can edit his personal information from his profile option. He can add his photo or remove it. He will be able to change his password. He can logout of his account from this section.

2.   Service Dashboard-This section shows all the available services provided by MotoMart and all the ongoing offers on different services. There will be a search option on the top left corner to search for services. He can select any service and then proceed to avail them.There is a 'flash card' option.If the customer is a referred customer by any partner then the flash card status is on and he can see and avail some special service deals.There is also another option where he has to fill up a form called 'Job Card'.He gives a description of the problems he is having and then submits it.The job card is then sent to the CRE dashboard.The CRE suggests services that are necessary and sends the suggested service list to the customer.The customer can remove some services or make it confirm. After confirming he proceeds to the Payment section. After Payment is complete a technician is allocated to that service.

He can view all his previous service history.

3.   Add vehicle- customers can add multiple vehicles in their profiles. He can add his vehicle using some information such as bike brand, bike model, chassis number, engine number, bike registration number. He can also add info like engine capacity, mileage.

4.   Parts and items-Here one customer can see and buy different bike parts and items. He can buy one single item or add items to cart. He can pay via mobile banking system or pay in cash.

5.   Bookings-Customers can book new services or view their service history. If any service is ongoing he can see the progress of the current service. He can chat directly with the technician working on his vehicle and also view the estimated time and delivery time.After the service is finished the customer can give the technician a rating which will be added to the technicians dashboard.

6.   Help and Support-This will allow the customer to interact with an AI chatbot. Customers can make a phone call directly to the CRE during business hours through this section.

7.Studio-Here a customer can virtually customize/modify his bike by adding different parts.

4.Admin Dashboard

The admin dashboard will have the following sections:

1.   HRM (Human Resource Management)-When a technician is hired the HR will add the technician to the apps database. Every technician hired is skillful on different types of services and on different bike brands. That will give the technicians attribute points based on their skillset. A fingerprint scanner is integrated with the app for the technician's attendance. Their biometric (fingerprint) information, and skillset is saved in the app. When a technician enters the shop his entry attendance is recorded, and when he departs, his exit attendance is recorded, thus his working hours are saved per date .The HR and the Manager can access the attendance records. Attendance records are organized by date for easy viewing.HR or Manager can filter attendance history by technician or date range.HR or Manager can analyze working hours of technicians based on the attendance records.

2.Accounts-Financial information about every sale, service revenue will be available at the Accountants section. Accountants can see about every sale of parts and items and service revenue.

3.**Shop-** Store Manager will be able to add Parts & items to inventory with item name, price , description, quantity and pictures.He can also update their pricing and other information.

4.Service and Offers-The Manager will add new services at times , provide new offers and packages on different services . These offers, services and packages are up-datable in this section. The app is integrated with MotoMart's FaceBook page.So when new offers are created the manager can post those offers to their Facebook page directly through this app. The services, offers and packages that are currently saved will be shown to the customers through this app.

5.Partners-Partners can be added and updated in the app and partner accounts can be created from this section. Current partners that are in an agreement with MotoMart can be viewed here in detail. Manager will be able to see the referred bikes from partners.

6.Service Requests- CRE and Manager can see all the service requests from customers and the service history from this section. Manager and and CRE can see all the ongoing services. CRE will have a section where all the pending service requests will appear and can see the job card filled up by the customers. He will refer appropriate services to the customer by understanding the job card. If it is unclear to the CRE, he will be able to call and message the customer. Manager will also be able to view previous service history.

5.Technician Dashboard

The technician dashboard will have-

1. **View Pending services-**

All the services that are allocated to the technician from customers (which came via the system) will be shown here.

Technician can view all of the pending services that he got from the customers.He can select a pending service to work on it.While working on a service, he becomes occupied. The CRE can see his occupied status.

Technician can click on the plus sign(Add) of a pending service to add it to the 'Current Service' module.If done so, the service info would be transferred to 'Current Service' , moreover, his 'occupied status' would get updated(occupied or not occupied) and the customer related to the service would get notified about the technician's profile.CRE can see the technician in the state of either being occupied or not occupied.

2. View Ongoing service- Technician can view the service that is ongoing .There will be an estimated service completion time against the service ID that the technician is currently working on . Technician can update the estimated completion time as per his need to finish the service. He can directly chat with the customer. After a service has been completed, technicians can update the 'done status'. Upon doing so, it will reflect as progress on the customer's profile,and he is unoccupied again. Moreover, the service info would be transferred to the 'Previous Services' module of the technician's profile.CRE can also see the completion of the service by the technician .

3.VIew Previous Services-Technician can view his service history in detail from here,he can also search the services that he previously had completed via phone no.(customer's)/Bike name/Bike Registration number/date.

4.Profile-From here a technician can update his phone number,password,email ID and add a profile picture. He can also see his service ratings.He can logout from his account.

6.Partner Dashboard

Partner Dashboard will have following section:

1. **Profile-**From here partners can change their phone number, email ID, password, add profile picture and log out.

2. **Add bike**-Partners can add new bike information about those bikes which they have referred to MotoMart. When they add the bike details it gets saved to the MotoMart database. When a customer opens a MotoMart account and adds his bike. The app checks the engine number. If the engine number matches with any referred bike's engine number then that customer will get an additional feature called flash card. Flash card introduces a variety of offers with discounts and some free services that are applicable only for referenced customers.

3. **Contract-**Contract details with MotoMart are viewable here.

7.Service Booking

A customer might know the precise services he wants for his vehicle. In that case he can go to the service dashboard and search for his preferred service to avail them. After selecting the service he will be navigated to the payment page.

If the customer is facing problems with his bike but doesn't exactly know what he should do or which services he should avail, he goes to the bookings option and books for a new service. If he chooses to book a new service he will be given a form called "Job Card". He will fill it up with a brief description of the problem he is facing with his bike. When the job card is filled and submitted CRE will see it and assign the service to a specific technician. A suitable technician is selected by the app based on skills attributes and is allocated the service at that specified service time. The customer will be able to see which technician will be working on his vehicle. If no technician is free the app will allocate a different time for the service. The customer will see that too. If the time isn't suitable he can cancel his service at that moment. But if it's ok then he moves to the payment page.

After the service is finished the customer can rate the technician.

8. Payment

To complete the payment process seamlessly, Customers are provided with clear and concise instructions guiding them through the necessary steps. They are offered two types of payment methods-Mobile Banking, Cash payment after service.

When a customer comes to the payment page after selecting services/offers/parts he is asked for a payment method. If he selects mobile banking he is directed to the SSLCommerz page. There he selects his preferable financial service like Bkash, Rocket or Nagad. After selecting a service he is asked for a phone number, then an OTP is sent to that number through SMS for verification. The customer has to input the OTP. If it matches then he is asked for the pin number. If the pin is correct he has to confirm payment. If he confirms then the payment is complete. Upon completion of payment, users receive immediate confirmation, along with a digital receipt via email and SMS.

The accountant updates the revenue against a service ID in case of ' Cash payment after service.'

System updates the revenue against a service ID in case of 'Mobile banking'

9. Settings

In the profiles users can set the theme of the app to dark/light. He can set the language to Bangla or English whichever he prefers. He can toggle

notifications on/off for the app.He gets all the notifications and can view them here.

Use Case Diagram of MMA

Level :0
Name: MotoMart App (MMA)
Primary Actor: Customer,Manager,CRE,HR,Store Manager,Accountant,Partner,Technician
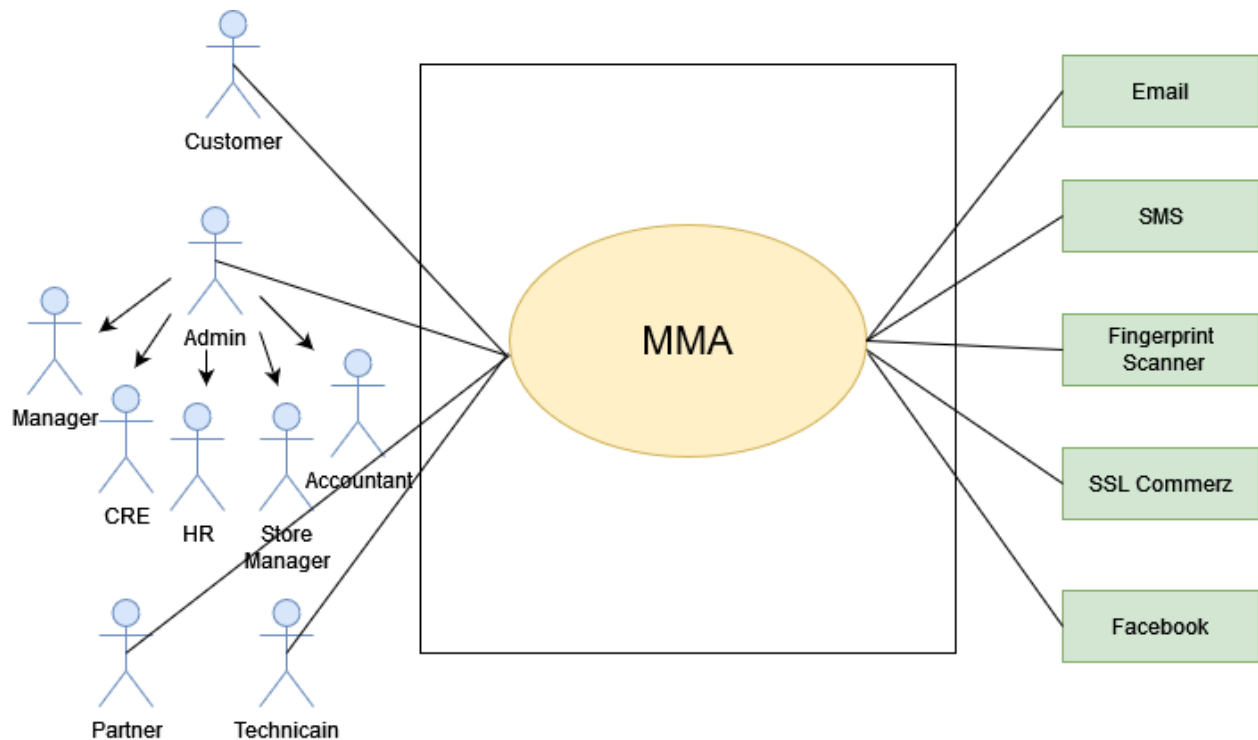**Secondary Actor:** Email,SMS,Fingerprint Scanner,SSL Commerz,Facebook

Fig 1: MotoMart App(MMA)

Level :1
Name: MotoMart App-Detailed
Primary Actor: Customer,Manager,CRE,HR,Store
Manager,Accountant,Partner,Technician
Secondary Actor: Email,SMS,Fingerprint Scanner,SSL
Commerz,Facebook
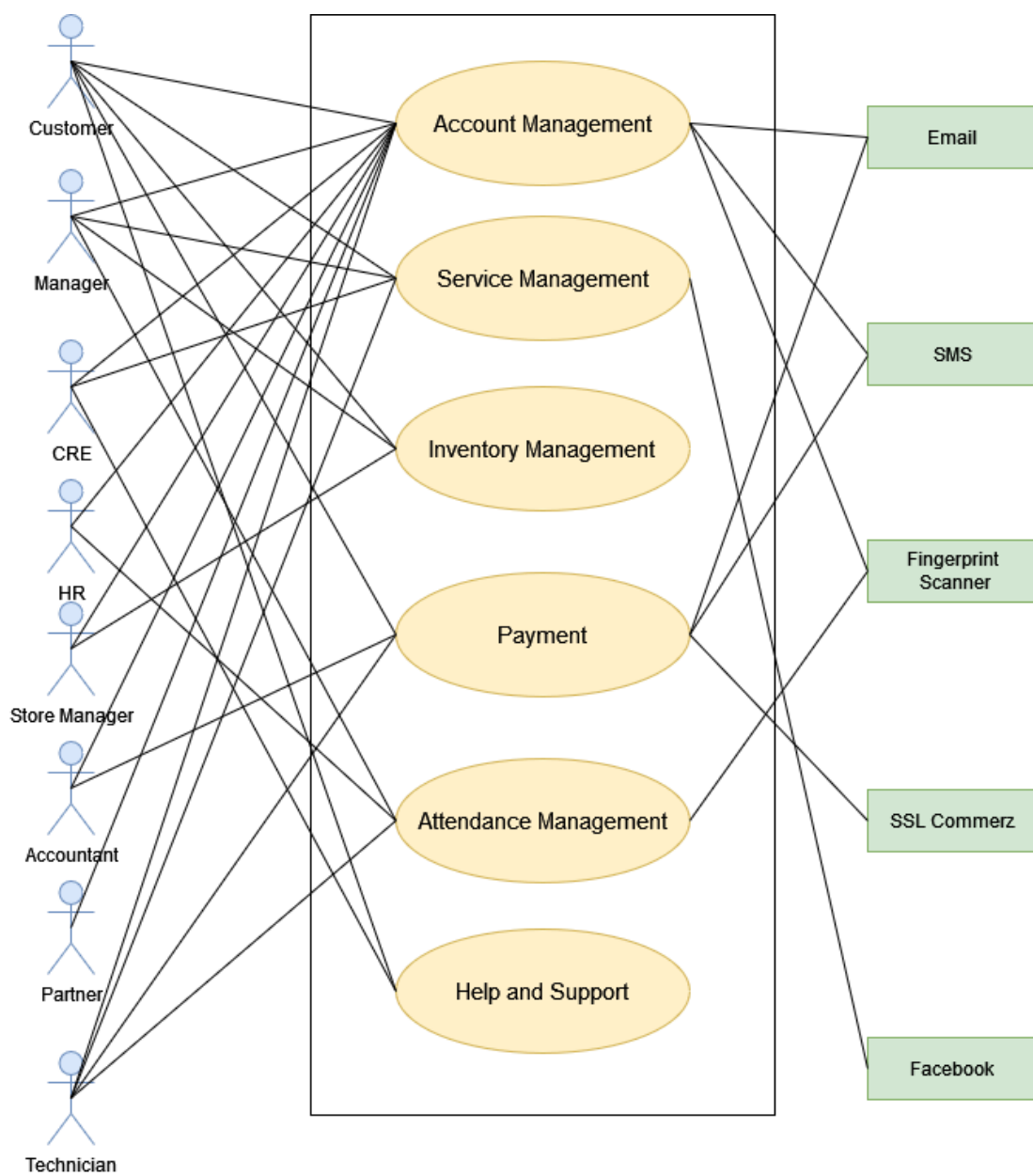
Fig 2: MotoMart App(Detailed)

Use case level 1 description

Account management:

The Manager primarily assumes the role of system administrator. Admin will have a predefined Id with whom he will perform the registration process and then he has to setup a password..After successful registration, HR,CRE,Accountant, Store manager along with the Manager can use this account.

HR will perform registration of technician accounts and the manager will perform registration of partner accounts.

Customer will perform registration using their credentials.(Name,email ID/phone_number and password).

All of the admins(HR,accountant,manager,CRE,Store manager) have to give the admin ID and password to login.After successful login, based on the roles, admin members have to give specific codes to enter their sections.

Customer,Technician and Partners have to login using their credentials(email ID/phone number and password) as well.

All of the users of Motomart app can update their profile information in the 'profile' section.
User can set the app theme to dark/ light , he can change the language to bangla or english, he will get notifications and will be able to view them, additionally he can toggle notification on/off.

Customers can add their bikes using their bike's description(bike brand, bike model, chassis number, engine number, bike registration number.) He can also add info like engine capacity and mileage.He can customize his bike in the 'studio'.

Partners can add bikes that they have referred to MotoMart.

Service management:

The Manager will add new services at times , provide new offers and packages on different services . He can update these offers, services and packages. The app is integrated with MotoMart's FaceBook page.So when new offers are created the manager can post those offers to their Facebook page directly through this app. The services, offers and packages that are saved will be shown to the customers through this app.

The customer selects his desired service and adds it to a cart or fills out a job card.Upon confirmation of the services in the cart,he proceeds for payment..Accountant can update the revenue if the customer pays offline. After successful payment, a technician is allocated.

If the customer's engine number matches with any bike's engine number that was referred by a Partner then that customer will get an additional feature called flash card. Flash card introduces a variety of offers with discounts and some free services that are applicable only for referenced customers.

Customer can track his ongoing service progresses .Upon completion of a service, he can rate the technician upon his satisfaction.

Manager and CRE can view all the ongoing services and Pending service requests(service or Job CARD).CRE will refer appropriate services to the customer by understanding the job card. If it is unclear to the CRE, he will be able to call and message the customer. Technician can also chat with the customer while doing his service.

Customer can view all of his service history .Manager and CRE can also view their customer's previous service history.

Inventory Management:

Store Manager will be able to add Parts & items to inventory with item name, price , description, quantity and pictures.He can also update their pricing and other information.

Customer can select parts and items to cart and proceed to payment.

Payment:

To complete the payment process seamlessly, customers are provided with clear and concise instructions guiding them through the necessary steps. They are offered two types of payment methods-Mobile Banking, Cash payment after service.

Attendance Management:

A Fingerprint scanner is used to track the attendance of technicians .When a technician enters the shop his entry attendance is recorded, and when he departs, his exit attendance is recorded, thus his working hours are saved per date .The HR and the Manager can access the attendance records. Attendance records are organized by date for easy viewing.HR or Manager can filter attendance history by technician or date range.HR or Manager can analyze working hours of technicians based on the attendance records.

Help & Support:

customer can interact with an AI chatbot. Customers can make a phone call directly to the CRE during business hours through this section.

Level :1.1

Name: Account Management

Primary Actor: Customer,Manager,CRE,HR,Store Manager,Accountant,Partner,Technician
Secondary Actor: Email,SMS,Fingerprint Scanner
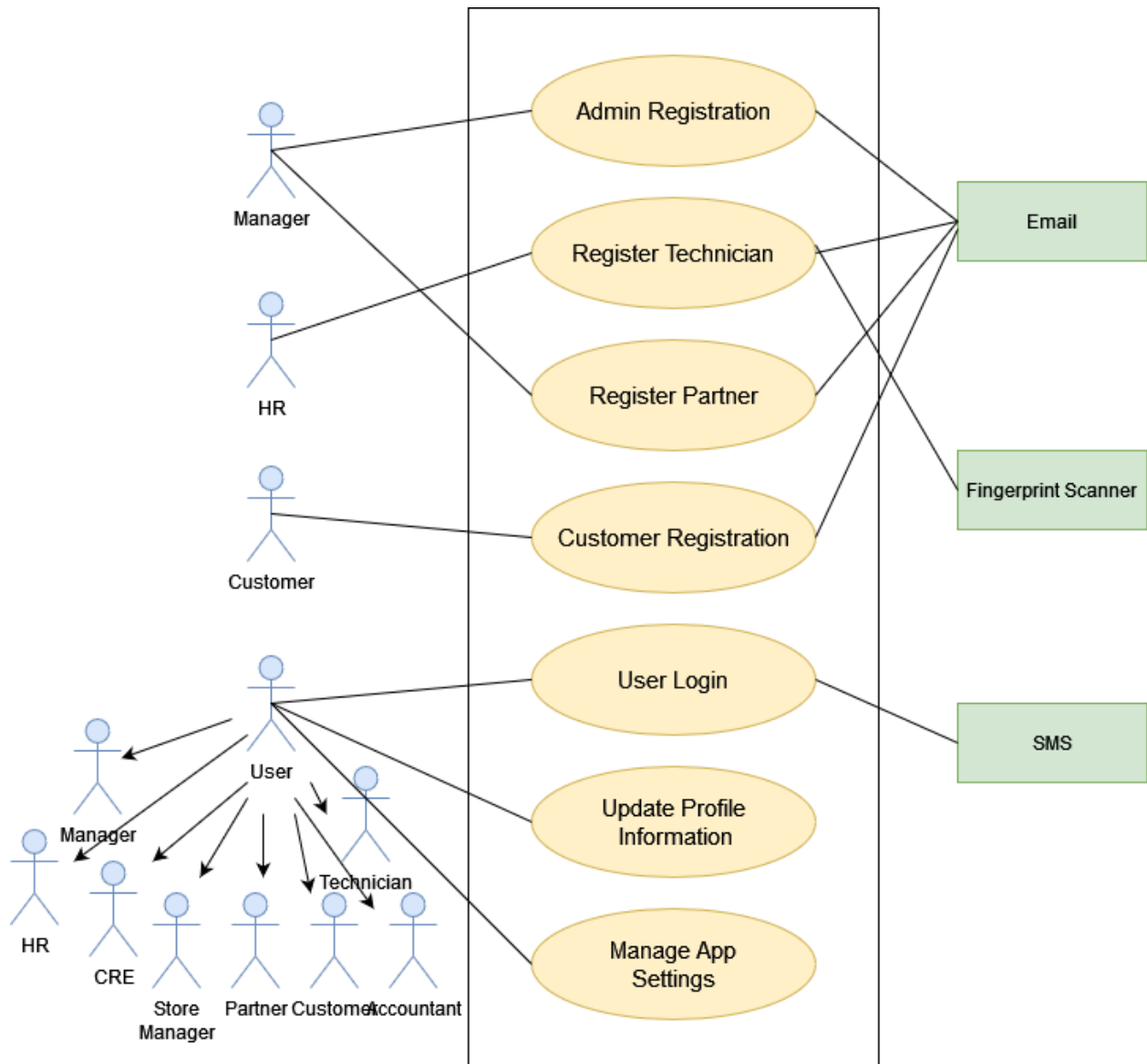
Fig 3: Account Management

Action & reply:

Action: Manager gives admin ID and sets up password.

Reply: System registers the admin and redirects him to admin homepage.

Action: Manager gives partner credentials and sets up a primary password.

Reply: System registers partner and sends an email to the partner saying "partner account X has been created successfully".

Action:HR gives technician credentials and sets up a primary password.

Reply: System registers technicians successfully.

Action: Customer gives his credentials and sets up a password.

Reply: System creates customer account and redirects him to his homepage.

Level :1.1.5

Name: User Login
Primary Actor: Customer,Manager,CRE,HR,Store
Manager,Accountant,Partner,Technician
Secondary Actor:SMS
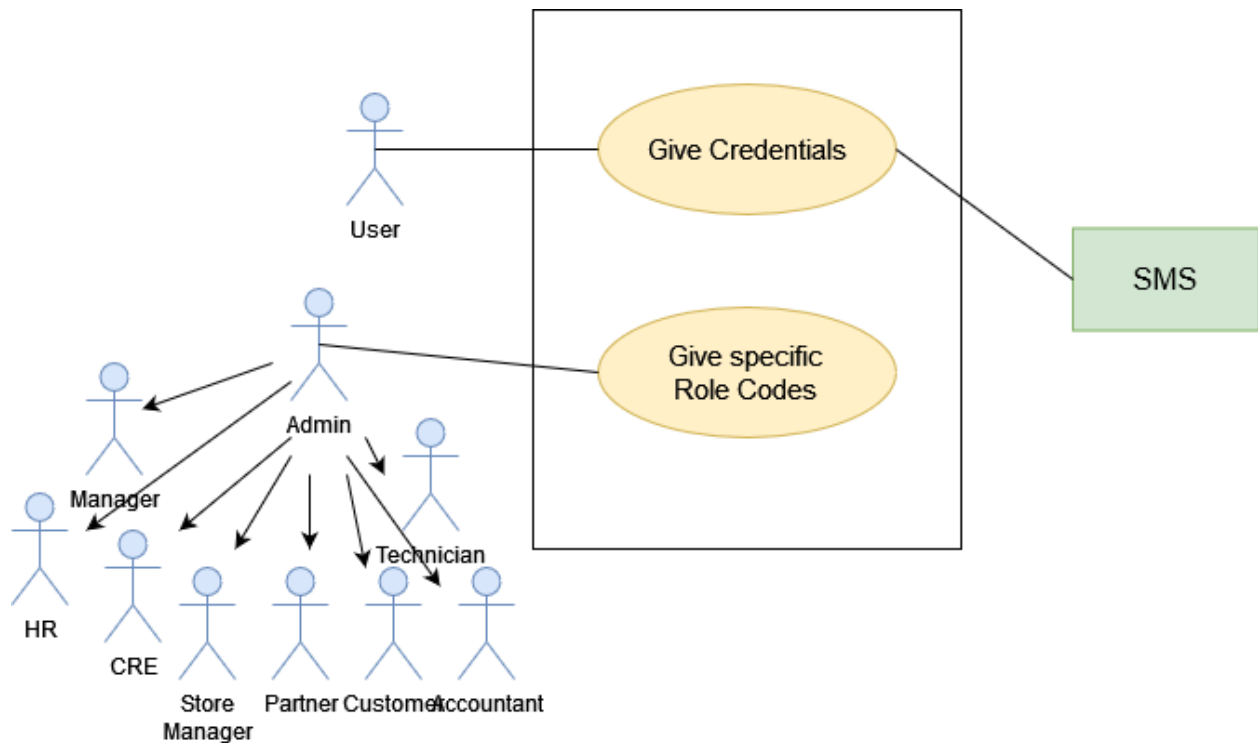
Fig 4: User Login

Action & reply:

Action: User gives credentials.
Reply: If matched, System logs him in.In case of 'forgot password', system sends otp to his phone number and asks to give the otp.If matched correctly, system logs him in.

Action: An admin member selects his role (manager/HR/CRE/store manager/Accountant).
Reply: System asks him to give specific role code.
Action: He provides the role code.
Reply: System logs him in his admin section.

Level :1.1.6

Name: Update Profile Information
Primary Actor: Customer,Manager,CRE,HR,Store
Manager,Accountant,Partner,Technician
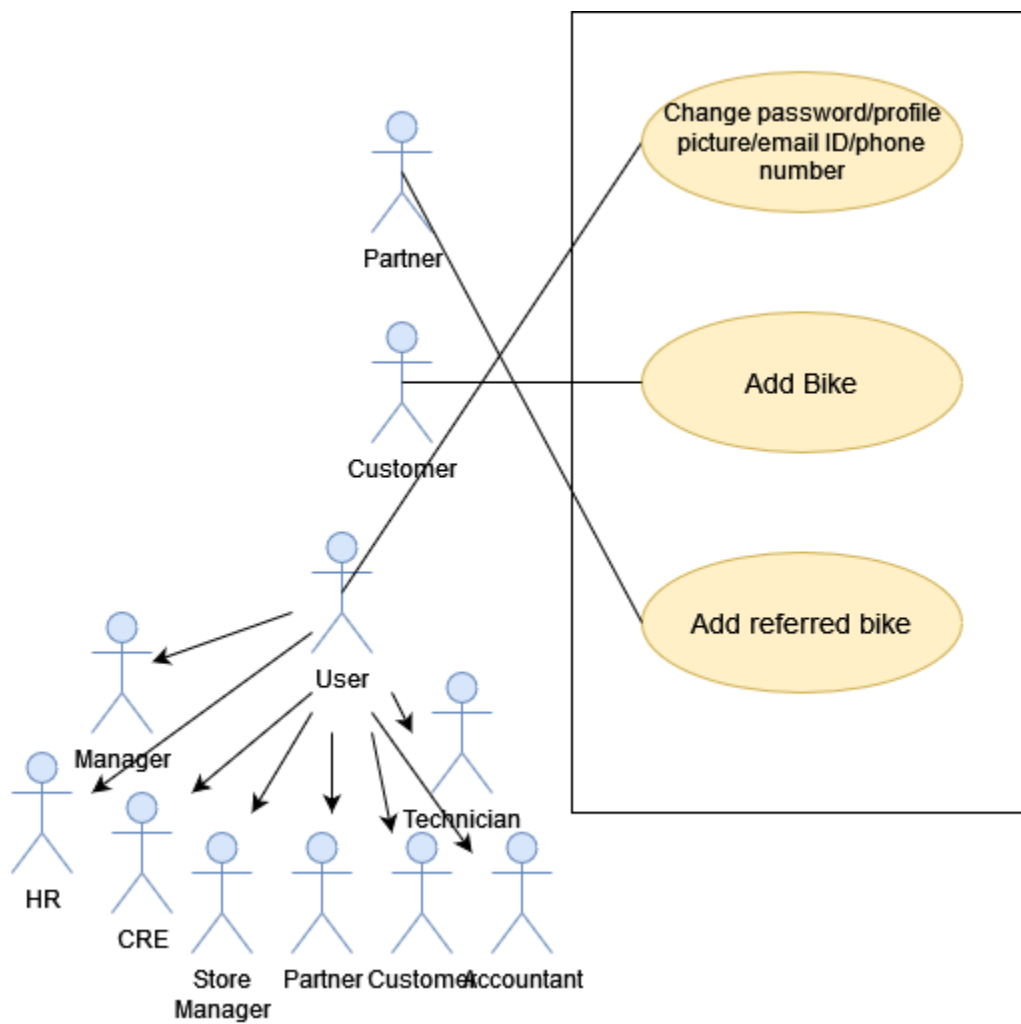
Fig 5: User Profile Information

Action & reply:

Action: User attempts to change his phone_number/email ID/password/profile picture.
Reply: System saves these changes.

Action: Customer selects add bike and provides his bike information like bike model, engine number, registration number, mileage.
Reply: System saves this information and shows "Bike added".

Action:A partner selects 'add bike' and provides bike model,name and engine number.
Reply: System saves this information.

Level :1.1.7

Name: Manage App Settings
Primary Actor: Customer,Manager,CRE,HR,Store Manager,Accountant,Partner,Technician
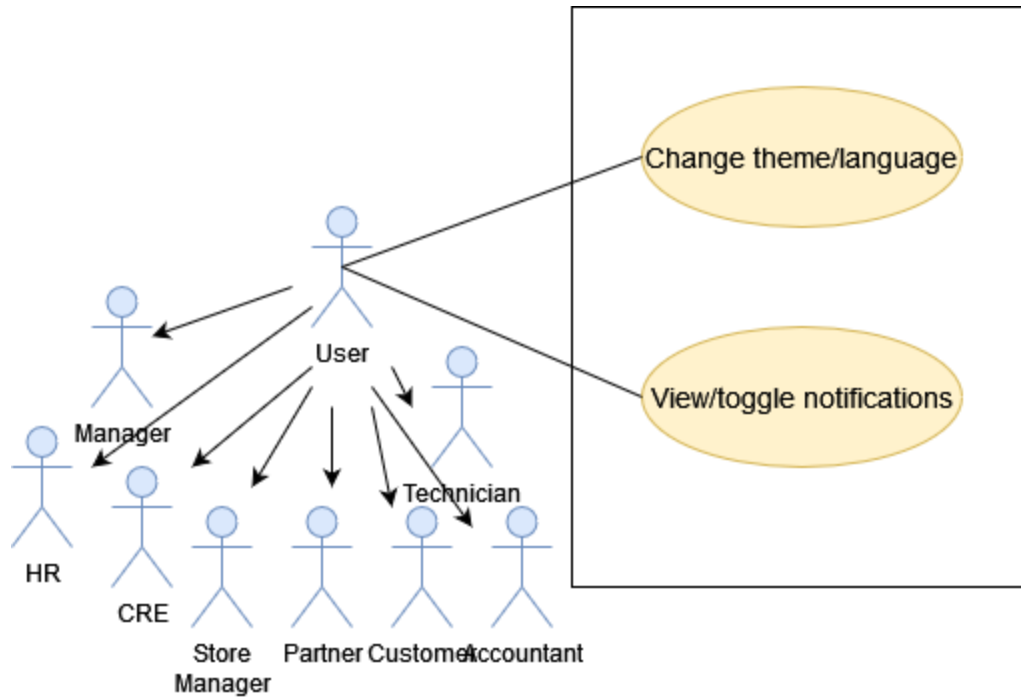
Fig 6: Manage App Settings

Level :1.2

Name: Service Management
Primary Actor: Customer,Manager,CRE,Technician
Secondary Actor: Facebook,Accountant,SSL Commerz
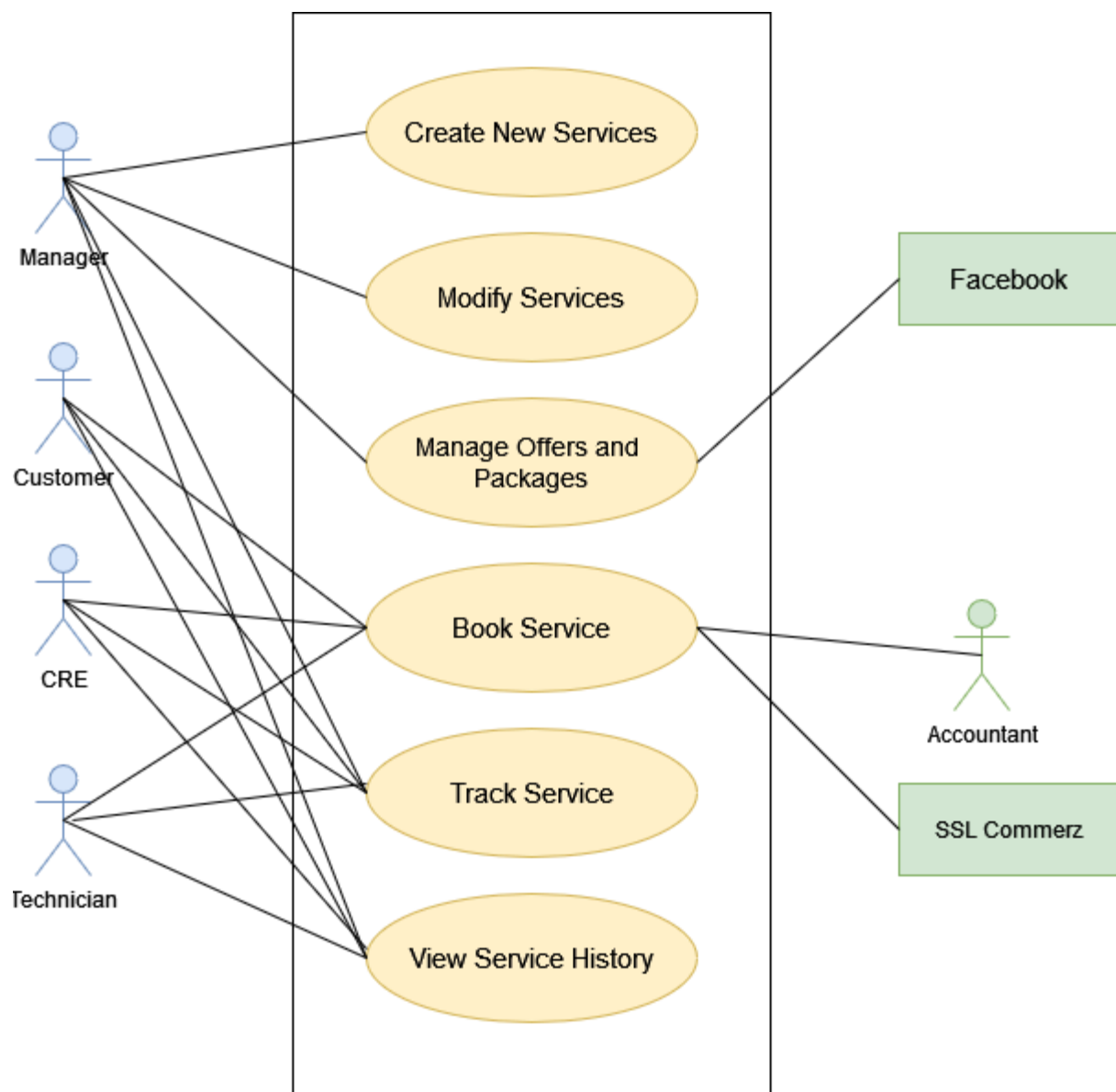
Fig 7: Service Management

Action & reply:

Action: Manager selects 'create new service' and adds a service specifying details such as service name, description, and price.
Reply: System saves the new service, making it available for customers to book.
Action: Manager selects the service to modify and changes details such as name, description, or price.
Reply: System saves the changes.

Level :1.2.3

Name: Manage Offers and Packages
Primary Actor: Manager
Secondary Actor: Facebook
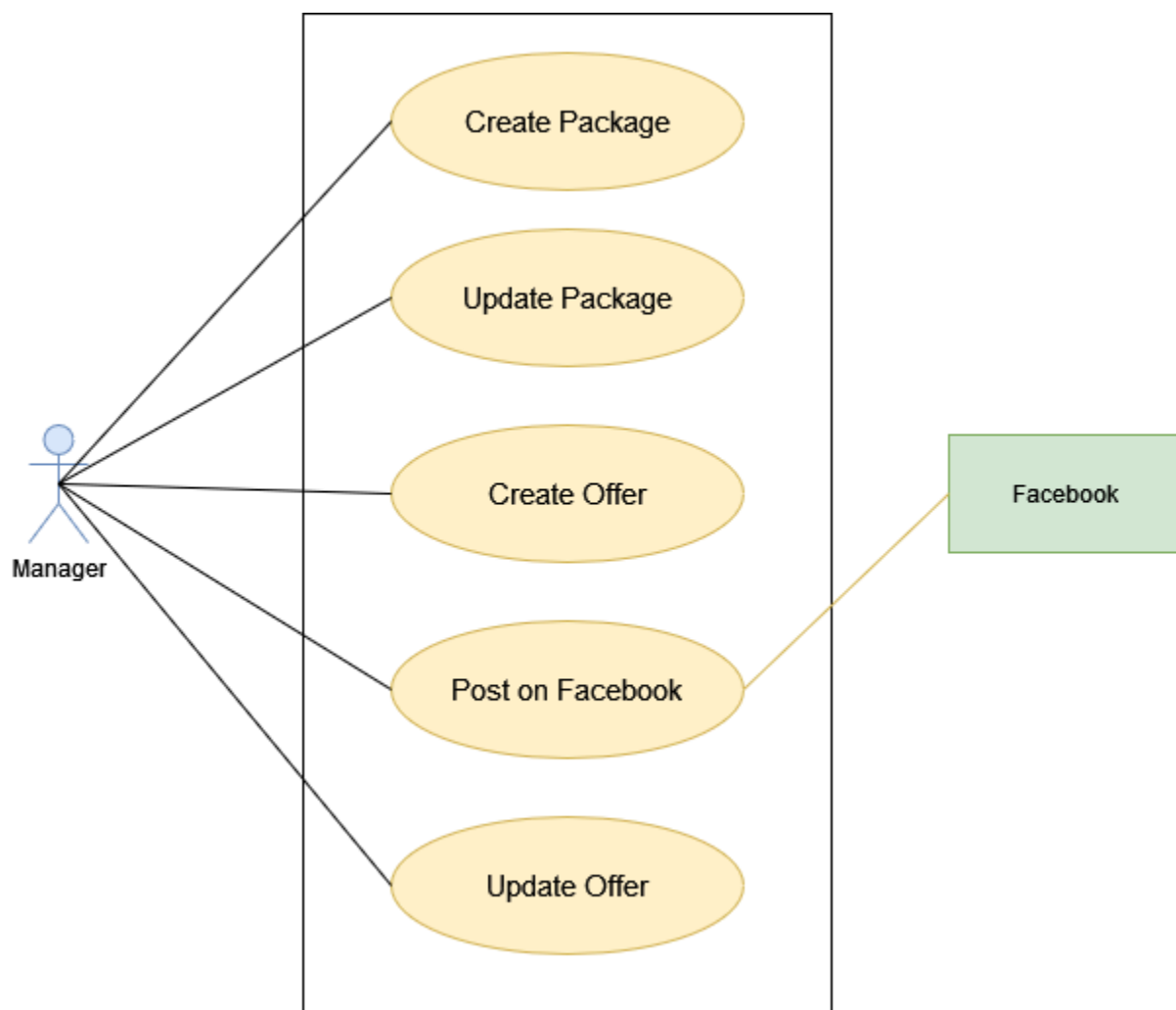
Fig 8: Manage Offers and Packages

Action & reply:

Action: Manager creates new offers or packages, specifying details such as discount rates and service inclusions.
Reply: System saves these, making it available for customers to book.
Action: Manager clicks 'post to facebook'.
Reply: System posts the new offer or modified offer to motomart's facebook page.

Level :1.2.4

Name: Book Service
Primary Actor: Customer,CRE
Secondary Actor: Technician,Accountant
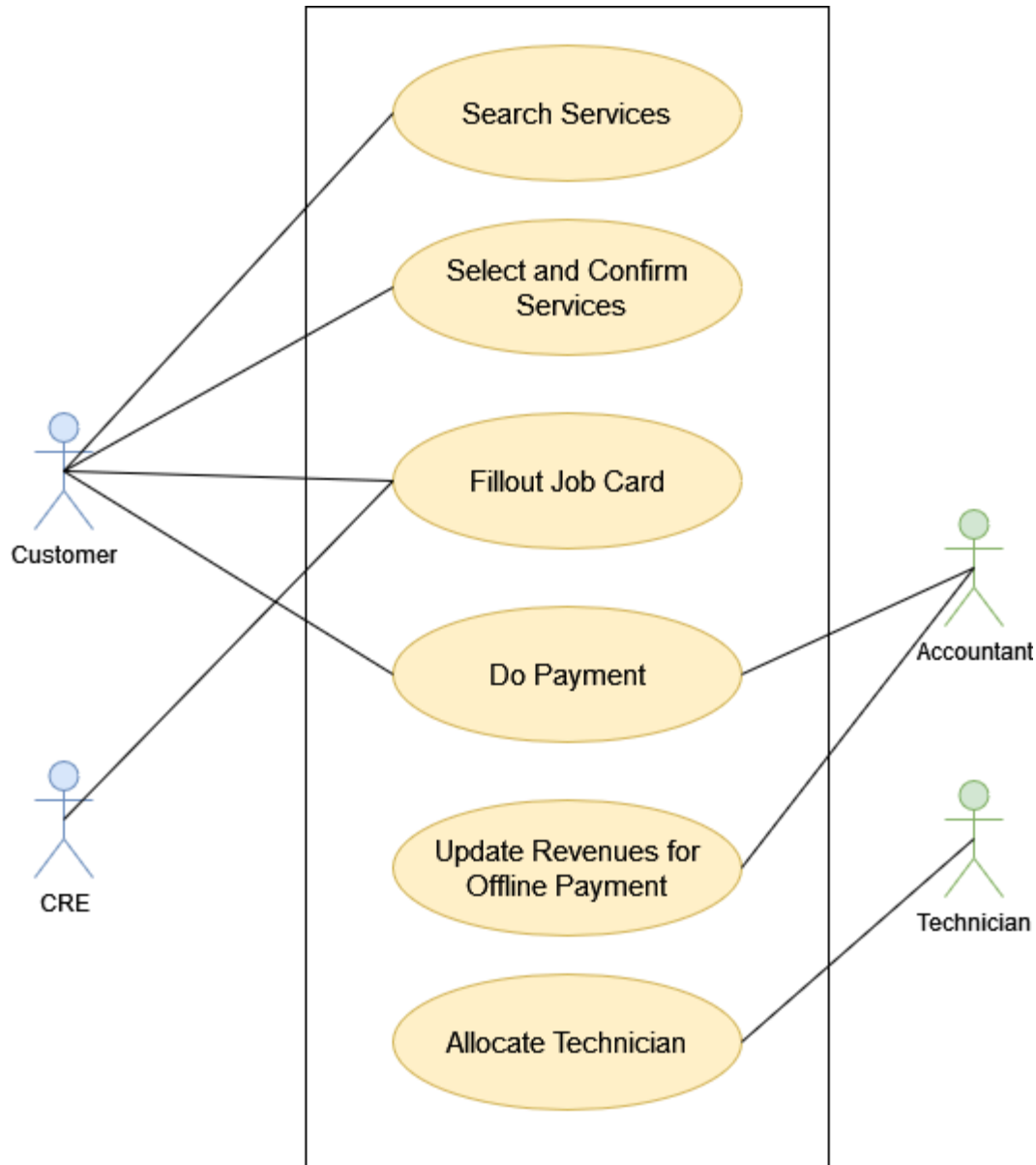
Fig 9:Book Service

Action & reply:

Action: Customer selects services that he wants and adds it to cart.
Reply: System adds the services to the cart.
Action: Customer selects his cart, views all his selected services and selects 'confirm'

Reply: System navigates him to the payment section, after successful payment, System allocates technician to do his services.

Action: Customer selects 'job card' and fills it out and clicks 'done' .

Reply: System sends the job card to CRE.

Action: CRE recommends services on the job card.

Reply: System shows the recommended services on the job card to the customer.

Action:Accountant enters revenue if customer pays offline.

Reply: System updates the revenue and shows "payment successful" on the customer's interface.

Level :1.2.5

Name: Track Service
Primary Actor: Customer,Manager,CRE,Technician
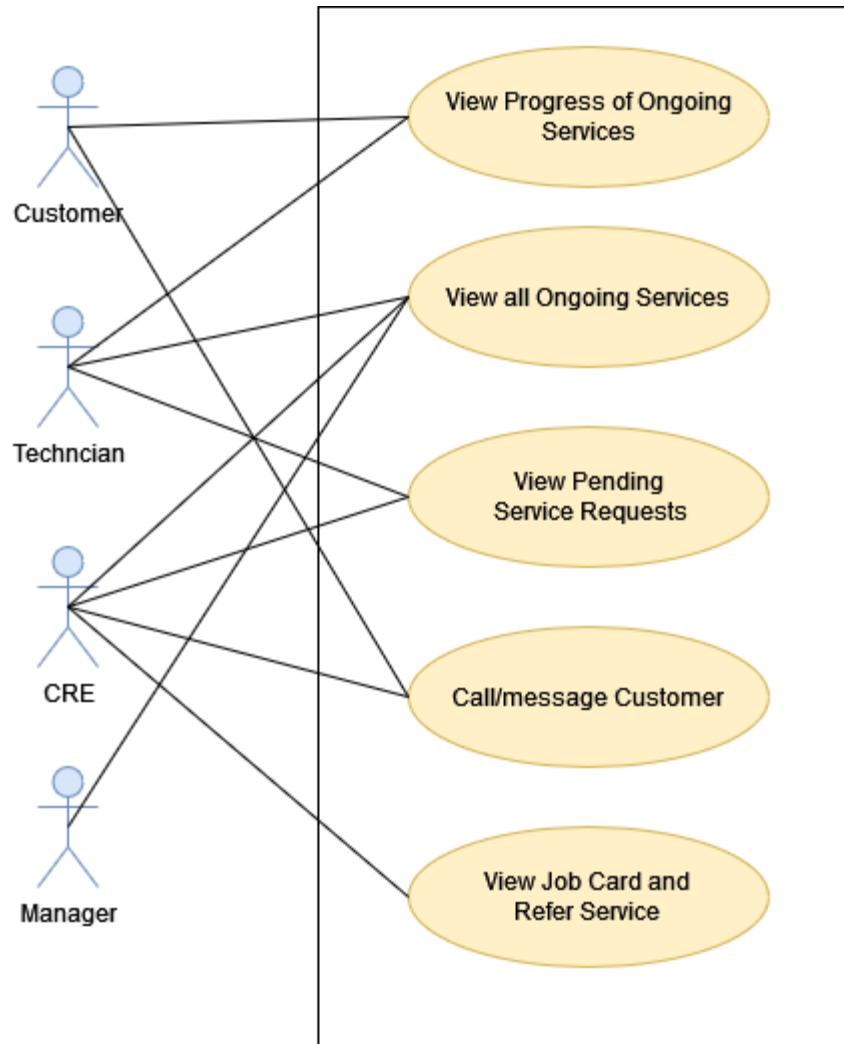
Fig 10: Track Service

Action & reply:

Action:CRE or Manager selects 'View all ongoing services'.
Reply: System shows all the services and their details that are currently being worked on by the technicians.

Action:CRE selects call/message customer.

Reply: System navigates him to a page where he can call/message customer.

Action:CRE or technician selects 'view pending service requests'.
Reply: System shows the CRE all the services that are confirmed by the customer but have not been allocated yet by the system. On the other hand, the system shows the technician all the services that are assigned to him by the system.

Action: CRE selects 'view job card'
Reply: System shows all the job cards .
Action: CRE refers services.
Reply: System shows the referred services on the customer's fill job card section.

Level :1.2.5.1
Name: View Progress of Ongoing Service
Primary Actor: Customer,Technician
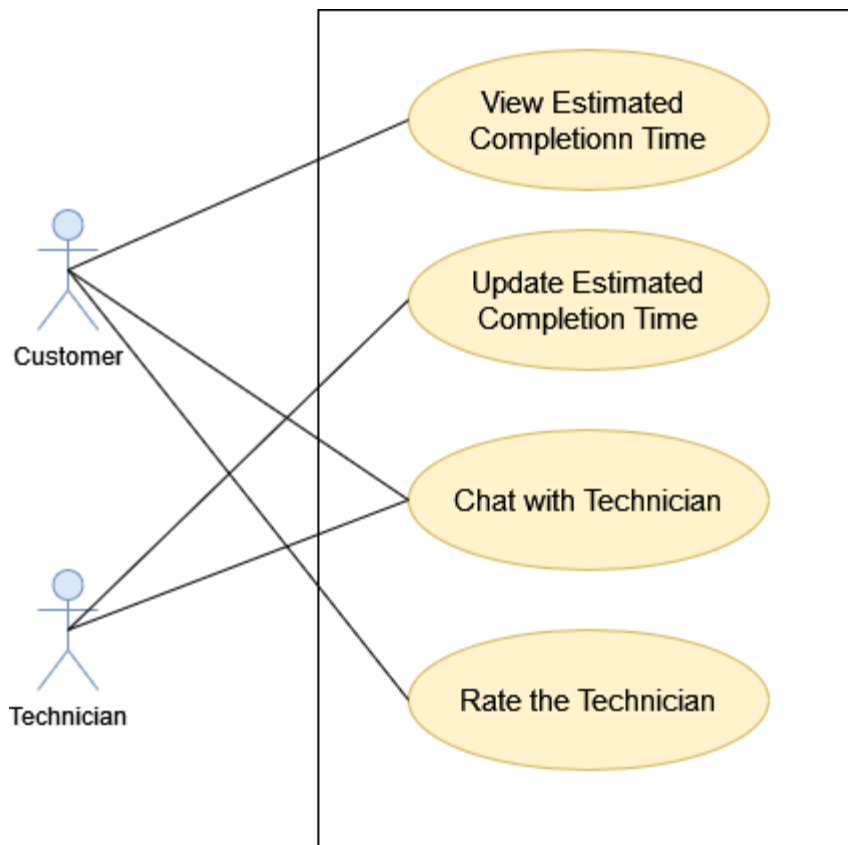
Fig 11: Track Service

Level :1.3

Name: Inventory Management
Primary Actor: Customer,Store Manager
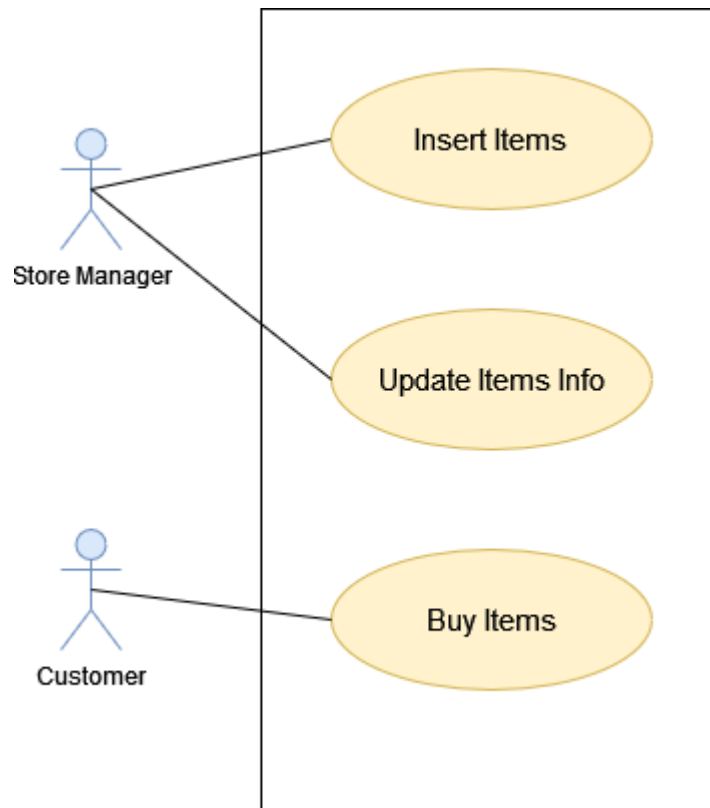
Fig 12: Inventory Management

Action & reply:

Action:Store Manager accesses the inventory management section and adds new items to the inventory, providing details such as name, price, quantity, and description.He can also modify the item details.
Reply: System saves the new items, making them available for purchase.

Action: Customer selects parts or items and adds them to his cart.He confirms the items on his cart.
Reply: Upon confirmation, System navigates him to payment.

Level :1.4

Name: Payment
Primary Actor: Customer
Secondary Actor: SSL Commerz,SMS,Accountant.
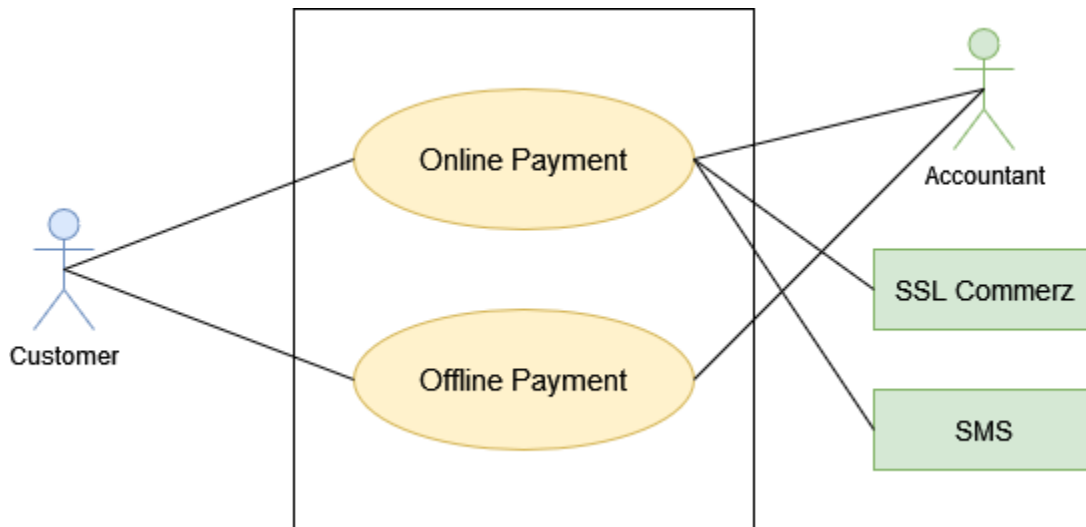
Fig 13: Payment

Action & reply:

Action:Customer selects the online payment method.
Reply: System redirects customer to SSLCommerz page.
Action:Customer chooses preferred financial service (e.g., Bkash, Rocket, Nagad).
Action: Customer provides phone number and verifies OTP received via SMS.
Action: Customer enters PIN number and confirms payment.
Reply: Upon confirmation, payment is completed, and customer receives immediate confirmation.

Action: Customer pays offline after service completion.
Action: Accountant records payment manually in the system.
Reply: Customer receives confirmation.

Level :1.5

Name: Attendance Management
Primary Actor: Technician
Secondary Actor: Fingerprint Scanner,HR
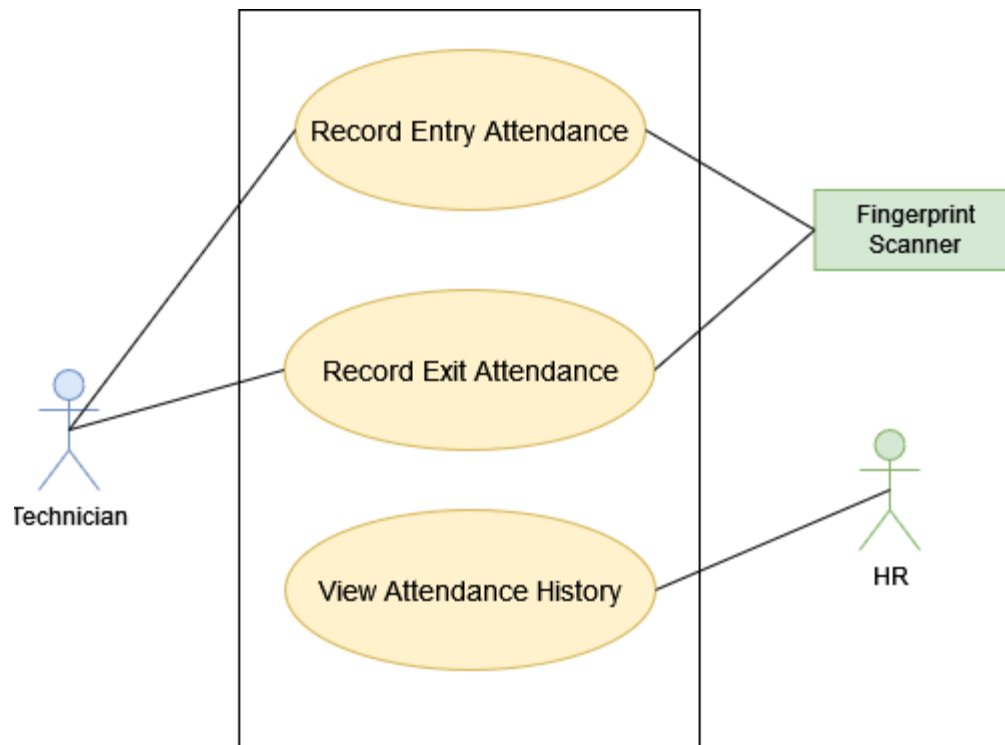
Fig 14: Attendance Management

Action & reply:

Action: Technician approaches the biometric fingerprint scanner in the motomart's entry and provides his fingerprint,
Reply: System records his entry attendance.
Action: While leaving, Technician again provides his fingerprint in the scanner.
Reply: System records his exit attendance.
Action: HR accesses the attendance history section.
Reply: System shows him all the technician's attendance.

Level :1.6

Name: Help and Support
Primary Actor: Customer
Secondary Actor: CRE
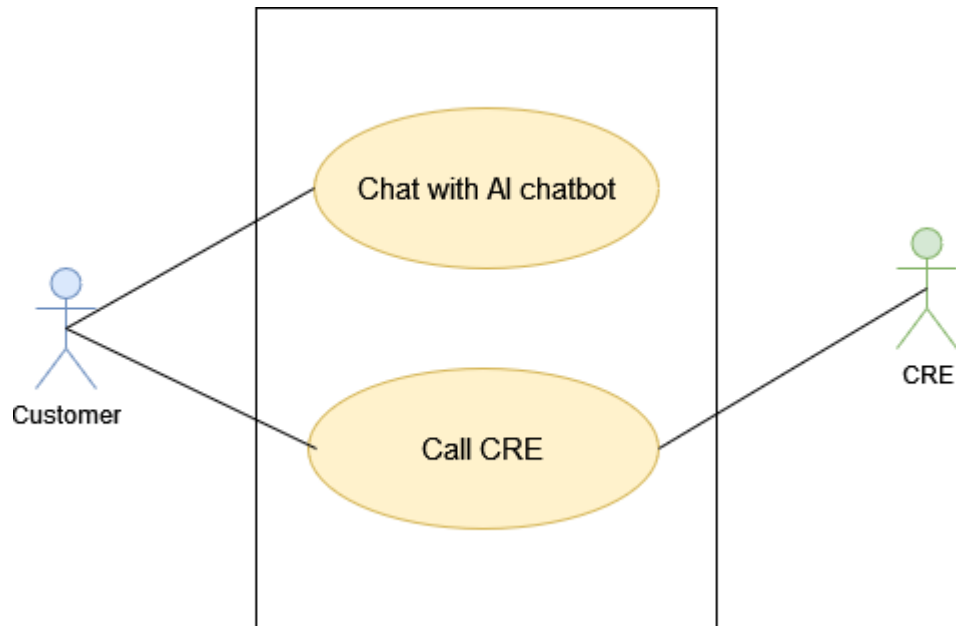
Fig 15: Help and Support

Action & reply:

Action: Customer selects 'Chat with AI chatbot' .
Reply: System navigates him to a page where he can chat with an AI that can answer his queries.
Action: Customer selects 'Call CRE'.
Reply: System calls and calls CRE so that customers can communicate with him regarding any issue.

Activity Diagram of MMA

Level :1
Name: MotoMart App-Detailed
Reference: Use Case Diagram level - 1
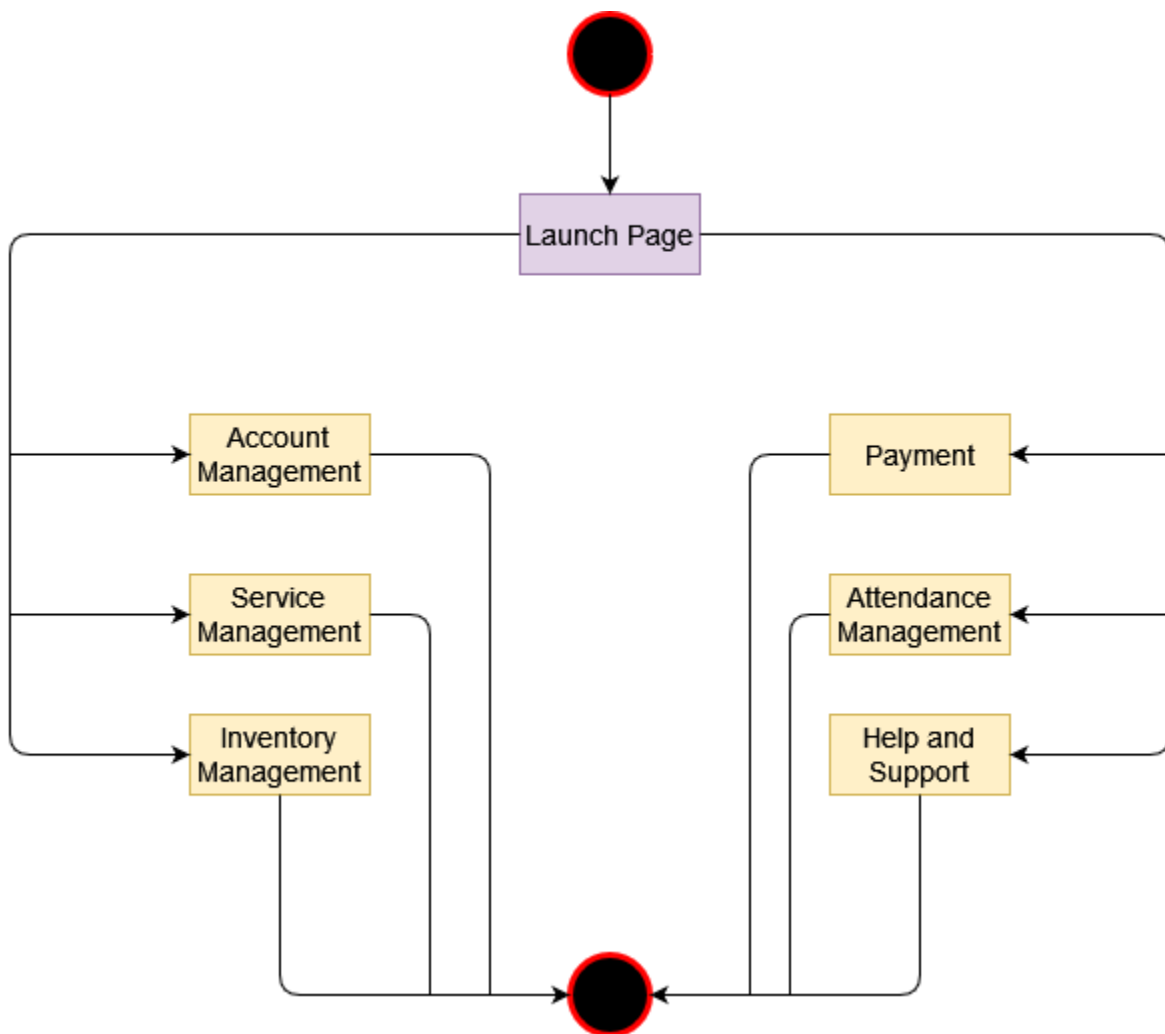
Fig 16: MMA (Use Case - 1)

Level :1.1

Name: Account Management
Reference: Use Case Diagram level - 1.1
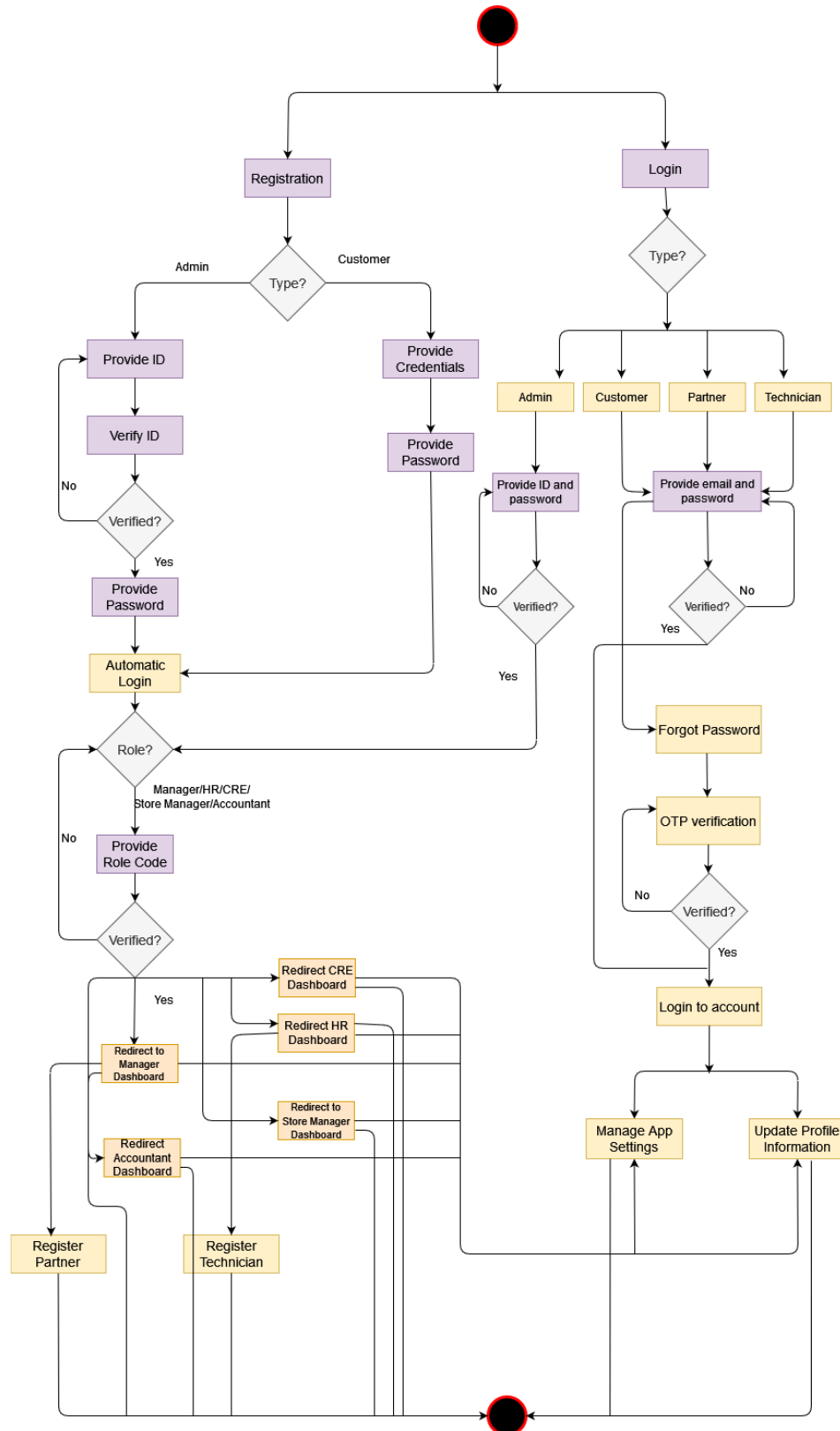
Fig 17: Account Management (Use Case - 1.1)

Level :1.2

Name: Service Management
Reference: Use Case Diagram level - 1.2
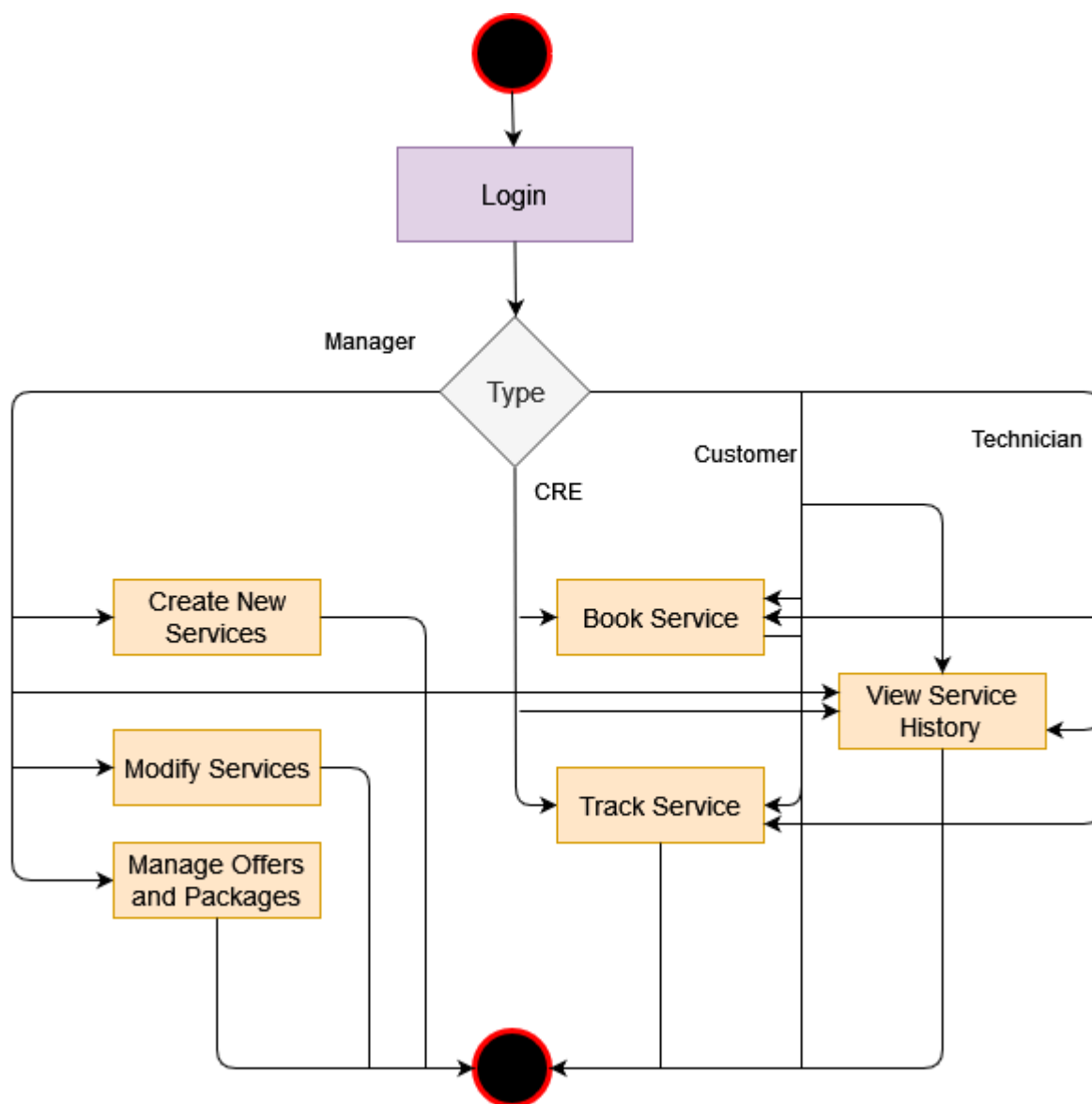
Fig 18: Service Management (Use Case - 1.2)

Level :1.2.4

Name: Book Service
Reference: Use Case Diagram level - 1.2.4
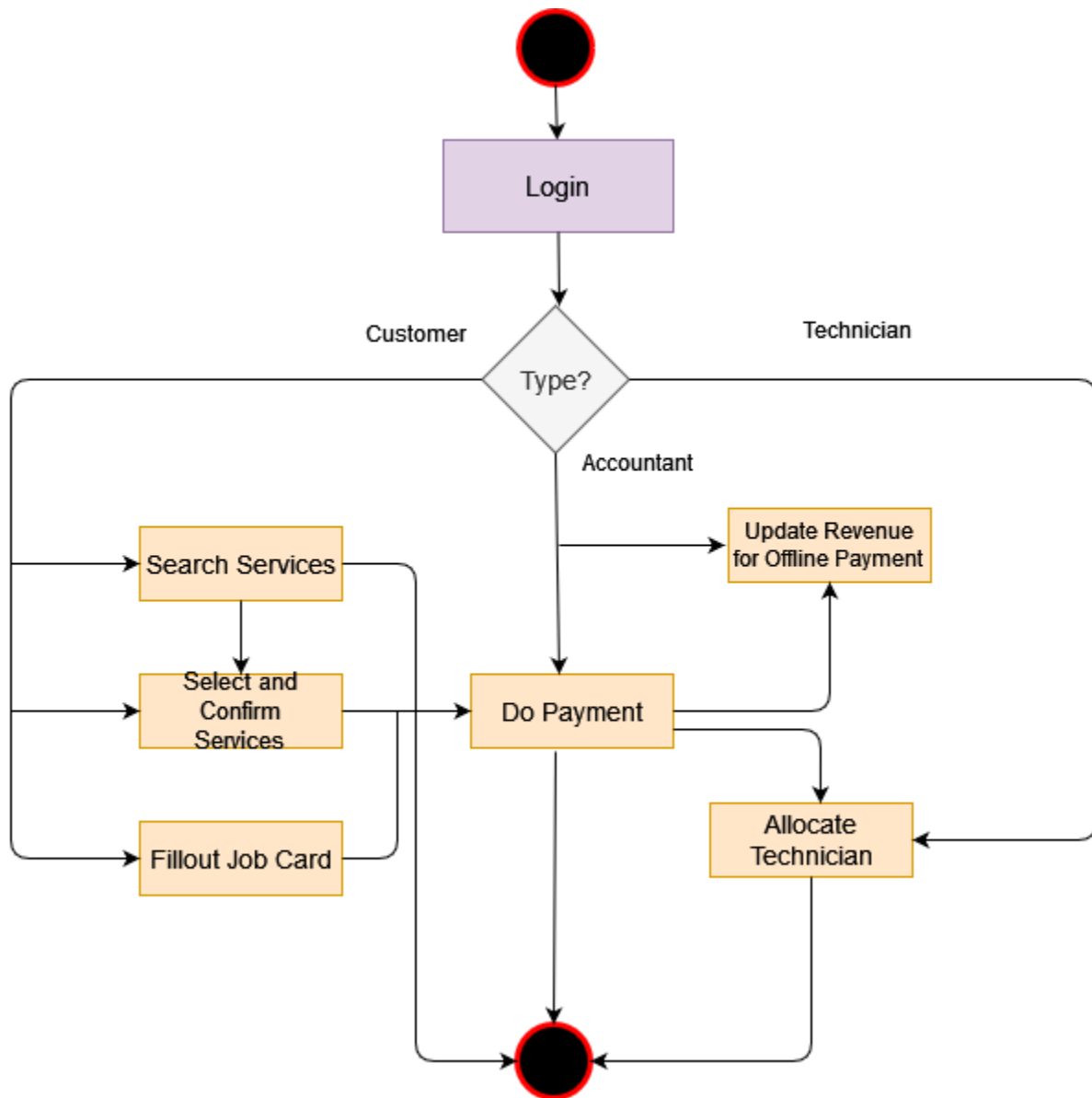
Fig 19: Book Service (Use Case - 1.2.4)

Level :1.2.5
Name: Track Service
Reference: Use Case Diagram level - 1.2.5
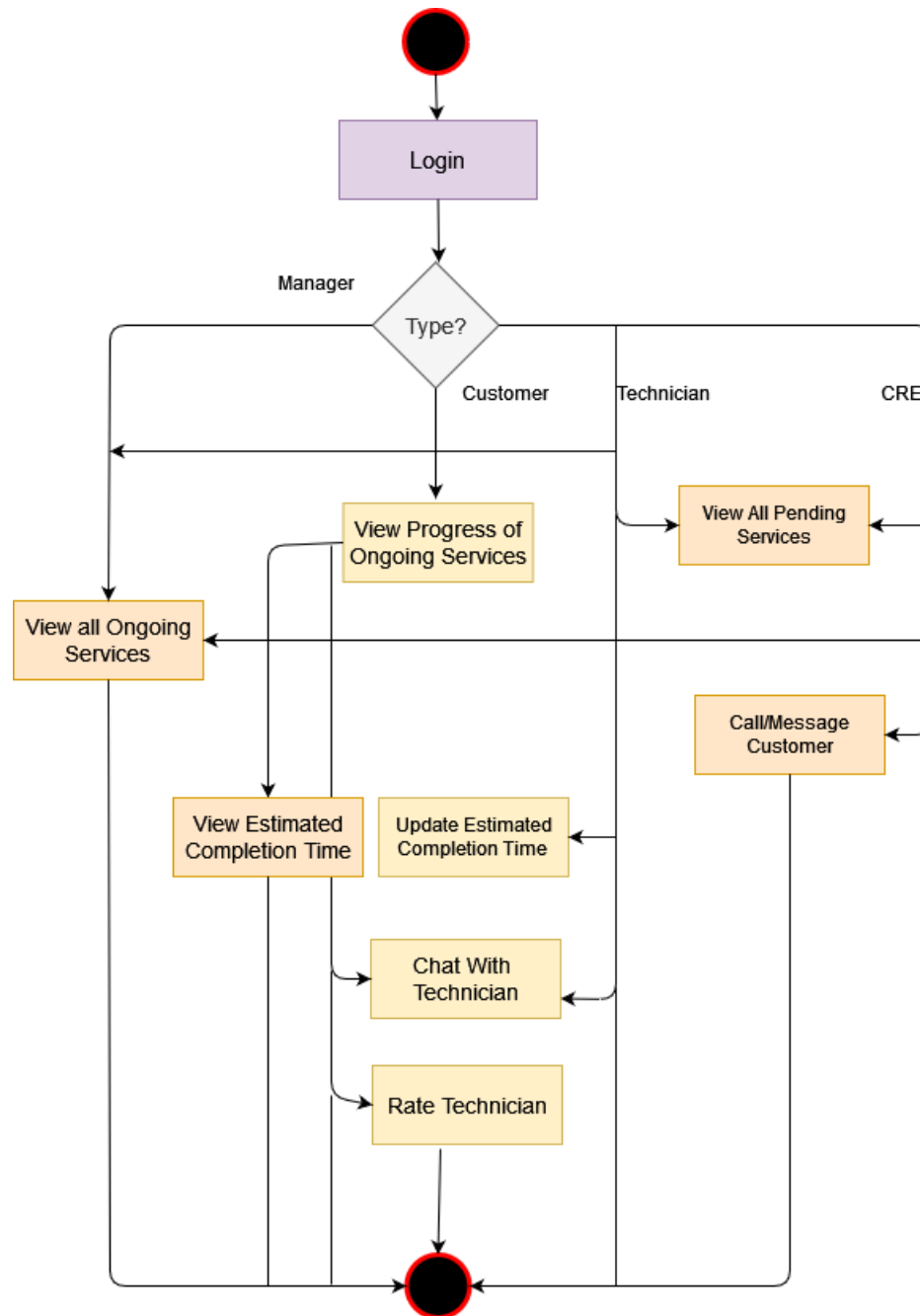
Fig 20: Track Service (Use Case - 1.2.5)

Level :1.4

Name: Payment
Reference: Use Case Diagram level - 1.4
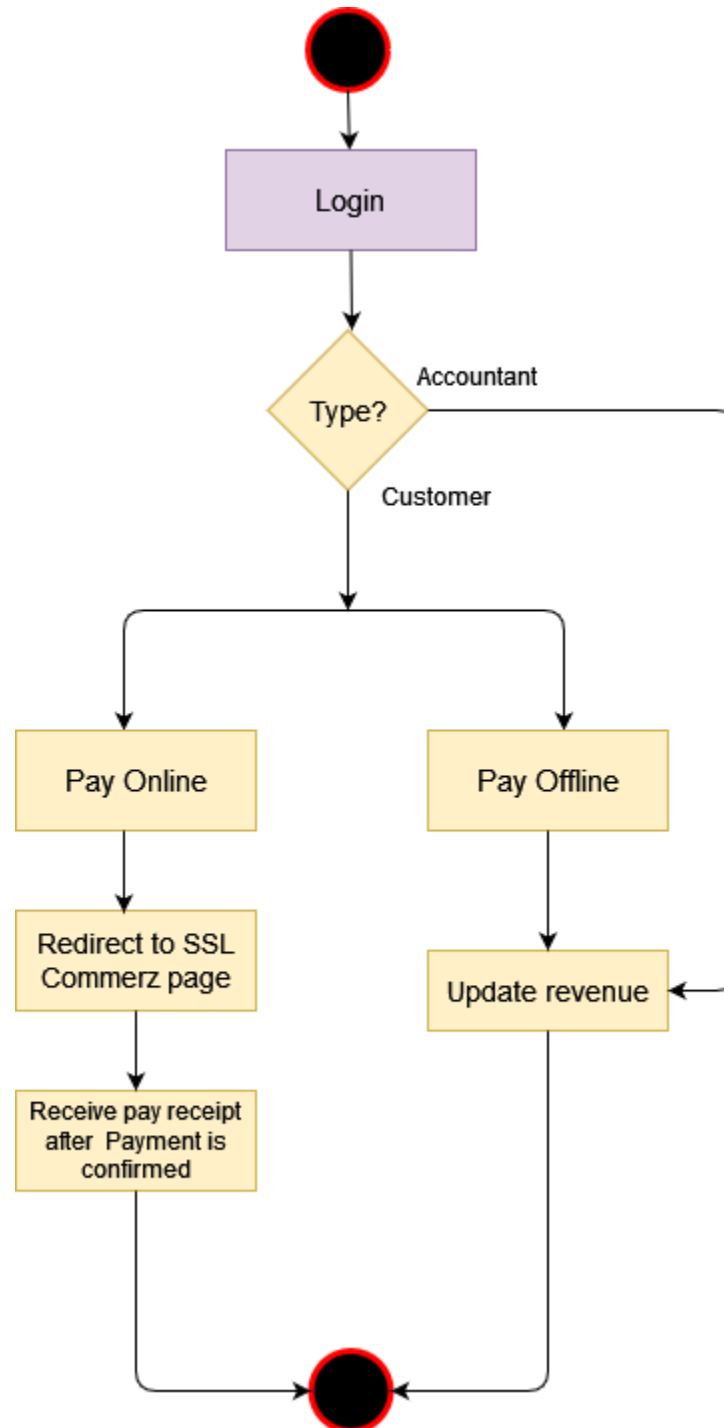
Fig 21: Payment (Use Case - 1.4)

Level :1.5

Name: Attendance Management
Reference: Use Case Diagram level - 1.5
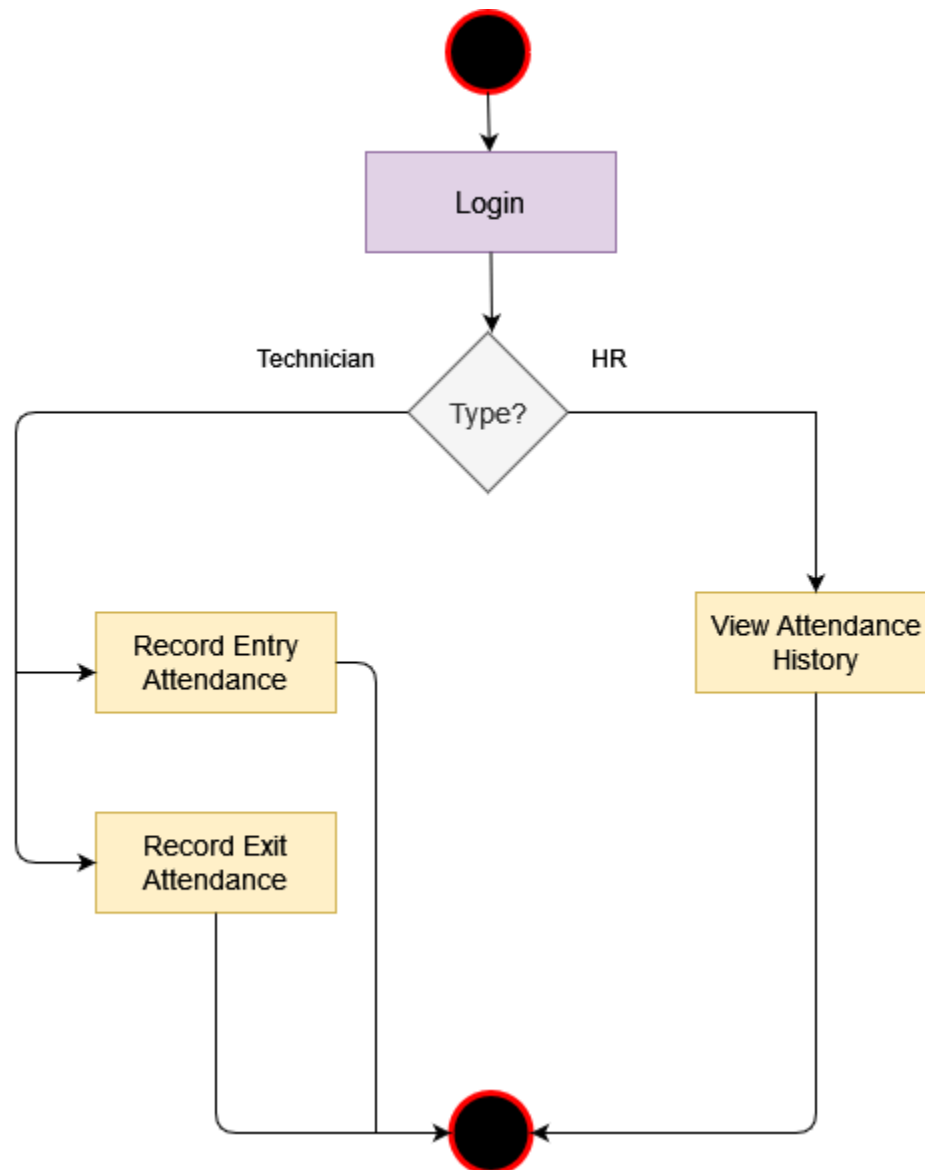
Fig 22: Attendance Management (Use Case - 1.5)

Level :1.6

Name: Help and Support
Reference: Use Case Diagram level - 1.6
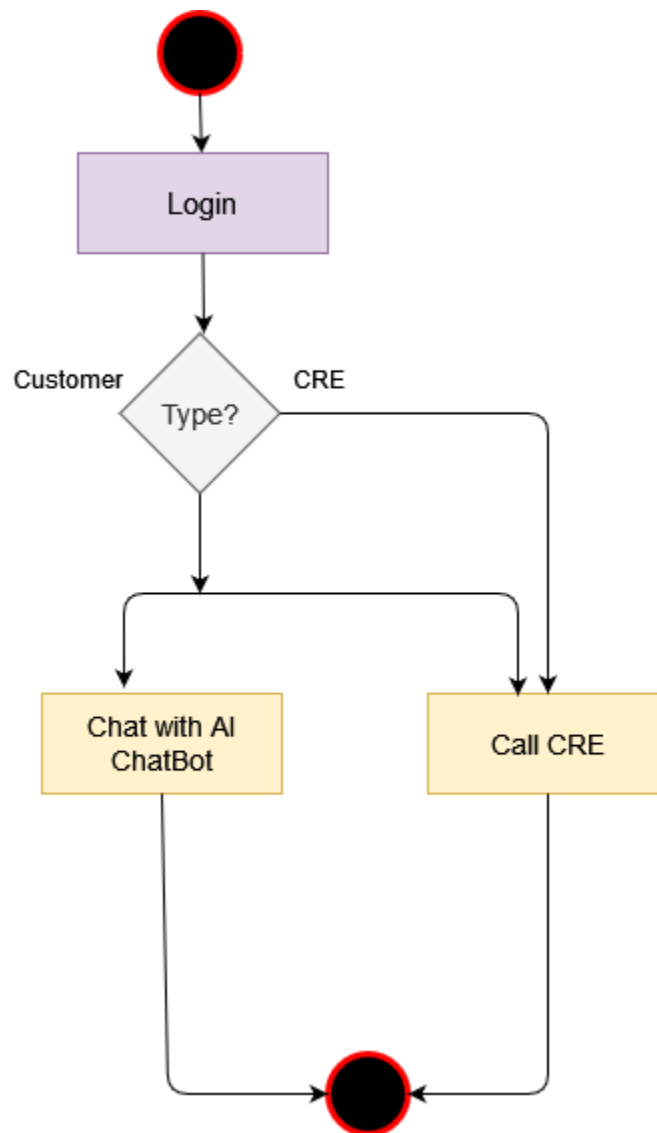
Fig 23: Help and Support (Use Case - 1.6)

Swimlane Diagram of MMA

Definition :

A swimlane diagram is a type of flowchart that delineates who does what in a process. Using the metaphor of lanes in a pool, a swimlane diagram provides clarity and accountability by placing process steps within the horizontal or vertical "swimlanes" of a particular employee, workgroup, or department. It shows connections, communication and handoffs between these lanes, and it can serve to highlight waste, redundancy and inefficiency in a process.

SID(Swimlane ID) : 1

Name: MMA

Reference: Use Case and Activity Diagram level - 1
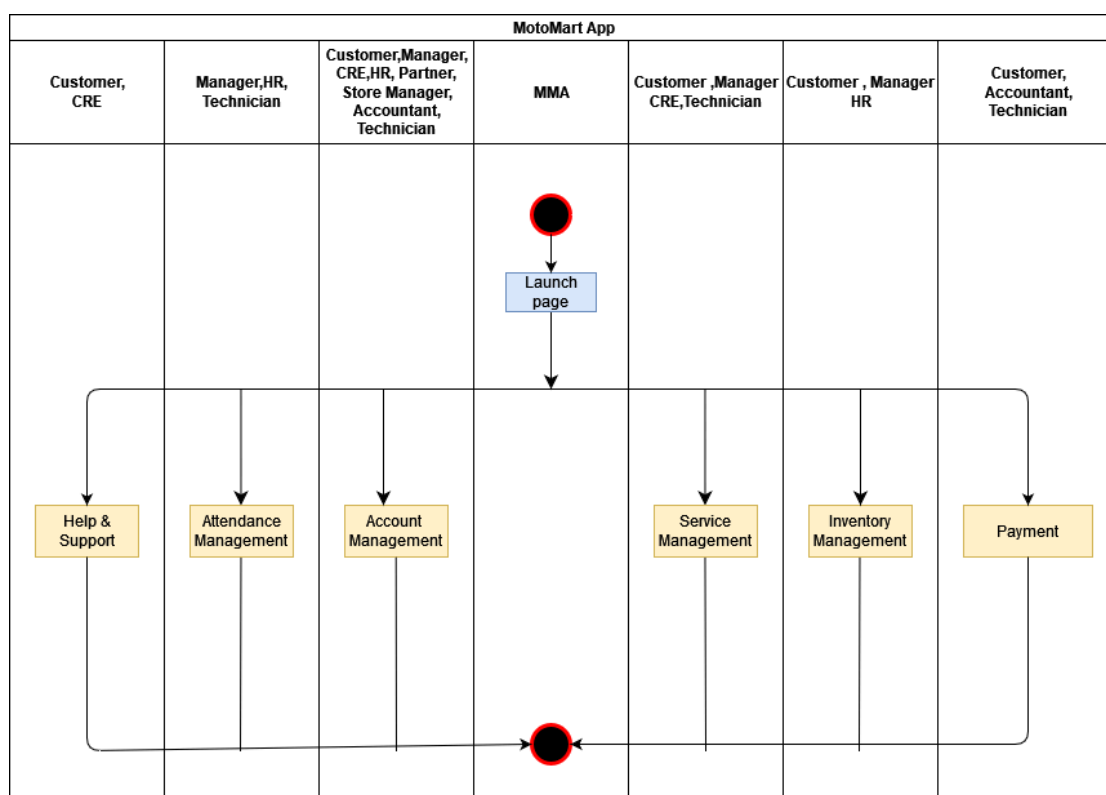
Fig 24: MMA (Swimlane - 1)

SID(Swimlane ID) : 1.1

Name: Account Management

Reference: Use Case and Activity Diagram level - 1.1
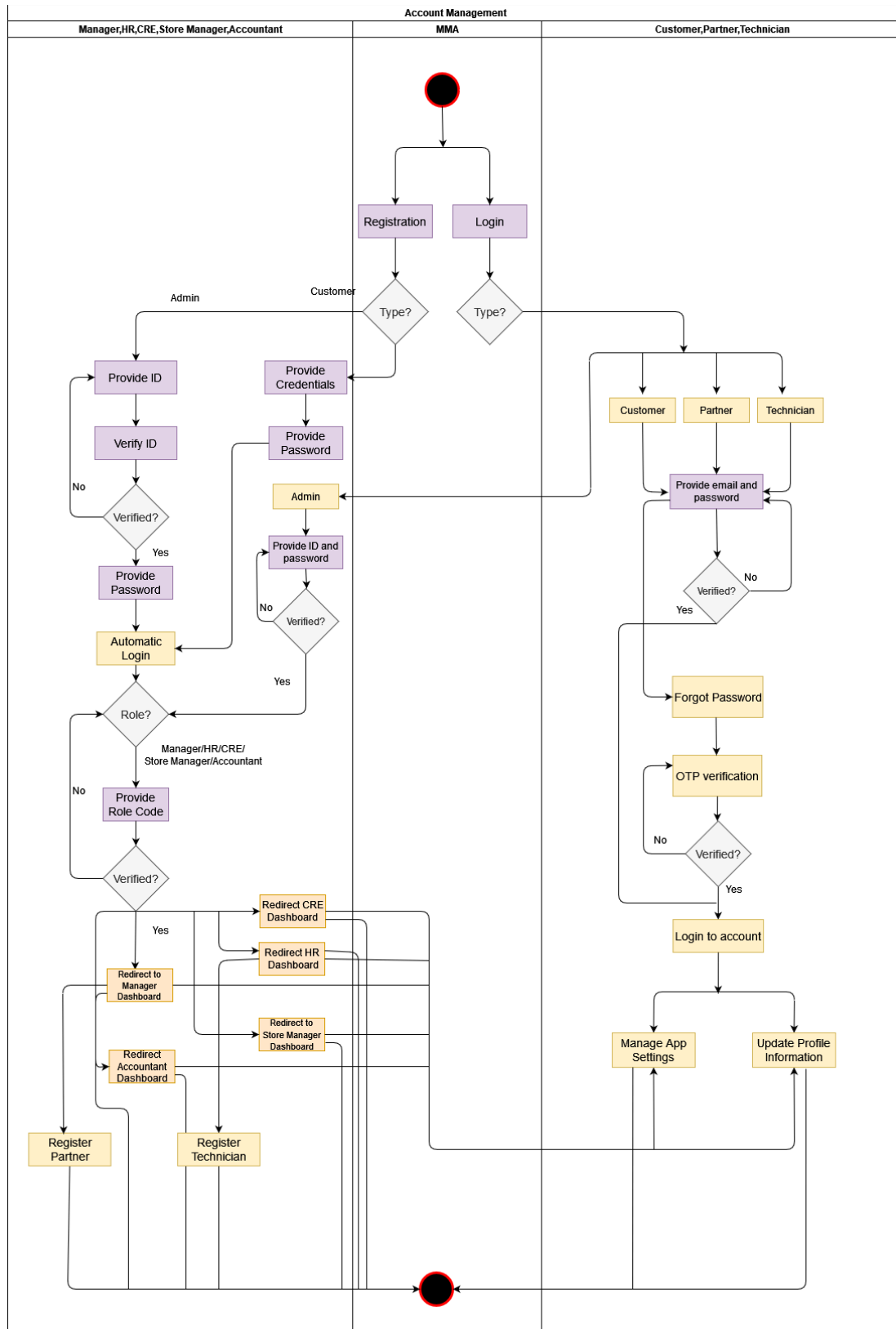
Fig 25 : Account Management (Swimlane - 1.1)

SID(Swimlane ID) : 1.2

Name: Service Management

Reference: Use Case and Activity Diagram level - 1.2
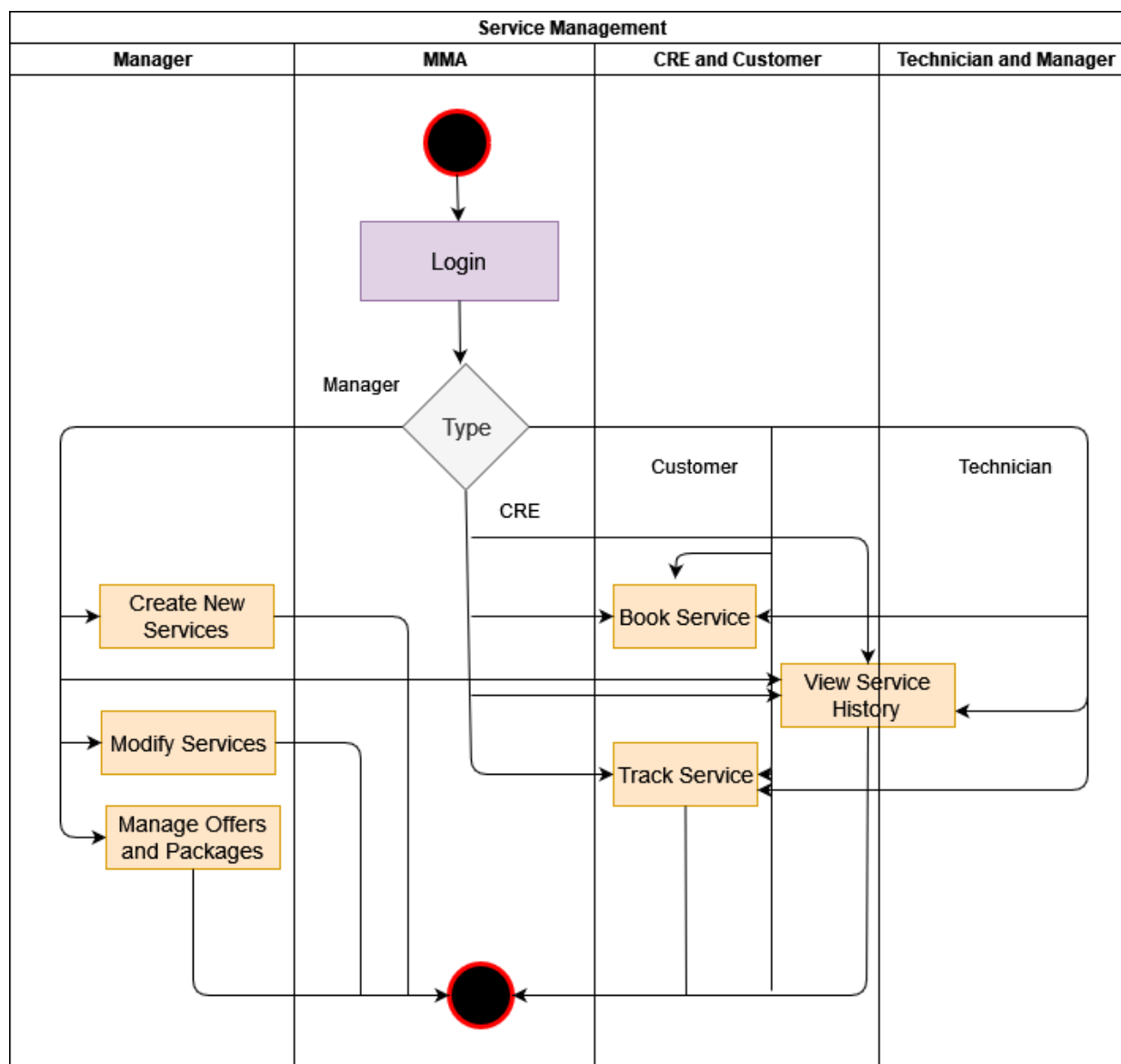
Fig 26 : Service Management (Swimlane - 1.2)

SID(Swimlane ID) : 1.2.4

Name: Book Service

Reference: Use Case and Activity Diagram level - 1.2.4
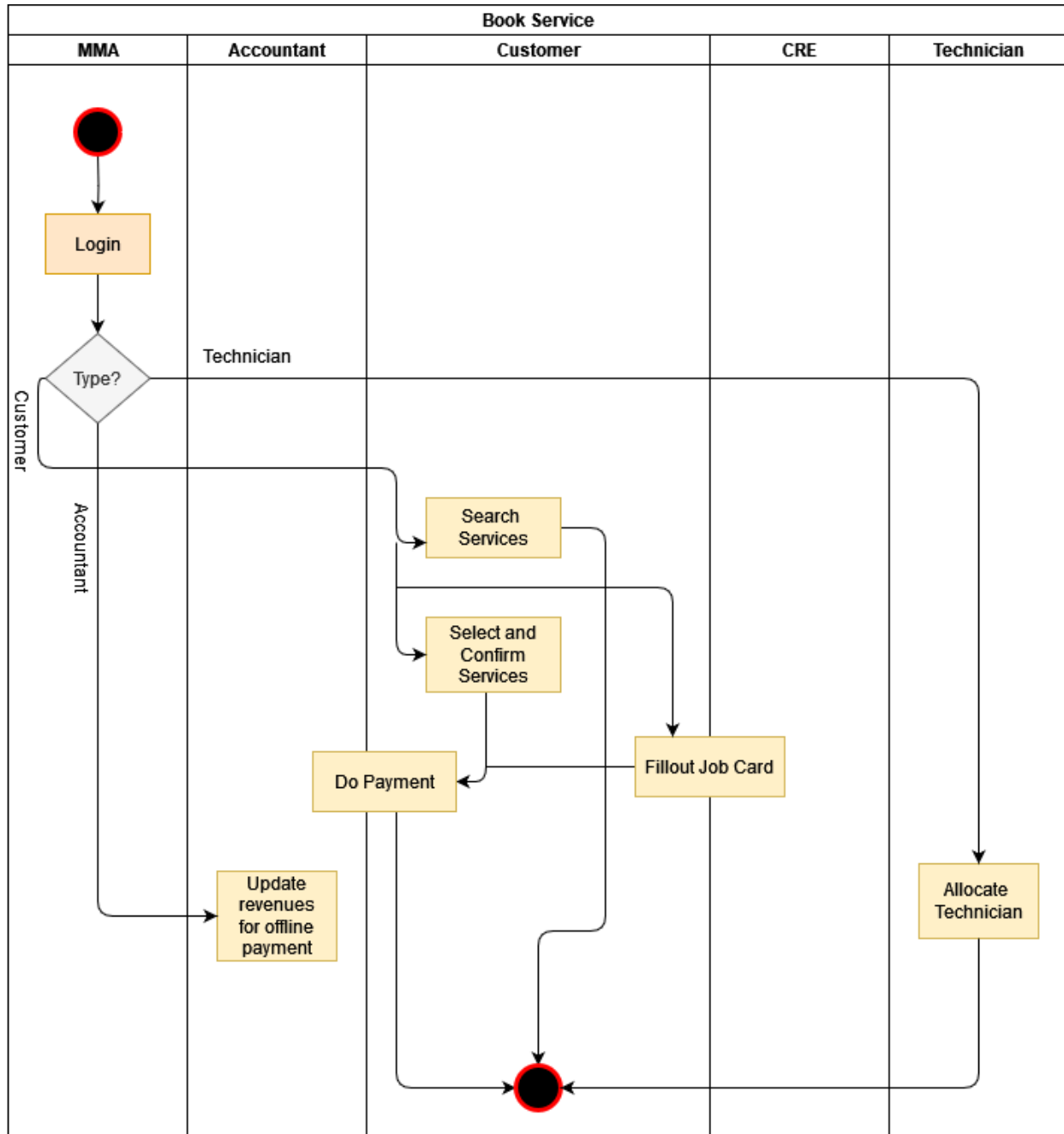
Fig 27 : Book Service (Swimlane - 1.2.4)

SID(Swimlane ID) : 1.2.5

Name: Track Service

Reference: Use Case and Activity Diagram level - 1.2.5
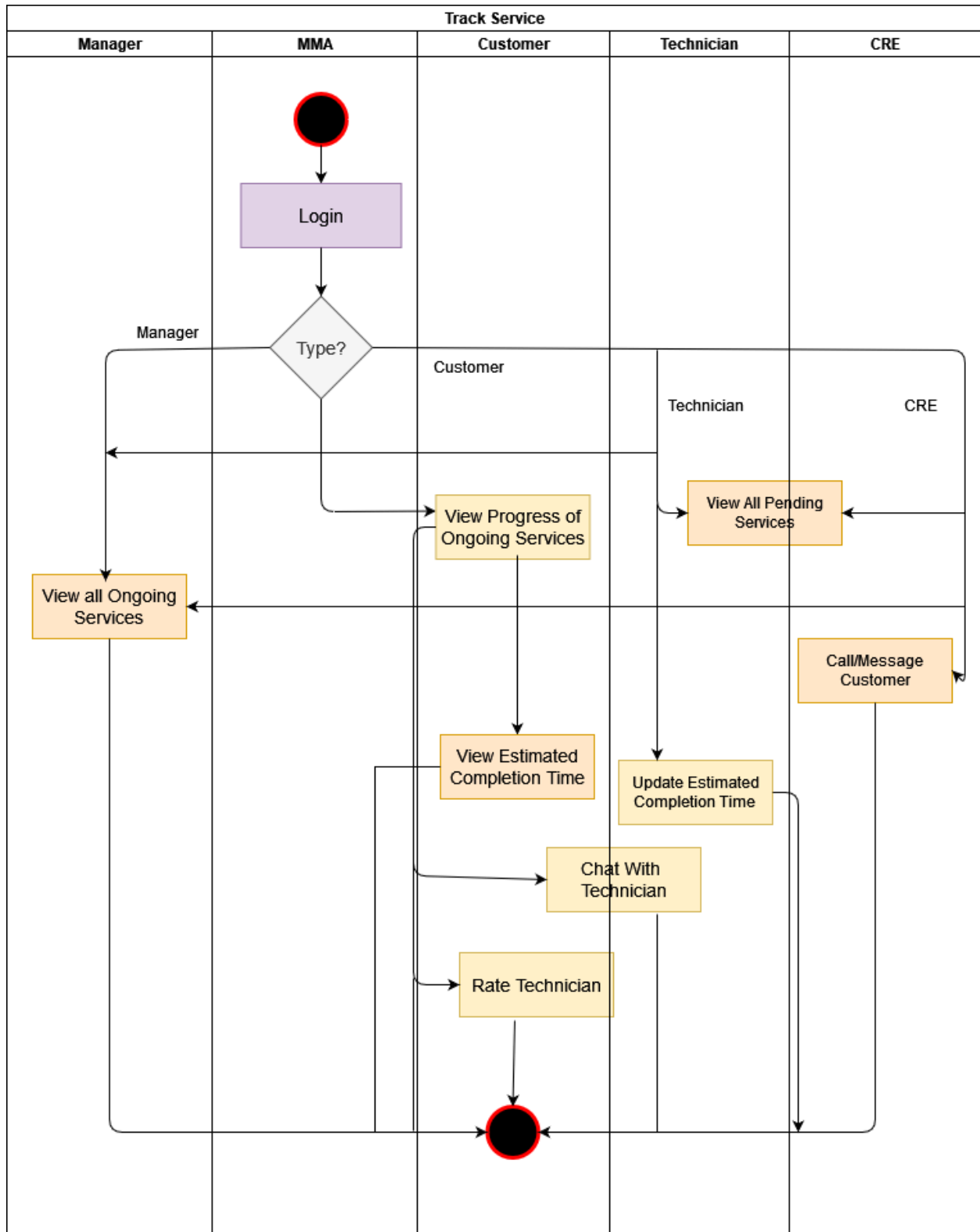
Fig 28 : Track Service (Swimlane - 1.2.5)

SID(Swimlane ID) : 1.4

Name: Payment

Reference: Use Case and Activity Diagram level - 1.4
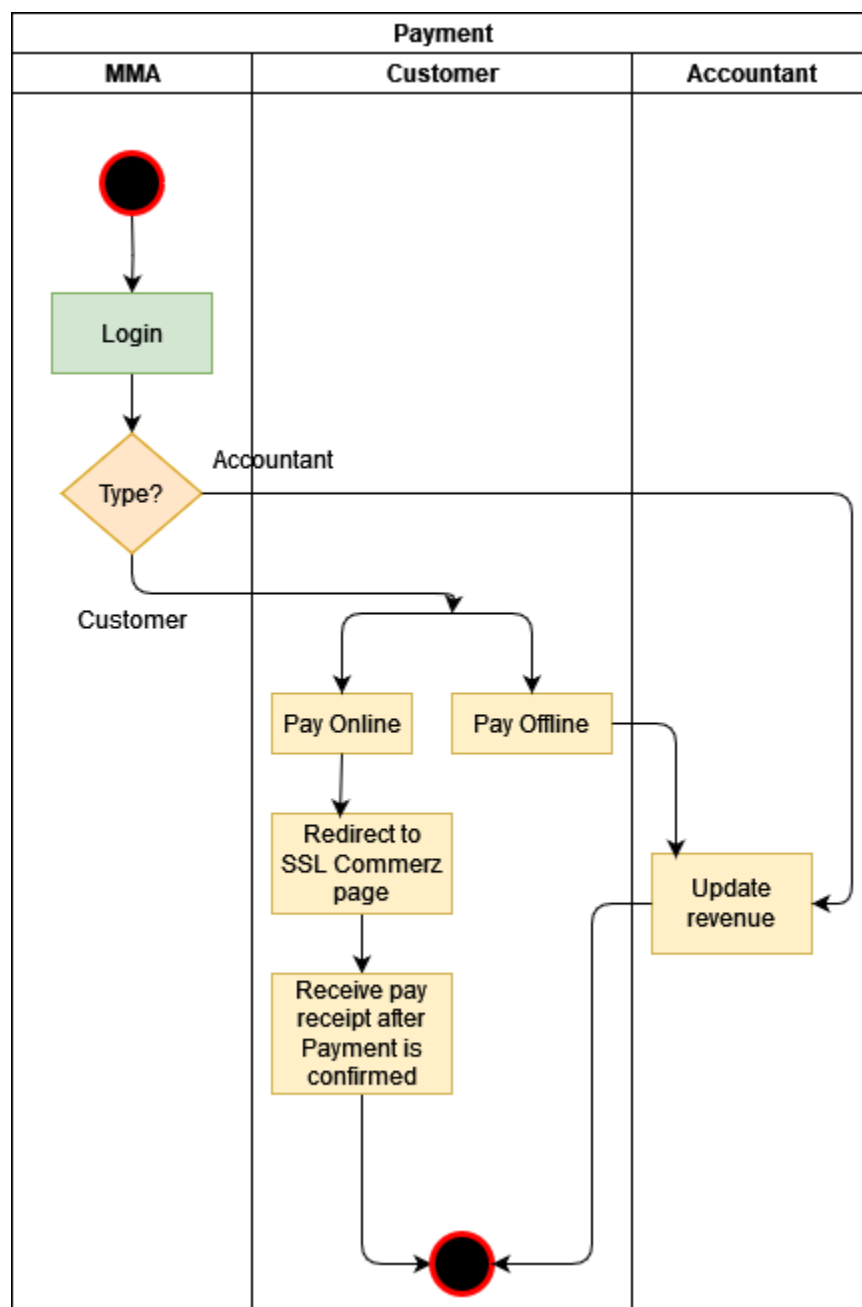
Fig 29 : Payment(Swimlane - 1.4)

SID(Swimlane ID) : 1.5

Name: Attendance Management

Reference: Use Case and Activity Diagram level - 1.5
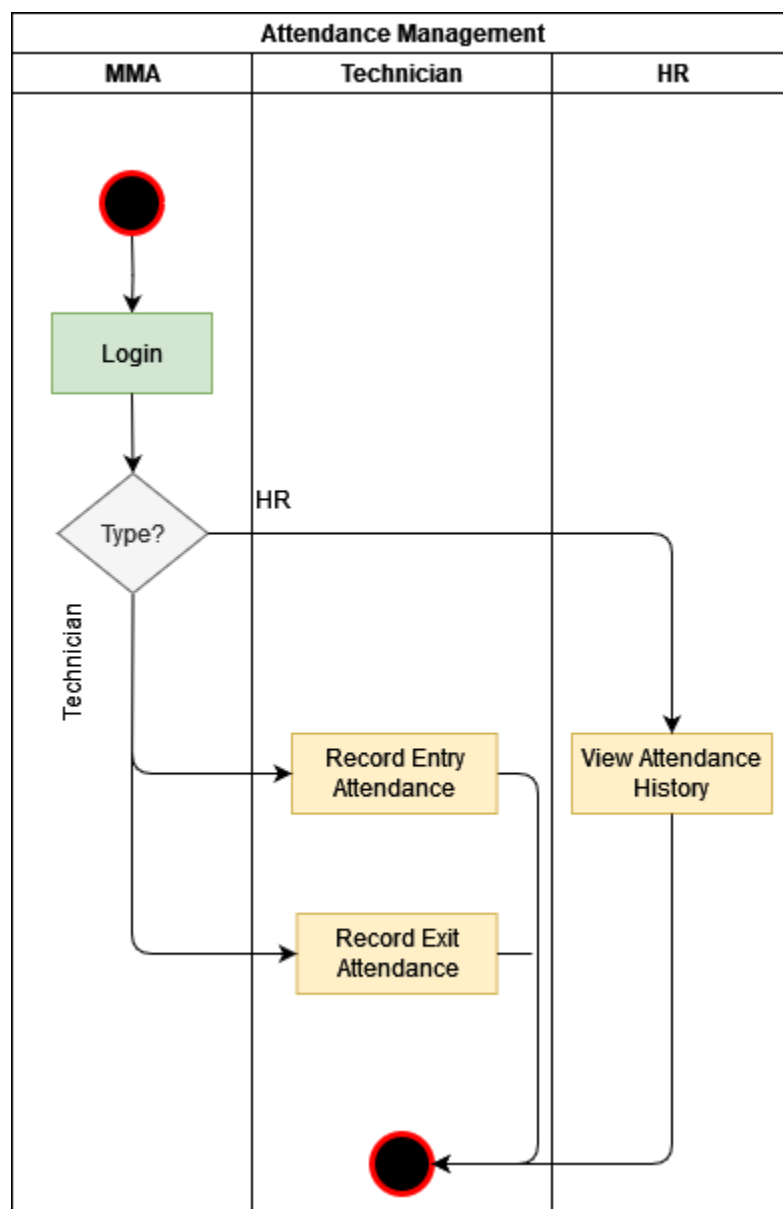
Fig 30 : Attendance Management (Swimlane - 1.5)

SID(Swimlane ID) : 1.6

Name: Help and Support

Reference: Use Case and Activity Diagram level - 1.6
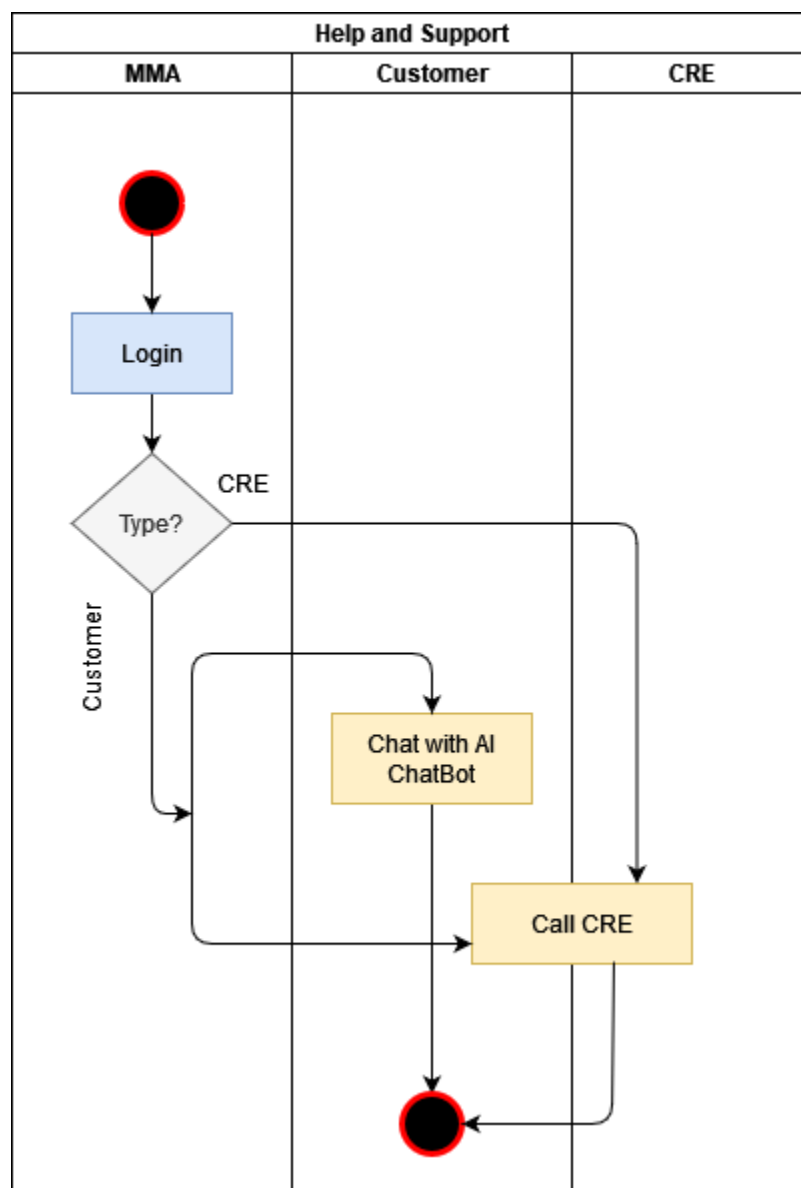
Fig 31 : Help and Support (Swimlane - 1.6)

Data Based Modelling

DATA MODELING CONCEPT : If software requirements include the necessity to create, extend or interact with a database or complex data structures need to be constructed and manipulated, then the software team chooses to create data models as part of overall requirements modeling. The entity relationship diagram (ERD) defines all data objects that are processed within the system, the relationships between the data objects and the information about how the dataobjects are entered, stored, transformed and produced within the system.

DATA OBJECTS : A data object is a representation of composite information that must be understood by the software. Here, composite information means information that has a number of different Page 60 of 126 properties or attributes. A data object can be an external entity, a thing, an occurrence, a role, an organizational unit, a place or a structure.

Noun Identification:

SL number	Noun	Problem Space / Solution Space	Attributes
1	Account	S	
2	Account	S	109,110,117
3	Address	S	
4	Admin	S	2
5	Agreements	S	
6	AI chatbot	S	
7	App	p	
8	Attendance	S	
9	Attributes	S	

10	Authentication	S	
11	Bangla	S	
12	Bike	S	14,15,16,17,25,43,44,48,72
13	Bike brand	S	
14	Bike information	S	
15	Bike model	S	
16	Bike registration number	S	
17	Biometric (fingerprint) information	S	
18	Bkash	S	
19	Bookings	p	
20	Cart	S	
21	Cash	S	
22	Characters	p	
23	Chassis number	S	
24	Chat	S	
25	Confirmation	S	
26	Contracts	S	
27	Convenience	p	
28	CRE	S	53,89
29	Credentials	p	
30	Criteria	p	
31	Current service	S	
32	Customer	S	22,116
33	Customization	S	
34	Dashboard	p	
35	Database	p	
36	Delivery time	S	
37	Description	S	
38	Details	p	
39	Discounts	S	
40	Email ID	S	
41	Engine capacity	S	
42	Engine number	S	

43	English	S	
44	Estimated time	S	
45	Experience	S	
46	Feature	S	
47	Financial information	S	
48	Flash card	S	52,94
49	Form	p	
50	Free services	S	
51	Help and Support	S	
52	Homepage	p	
53	HR	S	
54	ID	S	
55	Information	p	
56	Interface	S	
57	Inventory	p	
58	Invoice	S	
59	Item name	S	
60	Items	S	39,41,61,94,99
61	Job card	S	39,95
62	Language	S	
63	Log in	S	
64	Logout	S	
65	Manager	S	
66	Measures	p	
67	Mechanism	p	
68	Message	S	
69	Method	p	
70	Mileage	S	
71	Mobile Banking	S	
72	Modification	S	
73	MotoMart database	p	
74	My vehicle	p	
75	Nagad	S	

76	Name	S	
77	Notification	S	
78	Number	S	
79	Offers	S	39,41,94
80	OTP	S	
81	Packages	S	39,41,94
82	Page	p	
83	Partner	S	6,28,104
84	Password	S	
85	payment	S	19,23,27,60,73,82,92,94,102,120,122,131,137
86	Personal information	p	
87	Phone call	S	
88	Phone number	S	
89	Photo	S	
90	Pin number	S	
91	Plus sign	p	
92	Price	S	
93	Problems	S	
94	Process	S	
95	Profile	S	
96	Progress	S	
97	Quantity	S	
98	Questions	p	
99	Rating	S	
100	Receipt	S	
101	Recovery	S	
102	Refered customer	S	
103	Registration	S	11,42,86,120,137
104	Requests	S	
105	Rocket	S	
106	Role	S	
107	Sale	S	
108	Sales variation reports	S	

109	Search option	S	
110	Section	p	
111	Security	p	
112	Service	S	33,38,46,94,96,98,106,130,134
113	Service dashboard	p	
114	Service history	S	
115	Service revenue	S	
116	Shop	p	
117	Skillset	S	
118	SMS	S	
119	Special service deals	p	
120	SSLCommerz page	S	
121	Store manager	S	
122	Strength	p	
123	Studio	S	35,74,132
124	Symbol	p	
125	System	S	12,45,58,64,65,66,111,129,
126	Technician	S	9,10,18,47,101,116,119
127	Theme	S	
128	Time	S	
129	Transaction	S	
130	Trend	S	
131	Troubleshooting guidance	p	
132	Type	S	
133	User	S	1,4,56,78,80,86,90,91,97,108,134
134	Vehicles	S	13,14,15,16,17,25

Final data objects:

Data Object	Attribute	Type	Size
User	name	varchar2	40
	phoneNumber	Number	15
	password	Varchar2	40
	email	Varchar2	40
Admin	admin_id	Number	15
	password	Varchar2	40
	code	Number	15
	isManager	Bit	1
	isCRE	Bit	1
AI chatbot	Message_id	Number	15
	Customer_id	Number	15
	message	Varchar2	1000
Bike	Bike_id	Number	20
	Reg_no	Number	20
	Bike_chesis_no	Varchar2	20
	Engine_no	Varchar2	20
	Brand	Varchar2	30
Customer	Address	Varchar2	50
	Points	Number	10
Parts and items	Part_id	Number	15
	Name	Varchar2	40
	Price	Number	10
	Quantity	Number	10
	description	Varchar2	500
Job card	jobCard_id	Number	15
	customer_id	Number	15
	time	Time	15
	date	Date	20
	description	Varchar2	500

	Id information		
notification			
Offer	Offer_id Service_id Offer_description duration	Number Number Varchar2 time	15 15 200 15
packages	Package_id Price Description isAvailability	Number Number Varchar2 bit	15 15 100 1
partner	agreement	Varchar2	100
payment	Customer_id Amount Date Time isComplete	Number Number Date Time bit	15 15 20 15 1
Service	Service_id Name Description Price Duration	Number Varchar2 Varchar2 Number time	15 40 200 15 15
Studio	Customer_id Bike_id Colors Features Parts	Number Number Varchar2 	
System	Login Logout Notification Language Theme	Bit Bit Varchar2 Bit bit	1 1 200 1 1

	Bio_info	Varchar2	200
	isOccupied	bit	1
technician			
	Technician_id	Number	15
	Bike_brand	Varchar2	30
Technician skill set	Experience	Varchar2	100
	attribute	Number	10
	Date	Date	20
Fingerprint	Technician_id	Number	15
Scanner	Start_time	Time	10
	End_time	time	10
	Part_id	Number	15
	Date	Date	20
Parts and Items	Price	Number	10
history	Quantity	Number	10
	Customer_id	number	10
	Technician_id	Number	15
Service History	Customer_id	Number	15
	Service_id	Number	15
	Bike_id	Number	15
	onGoing	bit	1
	Partner_id	Number	15
Flas Card Service	Service_id	Number	15
	offerDetails	Varchar2	200
	Customer_id	Number	15
Cart	Service_id	Number	15
	Items_id	Number	15
	qunatity	number	10

Relationship Between Data Objects:

| Manager | IS A | Admin |

| CER | IS A | Admin |

| Store Manager | IS A | Admin |

| Accountant | IS A | Admin |

| HR | IS A | Admin |

| Technician | IS A | user |

| Customer | IS A | User |

| Partner | IS A | User |

HR	Register	Technician

Manager	Register	Partner

System	Sends OTP	User

Technician	Has	Skillset

Finger print scanner	Takes attendance	Technician

Accountant	Takes info from	Service history

Accountant	Takes info from	Parts and items history

Store manager	Add on	Parts and Items

Store manager	Updates	Parts and items

Store manager	creates	offer

Store manager	creates	packages

Store manager	Updates	offer

Store manager	Updates	Packages

Customer	Can view	Service

Customer	Can view	Offer

Customer	Can view	Packages

Customer	Can view	Items

Partner	Add/Update	Bike

Manager	Can View	Bike

| Manager | Can view | Service history |

| CRE | Can view | Job card |

| Customer | Fill up | Job card |

| CRE | Refers | Service |

| Job card | Has | Service |

| CRE | Call/Message | Customer |

| Customer | Has A | Flash card service |

| Partner | Refers | Bike |

| Customer | Has A | Cart |

| Customer | Makes | Payment |

System	Sends OTP	Customer

Customer	Add	Bike

Customer	Can bye	Parts and items

Parts and items	Added/ Remove	Cart

Customer	Book	Service

Customer	View	Service history

Customer	Chat with	Technician

Customer	Ratting	Technician

Customer	Chat with	AI chatbot

Call

Customer ——————————————— CRE

Bike ——————— modify ——————— Studio

Customer ——————— Add bike ——————— Studio

Technician ——————— Modify ——————— Service History

Notification ——————— Notify ——————— Customer

Notification ——————— Notify ——————— Technician

CRE ——————— Can view ——————— Technician

Technician ——————— Update ——————— Service history

Notification	—— Notify ——	CRE

System	—— Creates ——	Notification

Customer	—— Update ——	Service

Payment	—— Creates ——	Notification

User	—— Modify ——	System

ER Diagram:

Definition of ER Diagram : An Entity Relationship (ER) Diagram is a type of flowchart that illustrates how "entities" such as people, objects or concepts relate to each other within a system.

Fig 32 : ER Diagram

Class Based Modeling:

CLASS BASED MODELING CONCEPT : Class-based modeling represents the objects that the system will manipulate, the operations that will be applied to the objects, relationships between the objects and the collaborations that occur between the classes that are defined.

Identified Noun:

Serial	Noun
1	account
2	accountant
3	address
4	admin
5	admin id
6	agreement
7	AI chatbot
8	appropriate service
9	attendance
10	attendance record
11	attribute point
12	bangla
13	bike brand
14	bike model
15	bike registration number
16	brief description

17	card
18	cash
19	chassis number
20	cre
21	customer
22	dark
23	date
24	delivery time
25	description
26	different time
27	done status
28	email id
29	engine capacity
30	engine number
31	english
32	entry attendance
33	exit attendance
34	facebook page
35	financial information
36	fingerprint
37	fingerprint scanner
38	flash card
39	hr
40	HRM
41	information
42	inventory
43	item name

44	job card
45	Keep me log in
46	language
47	light
48	log out
49	login
50	manager
51	mileage
52	mobile banking
53	Motomart
54	name
55	notification
56	occupied status
57	offers
58	ongoing offers
59	ongoing service
60	OTP
61	package
62	Partner
63	parts and items
64	password
65	payment
66	pending service
67	pending service request
68	personal information
69	phone call
70	phone number

71	photo
72	previous service
73	price
74	process
75	profile
76	quantity
77	receipt
78	recovery mechanism
79	referred bike
80	referred customer
81	registration
82	role
83	sales revenue
84	service
85	service completion time
86	service history
87	service id
88	service ratings
89	service revenue
90	service time
91	skill attributes
92	skillset
93	sms
94	specific code
95	SSLCommerz
96	store manager
97	system

98	technician
99	theme
100	user
101	vehicle
102	settings
103	Avail Service

Identified Verb:

Serial	Noun
1	Seek Services
2	Initiate Profile Creation
3	Create Account
4	Click Option
5	Provide Essential Details
6	Setup Password
7	Provide ID and Password
8	Add New Technicians
9	Add New Partners
10	Create Partners Account
11	Notify User
12	Recover Password
13	Store Password
14	Edit Personal Information
15	Show Available Services
16	Add Vehicle

17	Select Services
18	Fill Up Job Card
19	Perform Payment
20	Allocate Service
21	Book Services
22	See Progress
23	Chat with Technician
24	Interact with AI
25	Customize Bike
26	Get Fingerprint Scan
27	Record Attendance
28	Add Part and Items
29	Update Pricing
30	See Service Requests
31	See Ongoing Services
32	View Service History
33	Estimate Service Completion Time
34	Update Service Completion Time
35	Chat with Customer
36	Update Status
37	Transfer Service Info
38	Search Completed Services
39	See Service Ratings
40	Logout from Account
41	Add Bike Information
42	Search Bike Details
43	Check Bike Details

44	Assign Service
45	Cancel Service
46	Verify OTP
47	Update Revenue
48	Set Theme
49	Set Language
50	Toggle Notification
51	Perform Registration
52	Add to Cart
53	Do Rating
54	Update Attendance Records
55	Perform Login

General Classification:

Candidate classes are categorized based on the seven general classification. The analysis classes manifest themselves in one of the following ways:

1. External entities
2. Things
3. Events
4. Roles
5. Organizational units
6. Places
7. Structures

A candidate class is selected for special classification if it fulfills three or more characteristics.

SL	Solution Space Noun	General Classification
1	account	2,7
2	accountant	4,5,7
3	address	2,6
4	admin	4,5,7
5	admin id	2
6	agreement	2
7	AI chatbot	1,3
8	appropriate service	2
9	attendance	2
10	attendance record	2
11	attribute point	2
12	bangla	
13	bike brand	2
14	bike model	2
15	bike registration number	2
16	brief description	2
17	card	2
18	cash	2
19	chassis number	2
20	cre	4,5,7
21	customer	4,5,7
22	dark	2
23	date	2
24	delivery time	2
25	description	2

27	done status	2
28	email id	2
29	engine capacity	2
30	engine number	2
31	english	
32	entry attendance	2,3
33	exit attendance	2,3
34	facebook page	1,3,7
35	financial information	2
36	fingerprint	2
37	fingerprint scanner	1,3
38	flash card	2,6,7
39	hr	4,5,7
40	HRM	7
41	information	2
42	inventory	2,6,7
43	item name	2
44	job card	2,3,7
45	Keep me log in	2
46	language	2
47	light	2
48	log out	3
49	login	3
50	manager	4,5,7
51	mileage	2
52	mobile banking	2
53	notifications	2,3,6

54	occupied status	2
55	offers	2,6,7
56	ongoing offers	2,6,7
57	ongoing service	2,6,7
58	OTP	2
59	package	2,6,7
60	Partner	4,5,7
61	parts and items	2,6,7
62	password	2
63	payment	1,2,6
64	pending service	2,3,7
65	pending service request	2,3,7
66	personal information	2,7
67	phone call	3,6
68	phone number	2
69	photo	2
70	previous service	2,3,7
71	price	2
72	process	3
73	profile	2
74	quantity	2
75	receipt	2,7
76	recovery mechanism	3,7
77	referred bike	6
78	registration	3
79	sales revenue	2,7
80	service	2,7

81	service completion time	2
82	service history	2,6,7
83	service id	2
84	service ratings	3
85	service revenue	2,7
86	service time	2
87	skill attributes	2,4
88	skillset	2
89	sms	2
90	specific code	2
91	SSLCommerz	1,3
92	store manager	4,5,7
93	technician	4,5,7
94	user	4,5,7
95	vehicle	1,2,7
96	settings	2,3,7
97	availService	2,7

Selection Criteria:

The candidate classes are then selected as classes by six Selection Criteria. A candidate class generally becomes a class when it fulfills around three characteristics.
1. Retain information
2. Needed services
3. Multiple attributes
4. Common attributes
5. Common operations

6. Essential requirements

Potential general classified nouns to become a class after selection criteria :

SL	Solution Space Nouns	Selection Criteria
1	accountant	1-5
2	address	1
3	admin	1-5
4	agreement	1
5	AI chatbot	1
6	cre	1-5
7	customer	1-5
8	entry attendance	2,6
9	exit attendance	2,6
10	facebook page	1
11	fingerprint scanner	6
12	flash card	1-5
13	hr	1-5
14	inventory	1-4
15	job card	1-4
16	manager	1-5
17	notifications	1-4
18	offers	1,3,4,5
19	ongoing offers	1,3,4,5
20	ongoing service	2,3,4,5
21	package	1,3,4,5

22	Partner	1-5
23	parts and items	1,3,4,5
24	payment	1,2,6
25	pending service	2,3,4,5
26	pending service request	2,3,4,5
27	personal information	1
29	phone call	1
30	previous service	2,3,4,5
31	receipt	1
32	recovery mechanism	1
33	sales revenue	1
34	service	2,3,4,5
35	service history	2,3,4,5
36	service revenue	1
37	service time	2
38	skill attributes	1
39	SSLCommerz	2,6
40	store manager	1-5
41	technician	1-5
42	theme	1
43	user	1-5
44	vehicle	1,6
45	settings	1-5
46	availService	1-5

Selected Classes:

1. User
2. Admin
3. Customer
4. Technician
5. Partner
6. Vehicle
7. Service
8. AvailedService
9. Offer&Package
10. Inventory&Item
11. JobCard
12. Payment
13. Notifications
14. Attendance
15. Settings
16. FlashCard

Attribute and method identification:

Class	Attributes	Methods
User	-userID - name -email -phoneNumber -address -password	+register() + login() +logout() +updateProfile() +recoverPassword() +save_sign_in_details()

	-userType (Admin, Customer, Technician, Partner)	
Admin	-adminID - password -role (Manager, HR, CRE, StoreManager, Accountant) -roleCode	+manageInventory(), +manageService(), +manageOffer&Package() +addPartner() +removePartner() +viewPartnerDetails(), +viewReferredBikes() +viewAttendance() +viewServiceHistory(), +viewPendingJobCard(), +addTechnician() +removeTechnician(), +showAttendanceHistory() +showPartsRevenue() +showSalesRevenue() +viewTechnicianDetails() +manageFlashCard()
Customer	- customerID - name - email - phoneNumber - address - password - photo - vehicles[] - serviceHistory[] - cart_parts_list - cart_service_list - cart_total_price	+ manageVehicle() + viewServices() - searchService() + fillJobCard() +viewServiceProgress() +chatWithTechnician() -selectService() -viewOffers() -viewPackages() +rateTechnician() -viewParts&items() +customizeBike() +addToCart() + viewCart() +viewFlashCard()

		+viewServiceHistory() +chatWithAI() +bookNewService() +RemoveFromCart() +calculateCartTotalPrice() +proceedToPayment()
Technician	- technicianID - name - email - phoneNumber - password - skillset[] - attendance[] -serviceHistory[] -occupiedStatus	+ viewPendingServices() +selectService() +updateServiceStatus() +chatWithCustomer() +viewServiceHistory() +viewOngoingServices() +performAttendance()
Partner	- partnerID - name - email - phoneNumber - password - referredBikes[] - contractDetails - flashcards	+ addReferredBike() + viewContract()
Vehicle	- vehicleID - brand - model - chassisNumber - engineNumber - registrationNumber - engineCapacity - mileage - ownerID	+ addVehicle() + updateVehicleDetails() + removeVehicle()
Service	- serviceID - serviceName - description - price	+ createService() + updateService() + deleteService() + getServiceDetails()

	- estimatedTime - status (active/inactive)	
AvailedService	- availedServiceID - customerID - vehicleID - serviceID - technicianID - status (pending/ongoing/com pleted) - progress - startTime - endTime - rating	+ updateServiceStatus() + updateProgress() + completeService() + rateService()
Offer&Package	- opID - opName - description - rate - applicableServices[] - validityPeriod	+ createOffers&Package() + updateOffers&Package() + removeOffers&Package() + postOnFaceBook()
Inventory&Item	- itemID - name - description - price - quantity - images[]	+ addItem() + updateItem() + removeItem()
JobCard	- jobCardID - customerID - vehicleID - description - suggestedServices[] - status (pending, approved, rejected)	+ createJobCard() + updateJobCard() + addServiceToJobCard()

Payment	- paymentID - customerID - serviceID - parts&itemsID - amount - paymentMethod (Mobile Banking, Cash) - paymentStatus - transactionID	+ initiatePayment() + verifyOTP() + confirmPayment() + generateReceipt()
Notifications	- notificationID - userID - message - readStatus	+ sendNotification() + viewNotifications() + markAsRead() + toggleNotifications()
Attendance	- recordID - technicianID - date - entryTime - exitTime	+ recordEntry() + recordExit() + calculateWorkingHours() + viewAttendanceByDate() +viewAttendanceByTechnician () + addFingerprint()
Settings	- themeName - languageName	+ setTheme() + getTheme() + setLanguage() + getLanguage()
FlashCard	- flashCardID - customerIDList[] - offers[]	+ activateFlashCard() + viewOffers()

Class Card:

User	
Responsibilities	**Collaborators**
- Modify account - Login - Logout - Recover password	Admin, Customer, Technician, Partner, Setting

Admin	
Responsibilities	**Collaborators**

Responsibilities	Collaborators
- Create account - Manage technician - Manage partner - Add vehicle - Add service - Manage flash card - Manage job card - Manage inventory - Manage service - Manage Offer&Package	User, Technician, Partner, Service, Vehicle, Settings, Offer&Package, Inventory&Item, Job card, Flash card

Customer

Responsibilities	Collaborators
- Create account - Manage service - Perform payment - Manage vehicle - Fill job card - Chat with technician - Rate technician - Customize bike - Manage cart - Chat with AI	Technician, Vehicle, Service, Payment, Job Card, Notification, Settings

Technician

Responsibilities	Collaborators
- Create Account - Select Service - Update Service Status - Chat with Customer - Perform Attendance	Admin, Vehicle, Service, Customer, Attendance, Notifications, Settings

Partner

Responsibilities	Collaborators
- Create account - Manage referred bike list	Admin, Vehicle, Settings

Vehicle

Responsibilities	Collaborators
- Add vehicle - Update vehicle details - Remove vehicle	Admin, Technician, Partner

Service

Responsibilities	Collaborators
- Create service - Remove service - Modify service	Admin

AvailedService

Responsibilities	Collaborators
- Update service status, - Update progress, - Complete service, - Rate service	Technician, Customer

Offer&Package

Responsibilities	Collaborators

Inventory&Item	
Responsibilities	**Collaborators**
- Add item to inventory - Remove item from inventory - Modify inventory	Admin

Attendance

Responsibilities	Collaborators
• Collect attendance • Manage attendance • Add fingerprint	Admin, Technician

Job card

Responsibilities	Collaborators
• Edit job card, • Create job card, • Add service to job card	Customer, Service, Admin

Payment

Responsibilities	Collaborators
• Initiate payment • Confirm payment • Generate receipt	Admin, Customer

Notifications

Responsibilities	Collaborators
• Send notification	Admin, Technician, Customer

Settings

Responsibilities	Collaborators
• Manage theme • Manage language	User

FlashCard

Responsibilities	Collaborators
• Create flash card • Show flash card holders	Customer, Service, Admin, Partner

Class-Responsibility-Collaboration(CRC) Diagram of Motomart App:
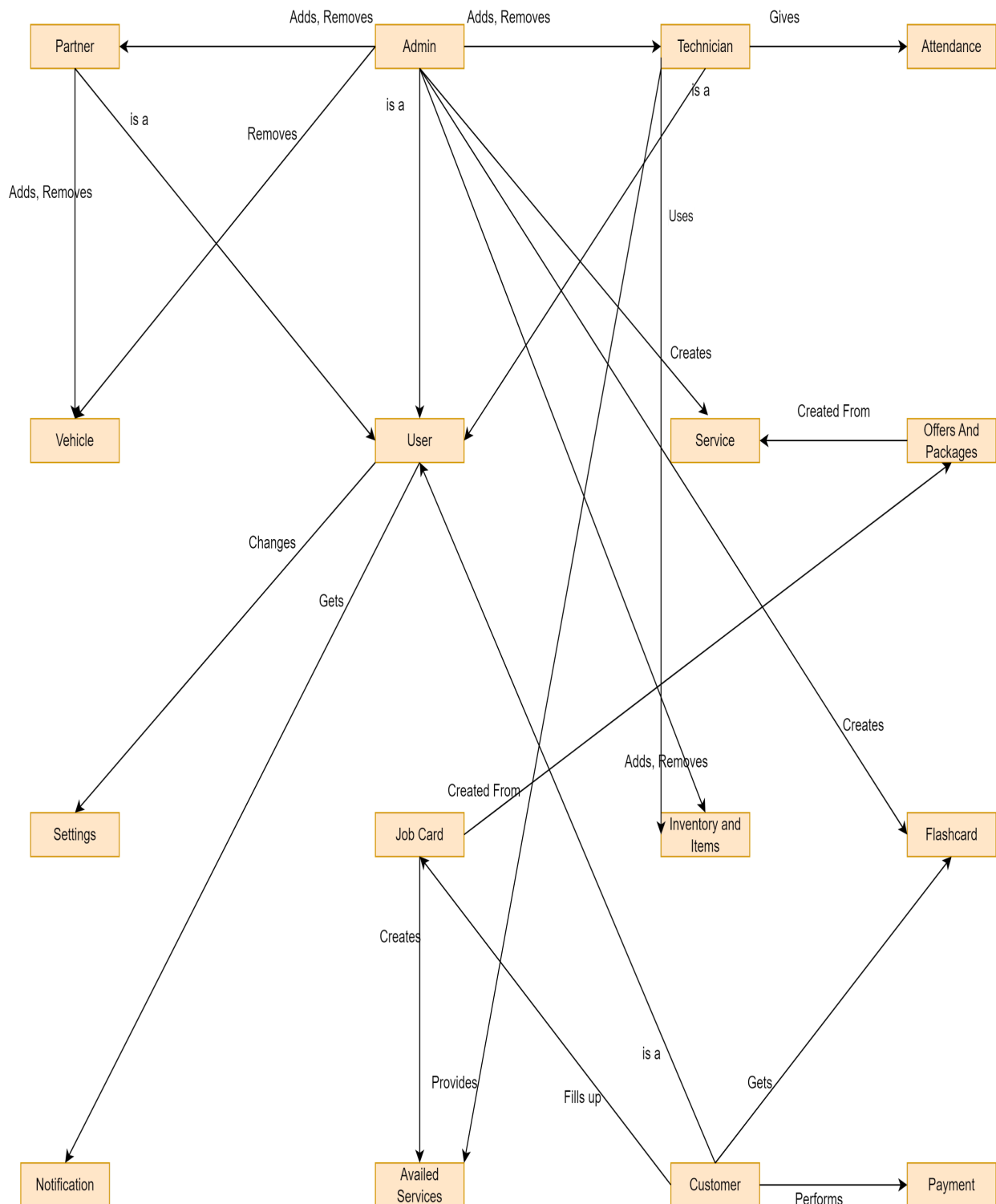

Fig 33 : CRC Diagram of MotoMart App

Behavioral Modeling:

Behavioral modeling in software engineering captures the dynamic aspects of a system, illustrating its responses to inputs, interactions, and events over time. For the MotoMart bike servicing app, this specifically involves using state transition diagrams and sequence diagrams. State transition diagrams depict the states the app can be in and the transitions between those states triggered by various events, providing insights into the app's dynamic behavior and possible state changes. Sequence diagrams detail the step-by-step interactions between objects, showing how the app components interact over time to accomplish tasks. These visual representations improve understanding of requirements, facilitate stakeholder communication, and aid in designing test cases, ensuring the MotoMart app behaves as expected across different states, timelines, and actors.

State Transition Diagram:

A state transition diagram, or state machine diagram, visually represents the states of the MotoMart bike servicing app and the transitions between those states triggered by various events. Key components include states (conditions or situations of the app), transitions (arrows indicating movement between states), events (triggers for transitions), and actions (activities performed during transitions). It starts with an initial state and may include a final state, marking the beginning and end of the app's processes. For the MotoMart app by mapping out the app's dynamic behavior and possible state changes, these diagrams provide valuable insights for system design, enhance stakeholder communication, and help identify potential errors or missing transitions in the system. This helps ensure the app operates smoothly and efficiently, providing a clear picture of its operational flow.
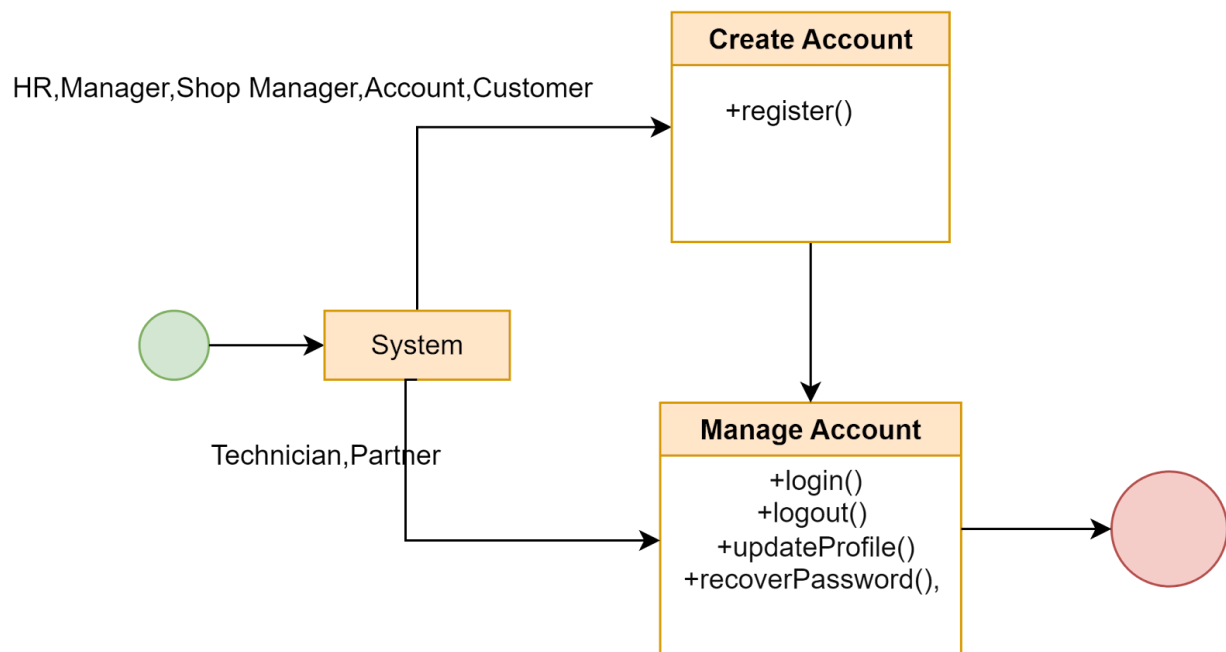
Event Table:

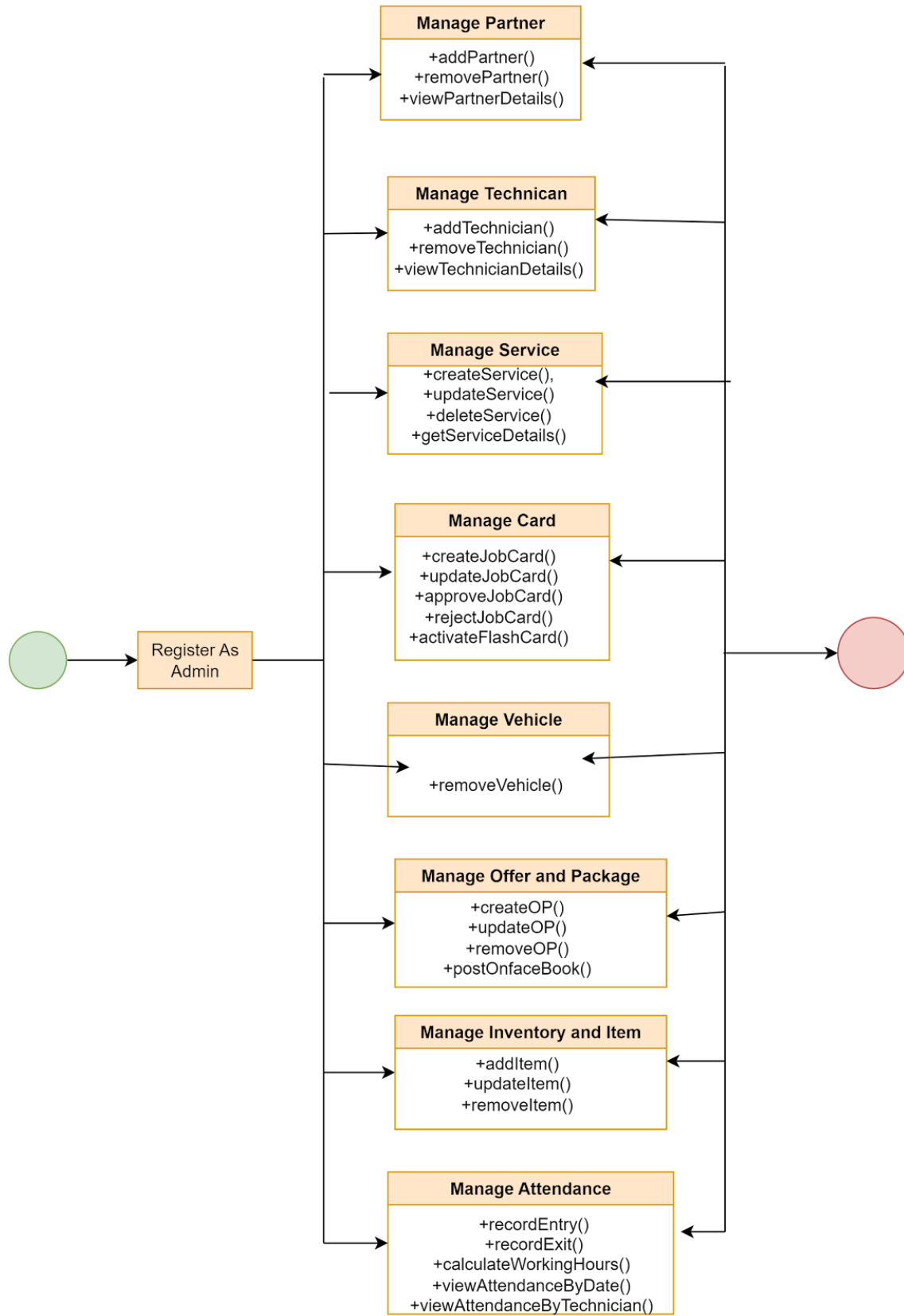| Initiator Class	Event	Collaborator Class
User	Create Account	Admin,Customer,Technician,Partner
User	Modify Account	Admin,Customer,Technician,Partner
Admin	Mange Technician	Technician
Admin	Manage Partner	Partner
Admin	Manage Vehicle	Vehicle,Partner
Admin	Manage Service	Service
Admin	Manage Card	Job Card, Glass Card
Customer	Book Service	Service,Availed Service
Customer	Manage Availed Service	Availed Service
Customer	Perform Payment	Payment
Technician	Offer Service	Availed Service
Technician	Give Attendance	Attendance
Partner	provide sponsored bike list	Vehicle
Admin	Manage Offer and Package	Offer and Package
Admin	Manage Inventory and Item	Inventory and Item
Admin	Manage Attendance	Attendance
Notification	Give Notification	Technician, Customer
Setting	Set and Modify Theme	Admin,Customer,Technician,Partner
Setting	Set and Modify Language	Admin,Customer,Technician,Partner

State Transition:

ID 1:
Name: User

ID 2:
Name: Admin

Manage Partner

+addPartner()
+removePartner()
+viewPartnerDetails()

Manage Technican

+addTechnician()
+removeTechnician()
+viewTechnicianDetails()

Manage Service

+createService(),
+updateService()
+deleteService()
+getServiceDetails()

Manage Card

+createJobCard()
+updateJobCard()
+approveJobCard()
+rejectJobCard()
+activateFlashCard()

Register As Admin

Manage Vehicle

+removeVehicle()

Manage Offer and Package

+createOP()
+updateOP()
+removeOP()
+postOnfaceBook()

Manage Inventory and Item

+addItem()
+updateItem()
+removeItem()

Manage Attendance

+recordEntry()
+recordExit()
+calculateWorkingHours()
+viewAttendanceByDate()
+viewAttendanceByTechnician()

ID 3:

Name: Customer

Manage Job Card
+fillJobCard()

Manage Cart
+addToCart()
+removeFromCart())

Manage Availed Service
+selectService()
+viewServices()
+viewServiceProgress()
+rateService()
+viewServiceDetails()
+viewServiceHistory()

Perform Communication
+chatWithTechnician()
+chatWithAI()

Perform Payment
+initiatePayment()
+verifyOTP()
+confirmPayment()
+generateReceipt()
+proceedToPayment()

Login As Customer

ID 4:

Name: Technician

Login As Technician

Give Attendance
+addFingerprint()

Offer Service
+viewPendingServices()
+selectService()
+updateServiceStatus()
+viewServiceHistory()
+viewOngoingServices()

ID 5:

Name: Partner

Provide Sponsored Bike LIst

+addReferredBike()
+updateVehicleDetails()
+removeVehicle()
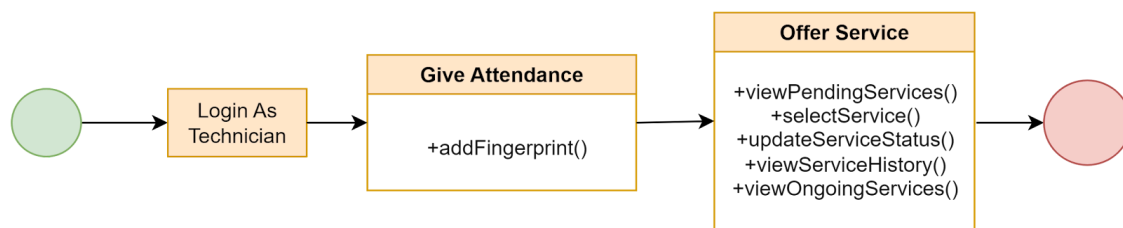
Login As Partner

ID 6:

Name: Notification

Give Notfication

System

+sendNotification()
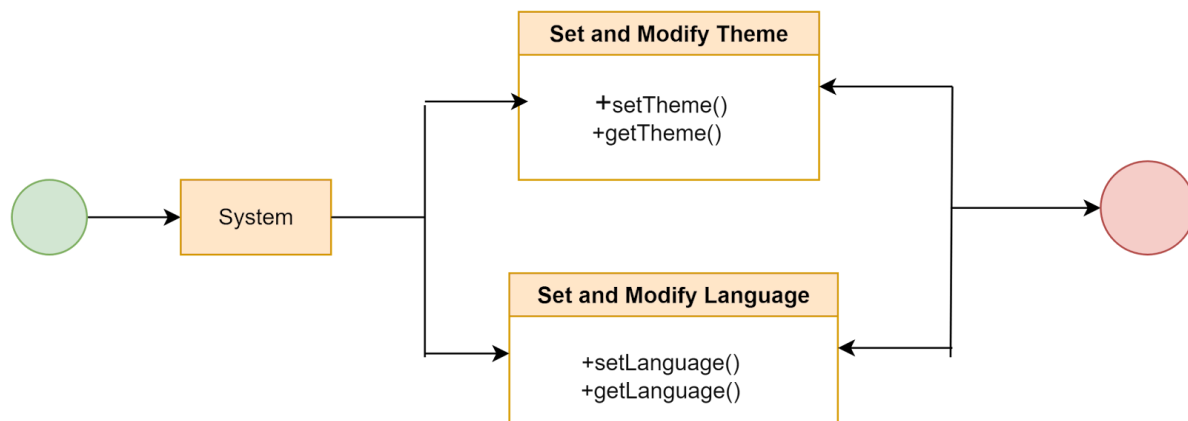+viewNotifications()
+markAsRead()
+toggleNotifications()
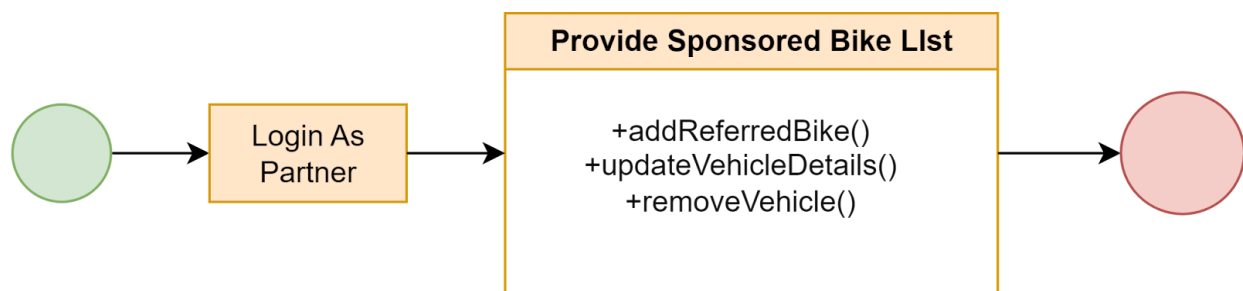
ID 7:

Name: Setting

Sequence Diagram:

A sequence diagram for the MotoMart bike servicing app illustrates the interactions between users and system components over time. It shows how a customer requests a service, the app interface processes the request, schedules the service with a technician, and confirms the appointment. By detailing the step-by-step exchange of messages, sequence diagrams help clarify the flow of operations, ensuring that each component interacts correctly to complete tasks. This enhances the design

and communication among stakeholders, leading to a smoother app functionality.