Department of Computing and Information Systems

School of Engineering and Technology

Sunway University

# SOFTWARE DESIGN DOCUMENT

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|---|---|
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# 1.0   Context Diagram

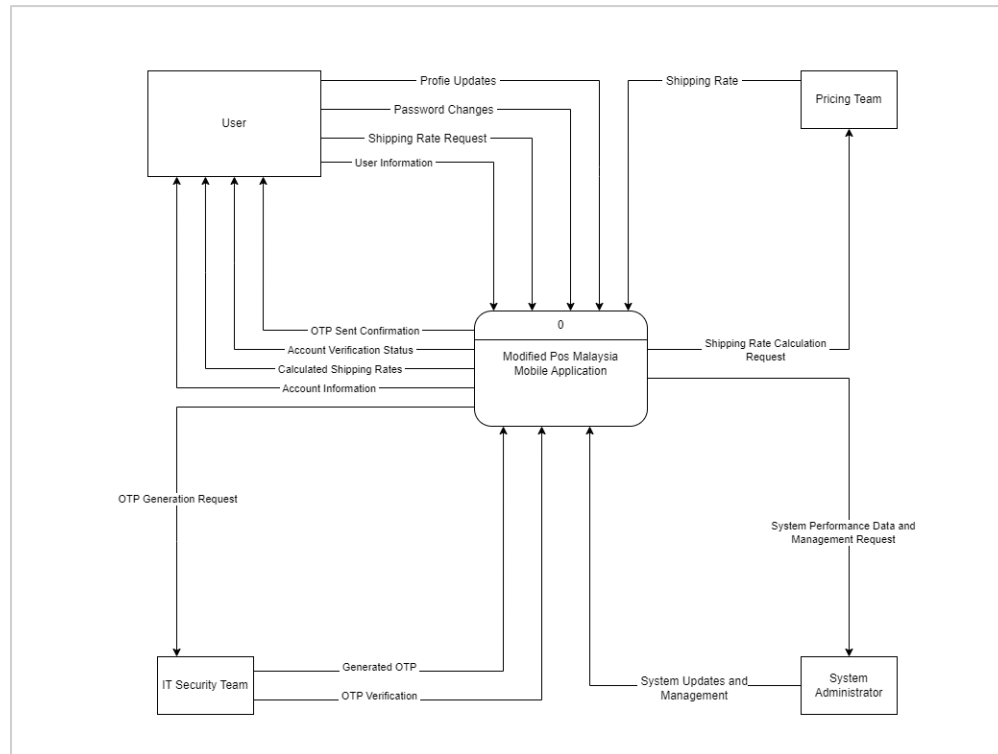**Figure 1** *Context Diagram of Modified POS Malaysia Mobile Application*



**Figure 1** gives an overview of how the **system communicates with external entities**. The main external entities that interact with the application are shown in the diagram, along with the data flows that take place between them and the system.

The users are the primary actors who interact with the application for various functionalities. They can modify their profile information, reset passwords, request shipping rate estimations, and provide general user data. In return, users receive OTP sent confirmations, account verification status updates, calculated shipping rates, and account information from the application. Through this interaction, users may manage their accounts securely, get the accurate shipping costs information, and protect their access through OTP verification.

A key player in preserving the application's integrity and security is the IT Security Team. The team handles requests from the application on OTP generation and returns the created OTP to the application. To guarantee the security and dependability of the

account verification process, they are also in charge of validating the OTPs that users get. Next, the Pricing Team will be performing shipping rate calculations. The application sends shipping rate calculation requests to the Pricing Team, which then responds with the calculated shipping rates to the application. This interaction ensures that users receive up-to-date and correct delivery costs information based on their input.

Besides, the application's administration and overall functioning are within the system administrator's control. The system sends performance data and management requests to the System Administrator, who in turn provides system updates and management actions back to the application. This ensures that the programme remains current, effective and well-maintained, providing a seamless user experience.

At the core of the diagram is the Modified POS Malaysia Mobile Application, which acts as the central process coordinating all interactions and data flows between the external entities and the system. It processes user requests, works with the IT Security Team for OTP generation and verification, interacts with the Pricing Team to compute shipping rates, and collaborates with the System Administrator to perform and look after system performance. By ensuring the uninterrupted operation and integration of all application functionalities, this core process offers users a complete range of services.

To summarise, the context diagram proficiently captures the high-level overview of the Modified POS Malaysia Mobile Application's functionalities and its external dependencies, highlighting the data exchanges and interactions among users, the IT Security Team, the Pricing Team, and the System Administrator.

# 2.0 Data Flow Diagram (DFD)

A graphical depiction of data flow in any system is called a data flow diagram (DFD). It can illustrate the flow of incoming, outgoing, and stored data. A data flow diagram explains every aspect of how data flows through the system. DFDs can be divided into several levels, which provide varying degrees of system detail.

## 2.1 DFD Levels

### 2.1.1 <u>DFD Level 0</u>

**Figure 2** *Data Flow Diagram of Modified POS Malaysia Mobile Application – Level 0*
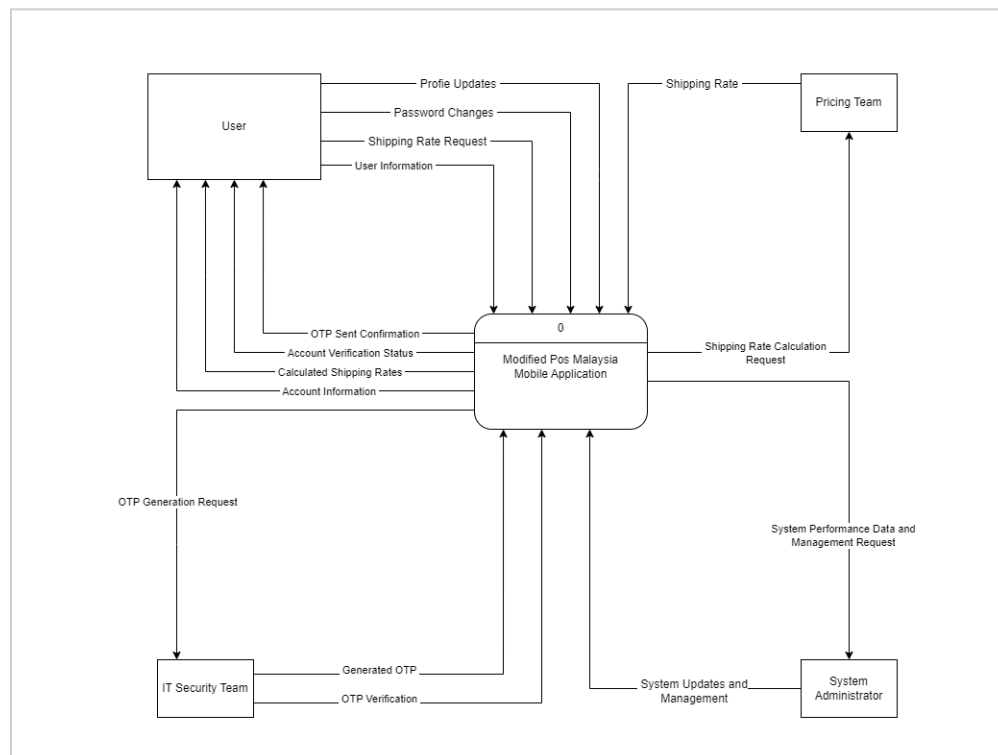


The DFD Level 0 for the Modified POS Malaysia Mobile Application (**Figure 2**) is also called the context diagram, provides the highest-level overview of the system's key processes and their interactions with external entities. Rather than emphasising internal sub-processes, this diagram shows a single high-level process and its interactions with outside elements. Users, the IT Security Team, the Pricing Team, and the System Administrator are the main external parties that communicate with the system.

This DFD Level 0 emphasises the major processes and their interactions with external entities, ensuring that user requests are processed efficiently, security measures are maintained, and accurate information is provided. Without delving into the specifics of each operation, it provides a thorough but high-level overview of the functions of the Modified POS Malaysia Mobile Application.

### 2.1.2 DFD Level 1

**Figure 3** *Data Flow Diagram of Modified POS Malaysia Mobile Application – Level 1*
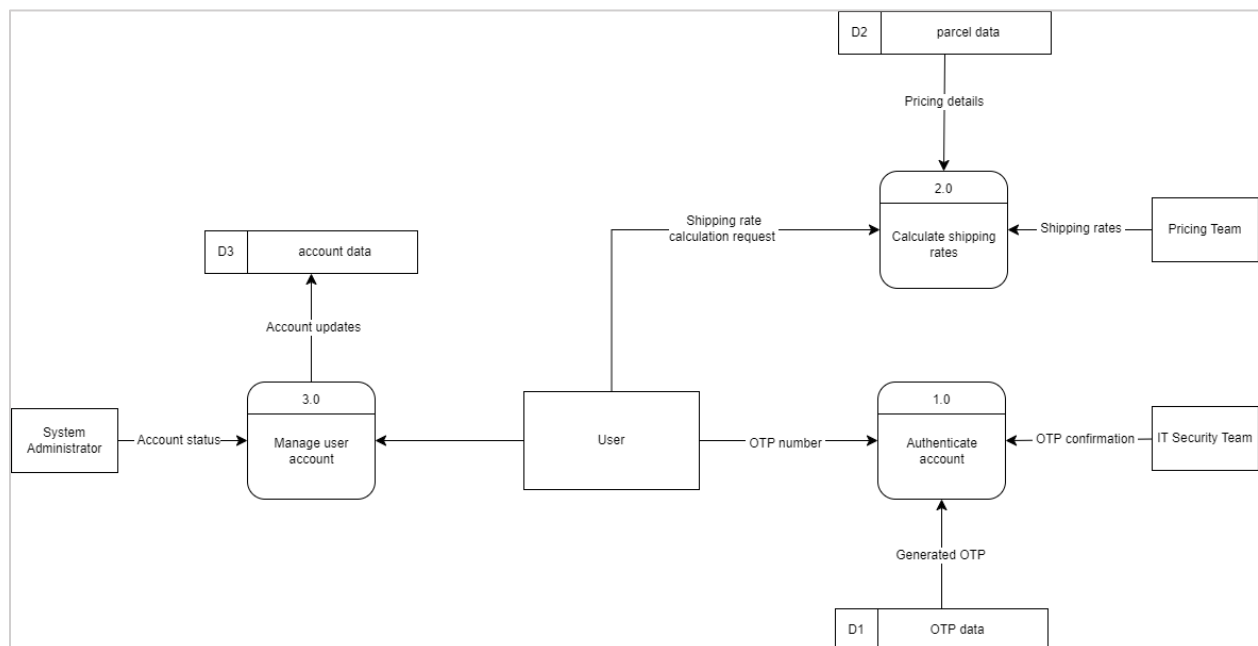


In the simplified DFD Level 1 (**Figure 3**), this level emphasises the three primary processes: OTP authentication, shipping rate calculation and user account management. For example, the detailed steps for requesting, generating, entering, and verifying OTPs are consolidated into a single broader process named "Authenticate account" (1.0).

The Modified POS Malaysia Mobile Application's DFD Level 1 diagram clearly demonstrates the main functions of the system and how they interact with external entities and data sources:

**Authenticate Account (1.0):** Handles the entire OTP authentication process, including OTP generation and verification, in collaboration with the IT Security Team.

**Calculate Shipping Rates (2.0):** Manages the calculation of shipping rates by processing user input and communicating with the Pricing Team.

**Manage User Account (3.0):** Facilitates user account management activities, including updates and deletions, with oversight from the System Administrator and storage in the account data store.

The application's primary functions are shown in this diagram in an easy-to-understand and structured manner, ensuring quick processing of user requests, safe authentication, accurate shipping rate calculations, and efficient account administration.

### 2.1.3 DFD Level 2

**Figure 4** *Data Flow Diagram of Modified POS Malaysia Mobile Application – Level 2*
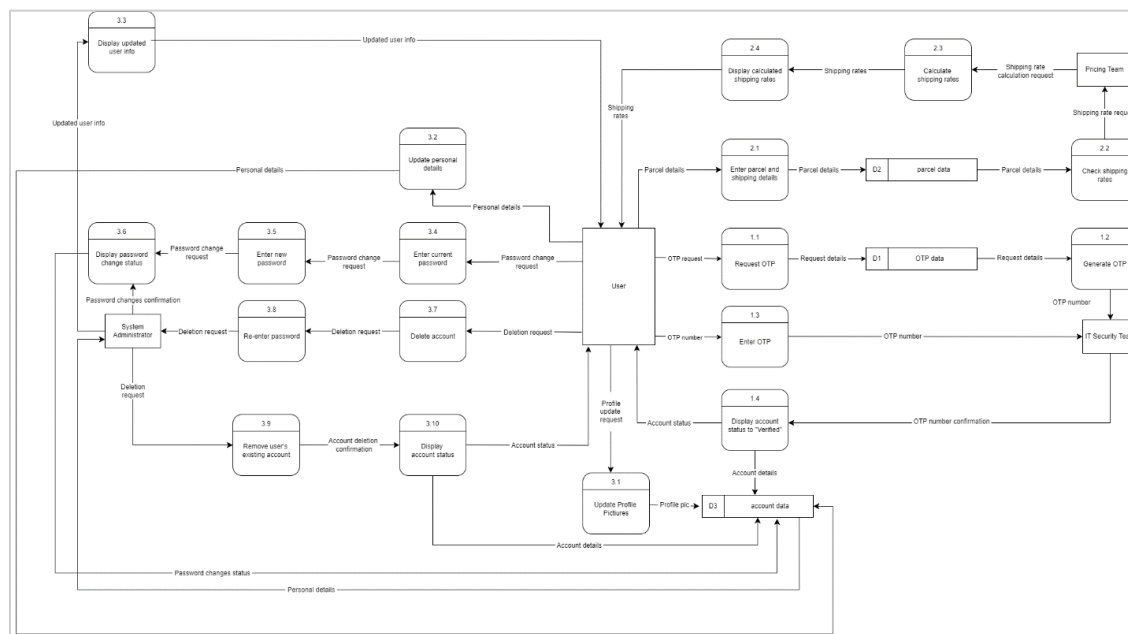


**Figure 4** provides a detailed breakdown of the specific processes involved in security verifications, shipping rate calculation, account management. This diagram offers a closer look at the internal operations of important system data flows and their workings.

**Account OTP Authentication**

- Request OTP (1.1) and Generate OTP (1.2): Users request an OTP for account verification. The request details are stored in the OTP data store (D1), and the OTP is generated by the IT Security Team. The user receives the generated OTP back for confirmation.

- Enter OTP (1.3): Users input the OTP they received to verify their account. The IT Security Team verifies the OTP; if the OTP is correct, the account status is updated to "Verified" (1.4).

**Shipping Rate Calculation**

- Enter Parcel and Shipping Details (2.1): Users enter the details of the parcel and shipping requirements. These details are submitted to the Pricing Team for rate calculation after being kept in the parcel data store (D2).

- Check Shipping Rates (2.2) and Calculate Shipping Rates (2.3): The Pricing Team processes the shipping rate calculation request and calculates the shipping rates. The calculated rates are sent back to the user and displayed (2.4).

**Account Management**

- Update Profile Pictures (3.1): Users can update their profile pictures. The process involves sending a profile update request and storing the updated picture in the account data store (D3). The updated profile information is then displayed to the user.
- Update Personal Details (3.2): Users can update their personal details, such as username, full name, email address and mobile phone. These details are stored in the account data store (D1), and the updated information is displayed back to the user.
- Enter Current Password (3.4): Users enter their current password when requesting a password change.
- Enter New Password (3.5): Users enter their new password, which is then stored and updated in the system. The password change status is confirmed and displayed to the user (3.6).

- Delete Account (3.7): Users can request to delete their accounts. They need to re-enter their password (3.8) to confirm the deletion, which is then processed by the System Administrator. The account is removed from the system (3.9), and the account deletion confirmation is displayed to the user (3.10).

The detailed processes illustrated in this DFD Level 2 highlight the specific steps involved in security verifications, shipping rate calculations, and account management. Every process in the Modified POS Malaysia Mobile Application is linked to relevant data repositories and the external entities, delivering an extensive and effective information flow.

## 2.2 Data Dictionary

Besides DFD Level 0, 1, and 2, there are also higher levels of DFD diagrams. However, constructing the diagram would defeat the purpose of DFD's as increasing levels of DFD yield more details, overcomplicating the diagram (Chi, 2023). The purpose of creating DFD's is to show non-technical stakeholders straightforward and simple overviews of the POS Malaysia mobile application. Hence, instead of diagrams, data dictionaries in the form of tables are provided for better understanding of the system.

### 2.2.1  Data Store

**a)  Account Verification System**

| Data Store Name | OTP Data |
|---|---|
| Description | Logs of all account verification attempts and OTP pins |
| Alternate Name | OTP Logs, OTP |
| Volume | 1GB per day |
| Frequency | Occurs when users authenticate their account, usually after login. |

**Attributes**

| Attribute | Data type | Example Value |
|---|---|---|
| Account ID | String | A987654321 |
| OTP | Integer | 123456 |
| GenerationTime | DateTime | 2024-06-28 10:45:00 |
| ExpiryTime | DateTime | 2024-06-28 10:48:00 |
| Verification Date | DateTime | 2024-06-28 10:46:00 |
| Status | String | Verified |
| IP Address | String | 192.168.1.1 |
| Device ID | String | D123456789 |
| Location | String | Puchong |

**b)  Rate Calculator System**

| Data Store Name | Parcel Data |
|---|---|
| Description | Parcel and shipping details such as region type, parcel type, origin and destination location, parcel weight and dimensions. This information is needed to estimate shipping rates. |
| Alternate Name | Parcel Details, Parcel |
| Volume | 800KB per day |
| Frequency | Occurs when users want to estimate their parcel shipping rates by entering their parcel and shipping details |

**Attributes**

| Attribute | Data type | Example Value |
|---|---|---|
| Rate ID | String | #A789X3E |
| Account ID | String | A123456789 |
| Region Type | String | Domestic/ International |
| Parcel Type | String | Parcel/ Mail |
| Origin | String | Kedah, Alor Setar |
| Destination | String | Puchong, Selangor |
| Parcel Weight | Float | 8kg |
| Parcel Dimensions (L*W*H) | Float | 45 |
| Width | Float | 3 |
| Height | Float | 5 |
| Length | Float | 3 |
| Rate | Float | 10.99 |

## c) Account Management System

| | |
|---|---|
| **Data Store Name** | Account Data |
| **Description** | Stores user account information |
| **Alternate Name** | Account Info, Account |
| **Volume** | 2GB per day |
| **Frequency** | Updated when users modify their account information or reset their password. |

**Attributes**

| Attribute | Data type | Example Value |
|---|---|---|
| Account ID | String | A123456789 |
| Username | String | robert |
| Email | String | robert@example.com |
| D.O.B | Date | 14/08/95 |
| Gender | String | Male |
| Location | String | Kuala Lumpur |
| Password Hash | String | $2y$10$abcdefghijklmnopqrst |
| Last Login | DateTime | 2024-06-28 09:00:00 |
| Status | String | Active |
| Profile picture | Blob | JPG <img src="/images/picture.jpg"> |

### 2.2.2  Data Flows

### a)  Account Verification System

| Data Flow Name | OTP Pin Request |
|---|---|
| Description | Data flow containing the OTP verification request details |
| Alternate Name | OTP Pin Req |
| Origin | User's Device (User) |
| Destination | Verification Server (IT Security Team) |
| Record | Account ID, OTP, Timestamp |
| Volume | 500 requests/day |
| Frequency | Occurs when users authenticate their account, usually after login |

| Data Flow Name | OTP Pin Generation |
|---|---|
| Description | Data flow containing the OTP response |
| Alternate Name | OTP Pin Gen |
| Origin | Verification Server (IT Security Team) |
| Destination | User's Device (User) |
| Record | Account ID, OTP, Timestamp |
| Volume | 500 requests/day |
| Frequency | Occurs after users request OTP |

| Data Flow Name | OTP Verification Request |
|---|---|
| Description | Data flow sending the OTP and user details for verification |
| Alternate Name | OTP Verify Req |
| Origin | User's Device (User) |
| Destination | Verification Server (IT Security Team) |
| Record | Account ID, OTP, Timestamp |
| Volume | 500 requests/day |
| Frequency | Occurs after users obtain OTP pin |

| Data Flow Name | OTP Verification Response |
| --- | --- |
| Description | Data flow containing the result of the OTP verification |
| Alternate Name | OTP Verify Resp |
| Origin | Verification Server (IT Security Team) |
| Destination | User's Device (User) |
| Record | Account ID, OTP, Status, Timestamp |
| Volume | 500 requests/day |
| Frequency | Occurs after users enter correct OTP pin. |

| Data Flow Name | Log Entry |
| --- | --- |
| Description | Data flow sending the result of verification to account data |
| Alternate Name | Verification Status Log |
| Origin | Verification Server (IT Security Team) |
| Destination | POS Malaysia Account Database |
| Record | Account ID, OTP, Status, Timestamp |
| Volume | 500 requests/day |
| Frequency | Occurs after users enter correct OTP pin. |

| Data Flow Name | Verification Notification |
| --- | --- |
| Description | Data flow sending OTP verification result notifications to users |
| Alternate Name | Ver Notif |
| Origin | Verification Server (IT Security Team) |
| Destination | User's Device (User) |
| Record | Account ID, OTP, Status, Timestamp |
| Volume | 500 requests/day |
| Frequency | Occurs after users enter correct OTP pin. |

### b) Rate Calculator System

| Data Flow Name | Parcel Details |
|---|---|
| Description | Data flow sending parcel and shipping details to POS pricing team |
| Alternate Name | Parcel information |
| Origin | Users |
| Destination | Pricing Team |
| Record | Region type, parcel type, origin and destination locations, parcel weight, parcel dimensions |
| Volume | 500 requests/day |
| Frequency | Occurs when users want to estimate their parcel shipping rates by entering their parcel and shipping details |

| Data Flow Name | Shipping Rate Request |
|---|---|
| Description | Data flow sending shipping rate request to POS pricing team |
| Alternate Name | Shipping cost enquiry |
| Origin | Users |
| Destination | Pricing Team |
| Record | Shipping rate |
| Volume | 500 requests/day |
| Frequency | Occurs when users check shipping rates |

| Data Flow Name | Shipping Rate Calculation Request |
|---|---|
| Description | Data flow containing shipping rate calculation request that Pricing Team uses to estimate shipping rates |
| Alternate Name | Shipping rate estimation request |
| Origin | Users |
| Destination | Pricing Team |
| Record | Shipping rate |
| Volume | 500 requests/day |
| Frequency | Occurs when users check shipping rates |

| Data Flow Name | Shipping Rates |
|---|---|
| Description | Data flow sending estimated shipping rates to users |
| Alternate Name | Shipping fees |
| Origin | Pricing Team |
| Destination | Users |
| Record | Shipping rates |
| Volume | 500 requests/day |
| Frequency | Occurs when POS Pricing Team has done calculating shipping rates for the request from users |

### c) Account Management System

| Data Flow Name | Account Update Request |
|---|---|
| Description | Data flow contain the request to update account information |
| Alternate Name | Acc Update Req |
| Origin | User's Device (User) |
| Destination | Account Database |
| Record | Account ID, New Data Fields |
| Volume | 200 requests/day |
| Frequency | Occurs when users update their account information |

| Data Flow Name | Account Deletion Request |
|---|---|
| Description | Data flow contain the request to delete an account |
| Alternate Name | Acc Del Req |
| Origin | User's Device (User) |
| Destination | Account Database |
| Record | Account ID |
| Volume | 50 request/day |
| Frequency | Occurs when users request account deletion |

| | |
|---|---|
| **Data Flow Name** | **Password Change Request** |
| **Description** | Data flow contain the request to change the user's password |
| **Alternate Name** | Pwd Change Req |
| **Origin** | User's Device (User) |
| **Destination** | Account Database |
| **Record** | Account ID, New Password Hash |
| **Volume** | 100 requests/day |
| **Frequency** | Occurs when users change their password |

| | |
|---|---|
| **Data Flow Name** | **Profile Picture Upload** |
| **Description** | Data flow contain the new profile picture data |
| **Alternate Name** | Prof Pic Upload |
| **Origin** | User's Device (User) |
| **Destination** | Account Database |
| **Record** | Account ID, Profile Picture |
| **Volume** | 150 requests/day |
| **Frequency** | Occurs when users upload a new profile picture |

| | |
|---|---|
| **Data Flow Name** | **Account Information Request** |
| **Description** | Data flow contain the request to retrieve account information |
| **Alternate Name** | Acc Infor Req |
| **Origin** | User's Device (User) |
| **Destination** | Account Database |
| **Record** | Account ID |
| **Volume** | 300 requests/day |
| **Frequency** | Occurs when users request to view their account information |

### 2.2.3  Data Process

**a)  Account Verification System**

| Process Name | Request OTP Pin |
|---|---|
| Description | User request OTP pin number. |
| Process Number | 1.1 |

| Process Name | Generate OTP Pin |
|---|---|
| Description | IT Security Team generates 6-pin OTP number. |
| Process Number | 1.2 |

| Process Name | Enter OTP Pin |
|---|---|
| Description | User receives OTP pin and enters into the app. |
| Process Number | 1.3 |

| Process Name | Display Verification Status |
|---|---|
| Description | IT Security Team verifies OTP sent by user against the OTP in the database. If it matches, user verification status is updates to "verified" and a notification is sent to the user. |
| Process Number | 1.4 |

**b)  Rate Calculator System**

| Process Name | Enter Parcel and Shipping Details |
|---|---|
| Description | Users enter parcel and shipping details such as region type, parcel type, origin and destination locations, parcel weight and dimensions. This occurs when users want to estimate shipping rates for their parcels. |
| Process Number | 2.1 |

| Process Name | Check Shipping Rates |
|---|---|
| Description | Users click on "Check shipping rates" once they have filled up all necessary information. This will send a shipping rate |

| | |
|---|---|
| | calculation request to POS Pricing Team to ask for the estimated shipping rates. |
| **Process Number** | 2.2 |

| | |
|---|---|
| **Process Name** | **Calculate Shipping Rates** |
| **Description** | POS Pricing Team calculate shipping rates based on the parcel information provided by users. |
| **Process Number** | 2.3 |

| | |
|---|---|
| **Process Name** | **Display Calculated Shipping Rates** |
| **Description** | The system displays calculated shipping rates to users. |
| **Process Number** | 2.4 |

### c) Account Management System

| | |
|---|---|
| **Process Name** | **Update Profile Picture** |
| **Description** | Process involves updating the user's profile picture in the database |
| **Process Number** | 3.1 |

| | |
|---|---|
| **Process Name** | **Update Personal Details** |
| **Description** | Process involves update the user's account information in the database |
| **Process Number** | 3.2 |

| | |
|---|---|
| **Process Name** | **Display Updated User Info** |
| **Description** | Process involves displaying the updated user information after changes are made to personal details |
| **Process Number** | 3.3 |

| | |
|---|---|
| **Process Name** | **Enter Current Password** |
| **Description** | Process involves users enter their current password when they request to change their password |

| Process Number | 3.4 |
|---|---|

| Process Name | Enter New Password |
|---|---|
| Description | Process involves users enter their new password, which is then stored and updated in the system |
| Process Number | 3.5 |

| Process Name | Display Password Change Status |
|---|---|
| Description | Process involves displaying the status of the password change request to the user |
| Process Number | 3.6 |

| Process Name | Delete Account |
|---|---|
| Description | Process involves deleting the user's account from the database |
| Process Number | 3.7 |

| Process Name | Re-enter Password for Deletion Confirmation |
|---|---|
| Description | Process involves users enter their password to confirm account deletion |
| Process Number | 3.8 |

| Process Name | Remove User's Existing Account |
|---|---|
| Description | Process involves permanently deletes the user's account from the system after re-entering the password |
| Process Number | 3.9 |

| Process Name | Display Account Status |
|---|---|
| Description | Process involves displaying the current status of the user's accunt such as verified, pending verification, or deleted |
| Process Number | 3.10 |

### 2.2.4 Entity(s)

### a) Account Verification System

| Entity Name | User |
|---|---|
| Description | The individual who is attempting to verify their account using the OTP verification system. |
| Alternate Name | Customer, End User |
| Input Data Flow | OTP Pin Request |
| Output Data Flow | OTP Verification Request |

| Entity Name | IT Security Team |
|---|---|
| Description | The server responsible for generating, sending, and verifying OTPs to the user. |
| Alternate Name | OTP Server, Generation Server |
| Input Data Flow | OTP Request |
| Output Data Flow | Verfication Notification |

### b) Rate Calculator System

| Entity Name | User |
|---|---|
| Description | Users who want to estimate shipping rates for their parcels |
| Alternate Name | End User, Customer |
| Input Data Flow | Parcel details |
| Output Data Flow | Shipping rates |

| Entity Name | Pricing Team |
|---|---|
| Description | Team responsible for calculating shipping rates for each request |
| Alternate Name | Rate Calculation Team |
| Input Data Flow | Shipping rates request |
| Output Data Flow | Shipping rates |

### c) Account Management System

| Entity Name | User |
|---|---|
| Description | An individual who uses the POS Malaysia mobile application to manage their account |
| Alternate Name | End User, Customer |
| Input Data Flow | Account Update Request, Account Deletion Request, Password Change Request, Profile Picture Upload, Account Information Request |
| Output Data Flow | Update Confirmation, Account Deletion, Password Change saved, Update Saved, Account Information |

| Entity Name | System Administrator |
|---|---|
| Description | An individual who manages and overseas the POS Malaysia mobile application's system and user accounts |
| Alternate Name | SysAdmin, Admin |
| Input Data Flow | Admin Login Request, User Account Management Request, System Maintenance Request |
| Output Data Flow | Admin Login Response, User Account Management Confirmation, System Maintenance Confirmation |

# 3.0   ERD Diagram

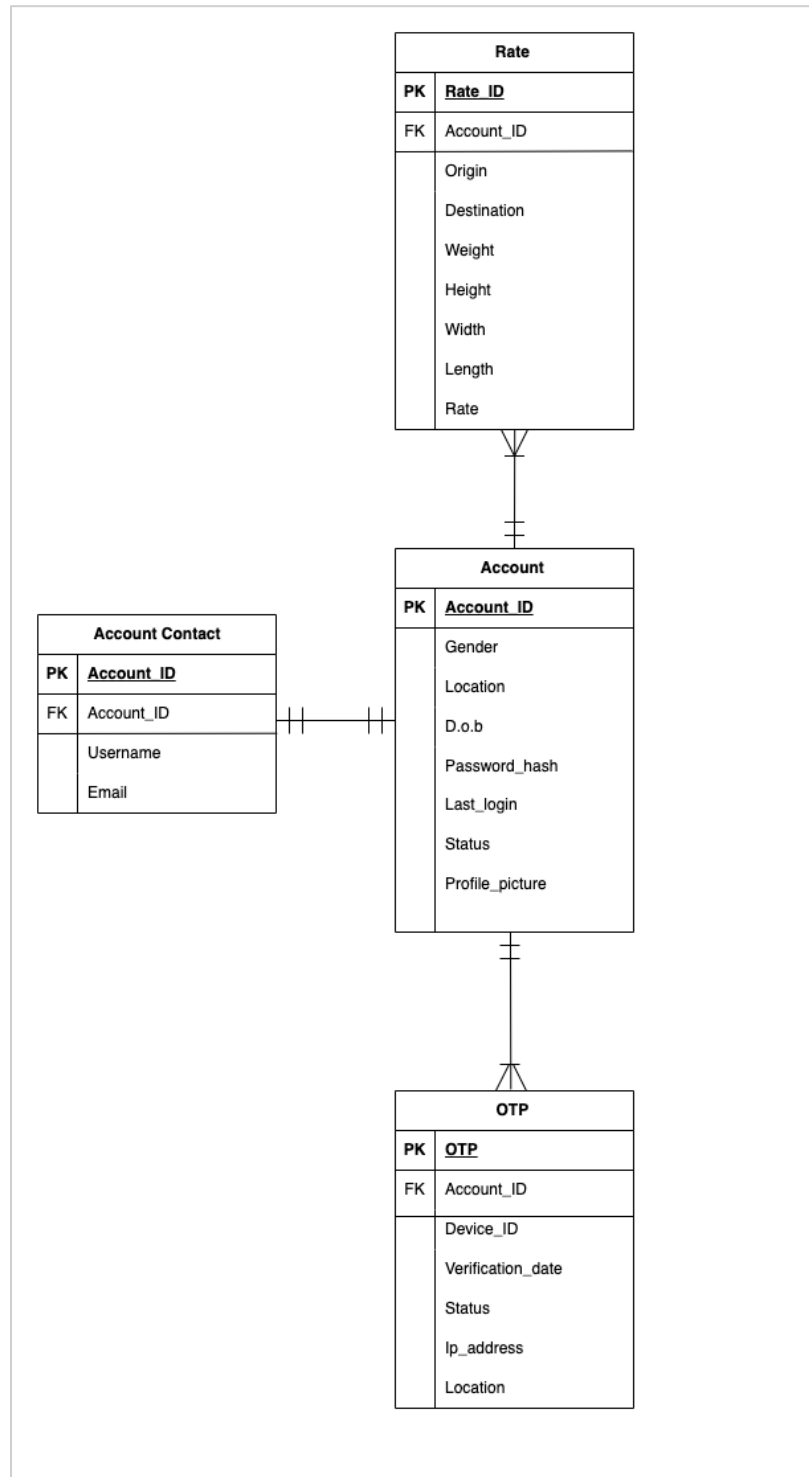**Figure 5** *ERD Diagram of Modified POS Malaysia Mobile Application*

**Figure 5** shows the **entity-relationship diagram (ERD)** of Pos Malaysia application. It shows the entities and the relationship between the entities and illustrates how data are being organised. In this ERD, it contains entities, attributes, and their relationship. Each entity has either primary key, foreign key or both. Primary key is uniquely identified to ensure data does not appear more than once. Foreign keys are keys that refer to primary keys of another table. The ERD is normalised into **third normal form (3NF)** to **minimise data redundancy** through organising data into smaller tables. 3NF is also easier to understand or maintain by causing less issues or errors when making changes to the existing tables.

The primary key and foreign key for account contact is Account_ID and its attributes are username and email. The primary key and foreign key are able to be the same only when the table is connected to a 1:1 relationship. Moreover, account has primary key Account_ID and its attributes contains gender, location, D.o.b, password_hash, last_login, and status. An **account can request multiple OTP** and **conduct multiple rate calculations.** The primary key of entity OTP is OTP with a foreign key Account_ID. The attributes include. Device_ID, Verification_date, Status, Ip_address, and Location. Lastly, entity rate has primary key Rate_ID with foreign key Account_ID. It has 7 attributes which are origin, destination, weight, height, length, width, and rate.

# 4.0   Class Diagram

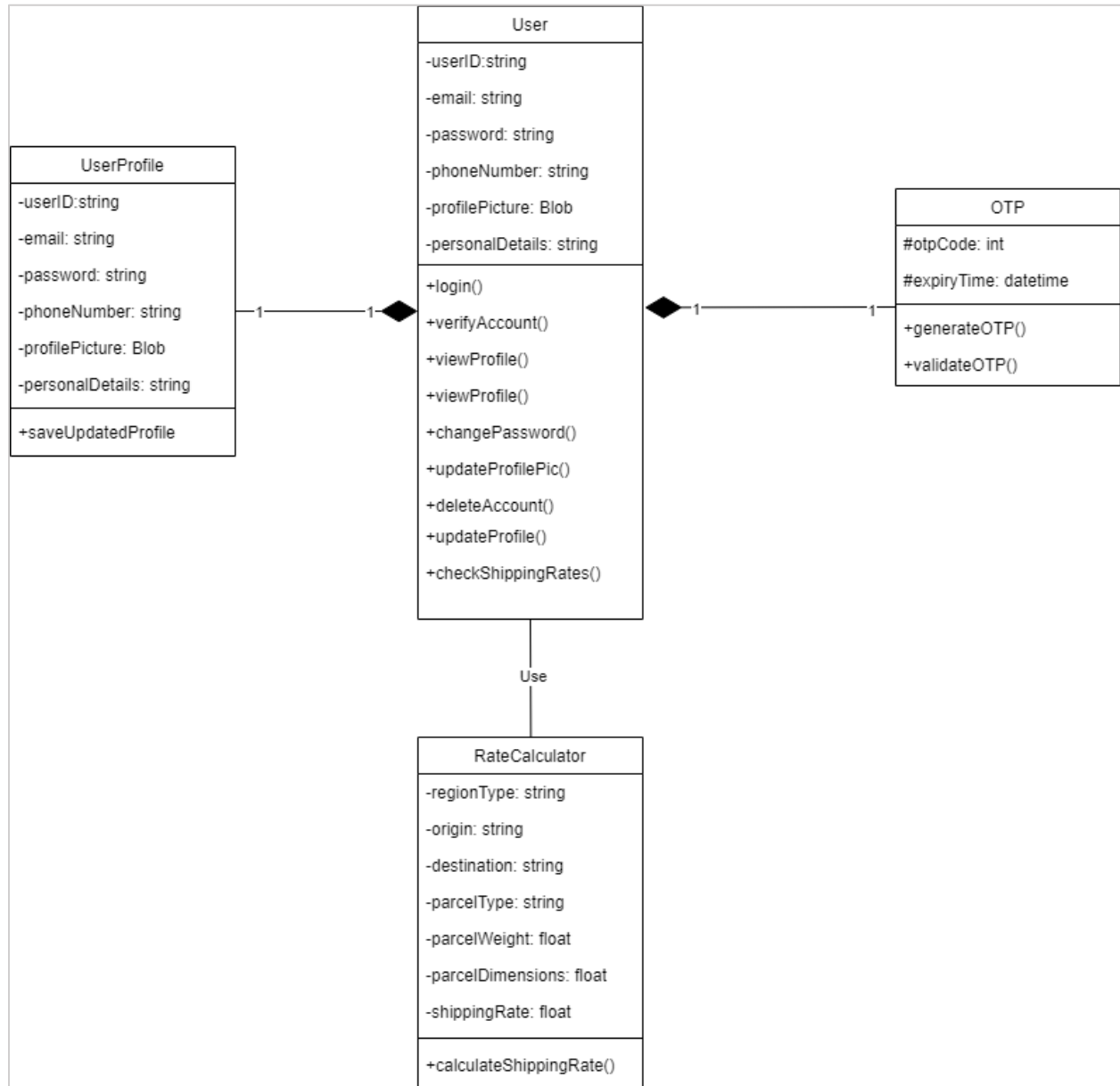**Figure 6** *Class Diagram of Modified POS Malaysia Mobile Application*



**Figure 6** shows the class diagram for the POS Malaysia app. There are four classes: User, UserProfile, OTP, and RateCalculator. The attributes in User, UserProfile, and RateCalculator are private (-), which indicates they cannot be accessed by other classes. The attributes for OTP are protected (#), which means they can be accessed by certain classes; in this case, otpCode and expiryTime can be accessed by User.

The relationship between UserProfile and User is a **one-to-one composition relationship**. UserProfile can only exist when there is a User, and one User can only have one UserProfile. The relationship between User and OTP is also a one-to-one composition relationship whereby OTP will only be generated when there is a new user creating an account, and one OTP is only valid for one user. There is a direct association relationship between User and RateCalculator, where users can use the RateCalculator feature to check shipping rates.

# 5.0   Sequence Diagram

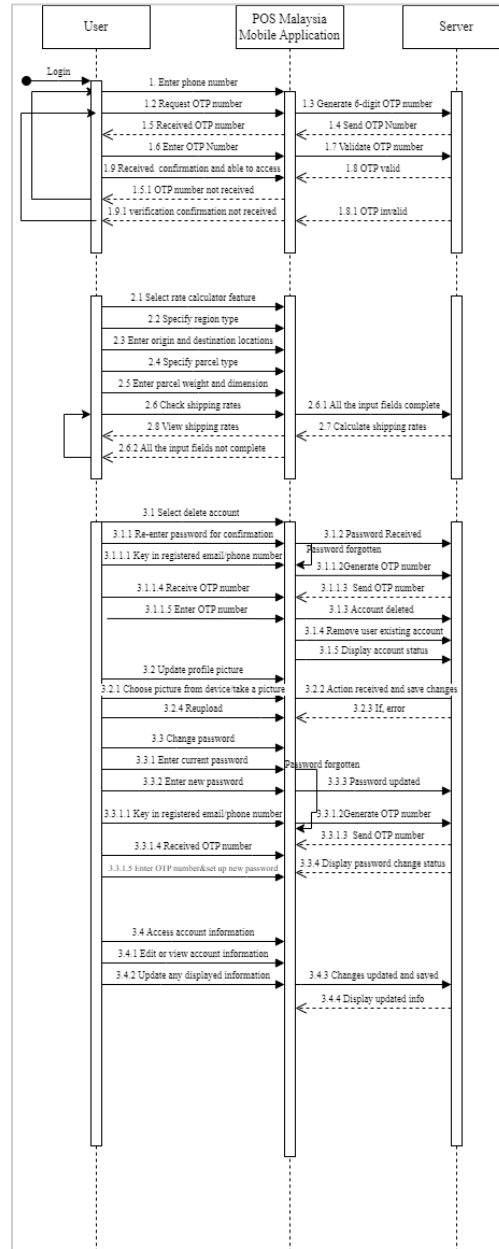**Figure 7** *Sequence Diagram of Modified POS Malaysia Mobile Application*



**Figure 7** outlines the **interactions between the user, POS Malaysia mobile application and server**, detailing how the proposed enhancements will function in the application. The process starts with **an OTP authentication verification**, where a user enters their phone number to begin the account verification process by requesting OTP number to the mobile app and the mobile app sends a request to server to generate code

and send it to user's registered phone number. The OTP Service validates the OTP and responds to the mobile app with the result (valid or invalid). The mobile app then notifies the user of successful authentication. If the user did not receive any OTP number or verification invalid, they have to enter the phone number again or request for another OTP number instead. Users can **access the rate calculator** by inputting shipping details which is the origin, destination, and parcel dimensions. The mobile app sends these details to the POS Malaysia server to calculate shipping rates. The server processes the information and calculates the shipping rates based on the provided details and sends the calculated rate options back to the mobile app. The mobile app displays the accurate cost for users. Following the account management, users delete their account by just entering their password. The application will be received, and account will be deleted. If users forgot their passwords, they might need to request for an OTP number to reset the password and **delete the account**. The mobile app then notifies the user of successful deletion. Users can **update their profile picture** and mobile application will send it to server when the action met, and changes saved. If an error happens, users will have to reupload it. Users can change their password by just entering their current password and new password and the server will update the password successfully. If users forget their current password, they will request for OTP number by enter their registered phone number or e-mail; server generates an OTP number and sends it back to user and allows user to change a new password. Last but not least, the user can view and edit their profile information. The mobile app sends the updated profile information to the POS Malaysia server for processing; the server processes the update and save. This sequence diagram details how the system integrates with the mobile app and the POS Malaysia server, ensuring a secure and user-friendly process.

# 6.0   State Transition Diagram

**Figure 8** *State Transition Diagram of Modified POS Malaysia Mobile Application*
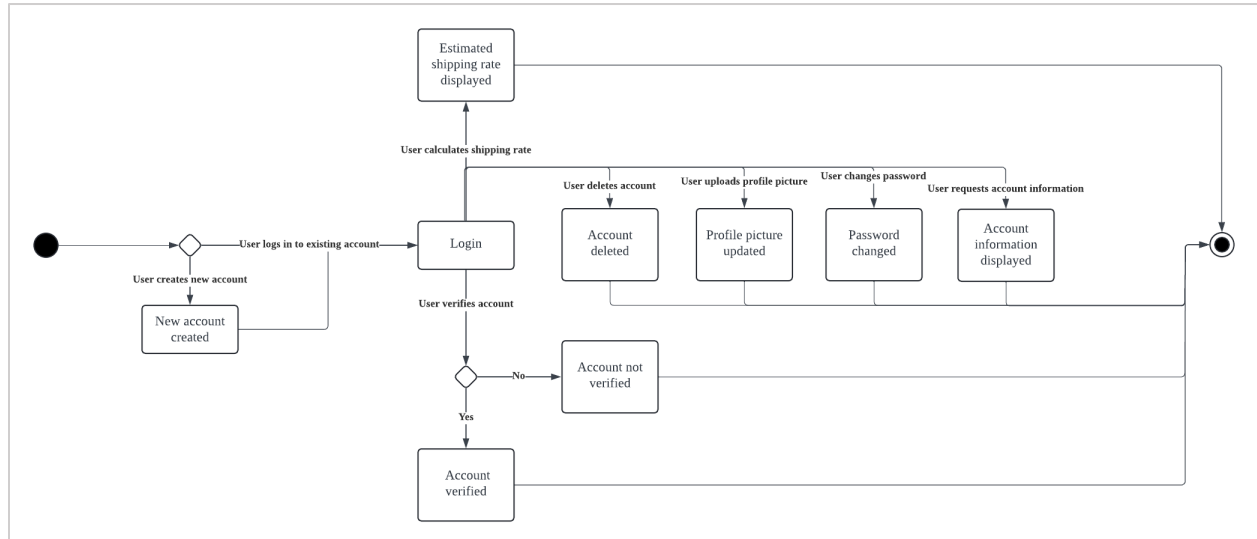


**Figure 8** outlines **the various states and transitions a user experiences** within an account management system. The process begins with a user either creating a new account or logging into an existing one. If a new account is created, the system transitions to the "*New account created*" state, followed by the user verifying the account. Depending on the verification status after conducting **account authentication**, the system either moves to "*Account verified*" or remains in "*Account not verified*." Once logged in, the user can perform several actions: **calculating the shipping rate**, which transitions to the "*Estimated shipping rate displayed*" state; **deleting the account**, moving to the "*Account deleted*" state; **uploading a profile picture**, leading to the "*Profile picture updated*" state; **changing the password**, transitioning to the "*Password changed*" state; and **requesting account information**, resulting in the "*Account information displayed*" state. Each action allows the user to return to the main functions or end the session, thus completing the cycle. This diagram effectively captures the user interactions and corresponding state changes within the system, providing a clear overview of the possible user journeys.

# 7.0 Activity Diagram

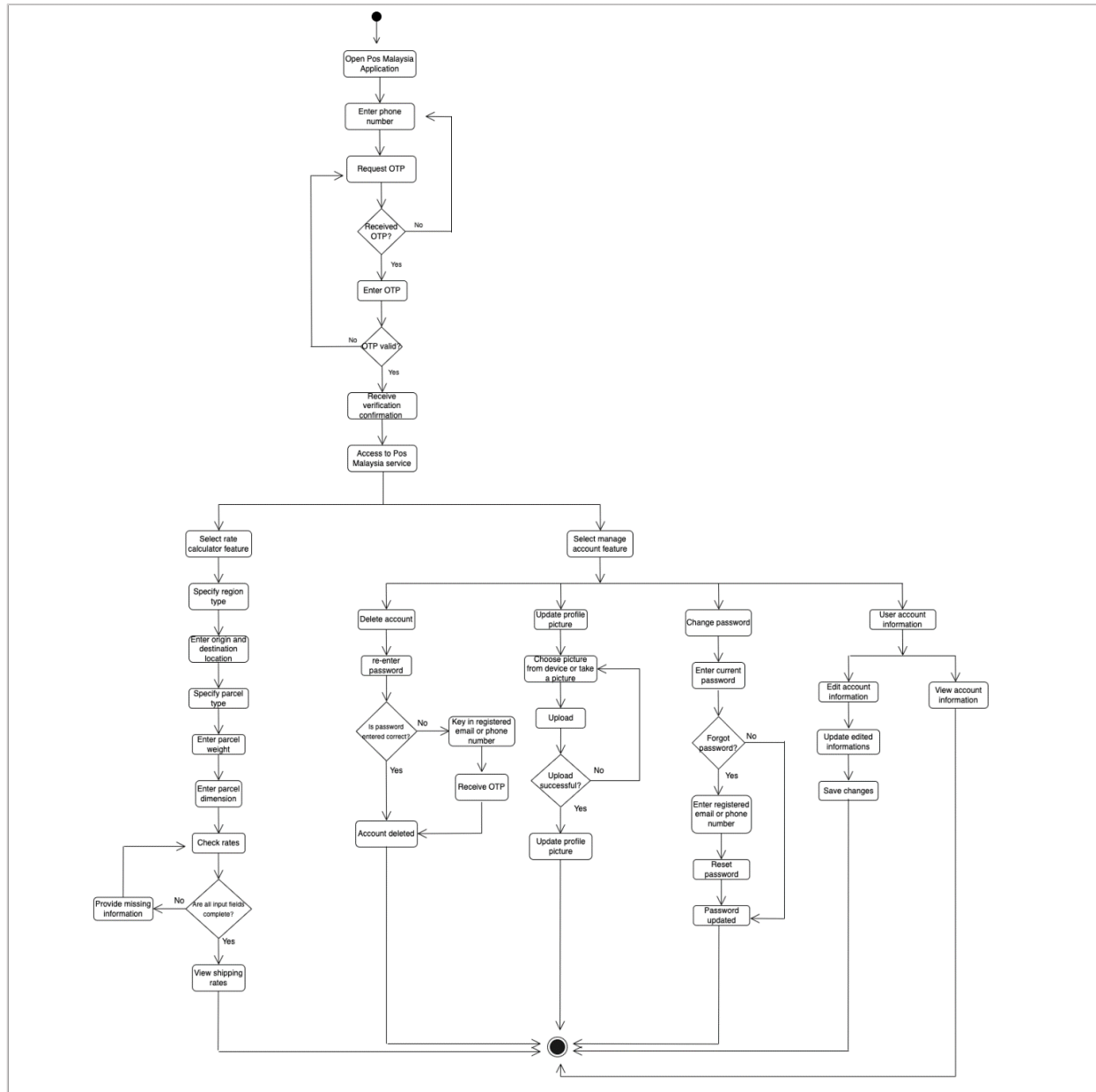Figure 9 *Activity Diagram of Modified POS Malaysia Mobile Application*



**Figure 9** illustrates the **steps to use Pos Malaysia mobile application** including steps to **verify the account**, using **rate calculator function**, and **manage user account** feature. The steps begin with customer entering their phone number to get OTP when user first open Pos Malaysia mobile application. When the OTP is valid, users are able to

access to Pos Malaysia's service. If the OTP is invalid, users have to request for OTP again. In the mobile application, users are able to choose rate calculator feature or manage account feature. If rate calculator feature is selected, users would have to specify sender and receiver location, parcel information to check the rates. If the inputs are not complete, users are asked to provide the missing information to continue the process. However, if user chose manage account feature, they can choose to delete account, update profile picture, change password, or edit or view user account information. To delete accounts, users have to re-enter their password if it is incorrect, they are asked for their email or phone number to get the OTP. When users want to update their profile picture, they can choose to upload it from their device or take picture. Once uploaded, the system will update the profile picture else, users would have to upload the picture again. Users are able to change their password by entering their current password and the new password. If they have forgotten their password, they have to enter email or phone number to reset the password. Lastly, users are able to view or edit their account information. Once the information is updated, the system will save the changes. This diagram clearly shows each step of Pos Malaysia mobile application, showing how each task is executed.

# 8.0 Use Case Diagram

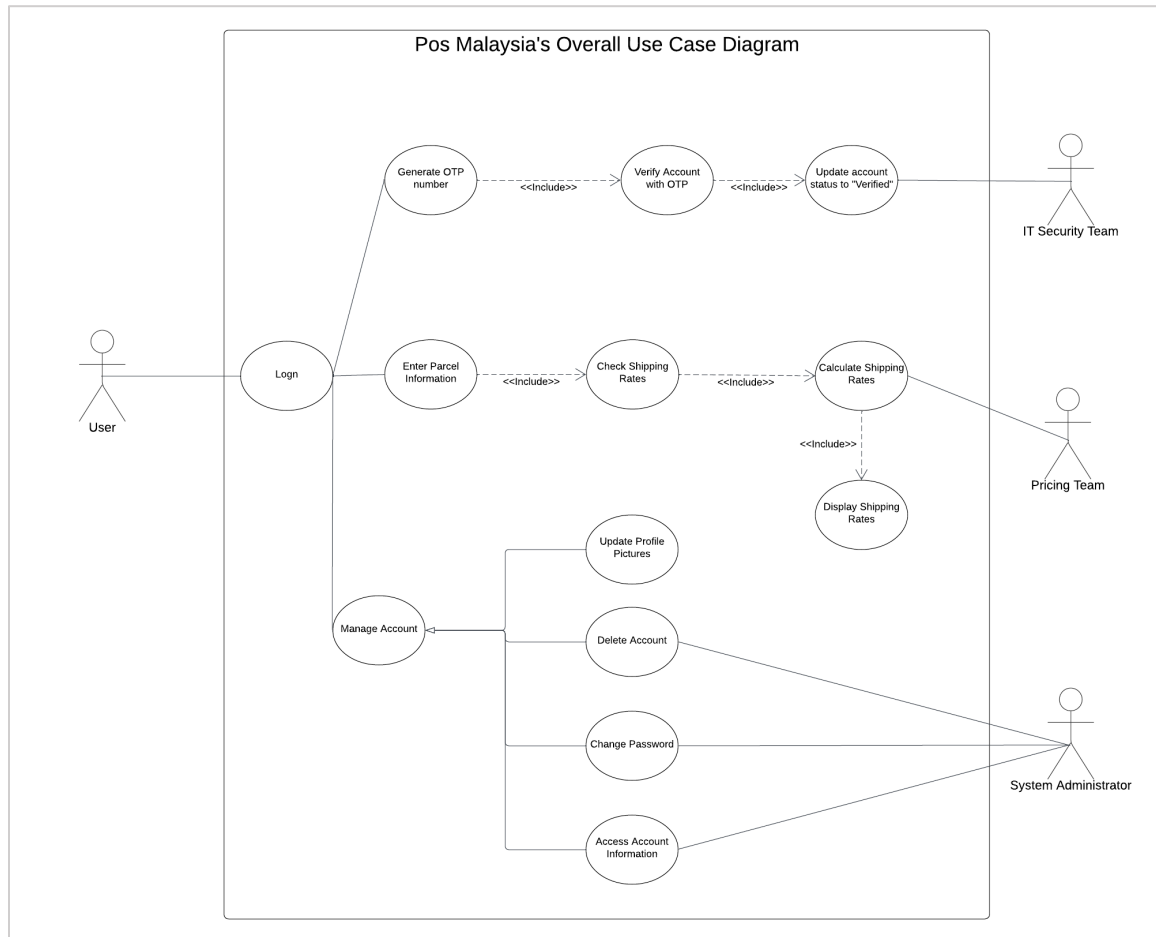**Figure 10** *Use Case Diagram of Modified POS Malaysia Mobile Application*



**Figure 10** provides a comprehensive view of **the interactions between a user and the system**, highlighting the roles of various **supporting teams** such as the **IT Security Team**, **Pricing Team**, and **System Administrator**. The **primary actor** in this diagram is the **user**, who begins by logging into the system. Upon logging in, the user can perform several key actions. The first action involves entering parcel information, which includes checking and **calculating shipping rates**. These activities are supported by the Pricing Team, which ensures that accurate shipping rates are displayed.

Another significant action is **managing the user account**, which includes several specific tasks: updating profile pictures, deleting the account, changing the password, and

accessing account information. These tasks are facilitated by the System Administrator, who ensures that the account management processes run smoothly and securely.

Additionally, the diagram outlines the process of account verification. After logging in, the user can generate a One-Time Password (OTP), which is part of **the account verification process**. This process involves verifying the account with the OTP and subsequently updating the account status to "Verified." The IT Security Team oversees these actions to ensure the security and integrity of the user account.

Overall, this use case diagram effectively illustrates the various interactions and processes involved in the Pos Malaysia system, detailing the roles of the user and supporting teams in managing account activities and ensuring secure, accurate operations.

# Contribution Statement

| Name | StudentID | Percentage | Activities |
|------|-----------|------------|------------|
| Lauren Wong Hyun-Ee | 21046305 | 20% | • Prepared SDD/SDS Section 2.2 Data Dictionary for account verification system.<br>• Completed SDD/SDS Section 6.0 State Transition Diagram. |
| Khor Jia Ming | 21044516 | 20% | • Prepared SDD/SDS Section 2.2 Data Dictionary for rate calculator system.<br>• Completed SDD/SDS Section 4.0 Class Diagram. |
| Tai Yong Xuan | 22012835 | 20% | • Prepared SDD/SDS Section 3.0 ERD diagram.<br>• Completed SDD/SDS Section 7.0 Activity Diagram. |
| Ooi Shi Qi | 21098272 | 20% | • Completed SDD/SDS Section 1.0 Context Diagram and Section 2.1 Data Flow Diagram<br>• Completed SDD/SDS Section 8.0 Use Case Diagram. |
| Chia Wan Ying | 23020829 | 20% | • Prepared SDD/SDS Section 2.2 Data Dictionary for account management system.<br>• Completed SDD/SDS Section 5.0 Sequence Diagram. |

# References

Chi, C. (2023, September 6*). A beginner's guide to data flow diagrams. Hubspot.*

        https://blog.hubspot.com/marketing/data-flow-diagram