SOEN 6481 - Software System Requirements Specification

Fall 2019

Requirements Analysis and Elicitation for Ticket Vending Machine

Project Report

Deliverable 1

Presented to

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Github URL : https://github.com/niravjdn/SRS-Project

Contents

Chapter 1

Introduction

1.1 Introduction

This document provides an understanding of iGo, a ticket vending machine (TVM) which shall be used in Canada, Montreal, Quebec.

1.2 Purpose

The purpose of this document is to collect, analyse and define needs and features of an online Ticket Vending Machine system (iGo) in Montreal, Quebec, Canada. It focuses on the features expressed by stakeholders which they would like to see in their application. This document provides details of how iGo - an online ticket vending machine fulfills these needs.It describes the problems graphically with the context of use modeling, problem domain modeling, stakeholders modeling and use case modeling for different perspectives.

1.3 Scope

This document applies to the Online Ticket Vending Machine(or System) (called iGo) in Montreal, Quebec, Canada, mainly for metros and buses. iGo plays as an online platform allowing travellers to top up their OPUS cards and manage STM transactions themselves. iGo does not include the development and maintenance part of STM system and physical STM Ticket Vending Machines in STM offices.

Chapter 2

Product Overview

2.1 Problem Statement

Most of transportation we utilize every day in Montreal, Quebec, Canada is given by STM (Montreal Transit Corporation) with buses and metros. The travellers have either have to buy re-loadable OPUS card or one time usable tickets. The travellers must have to reload their card every week or every month. In order to top up their OPUS card, travellers often wait for a long queue in front of machines and STM office stations. The travelling process could be interrupted due to the fact that people usually forget to top up their OPUS card on time.

iGo is an online Ticket Vending Machine Web Application that integrates with STM OPUS Card reloading system. People can connect and top up their OPUS cards online using their desktops or mobile devices at home. The payment can be made using debit, credit cards or via Paypal.

2.2 iGo Description

The solution is intended to build an online web application that enables traveller to register, login, link and top up their OPUS cards. The similar system exist in Toronto Public Transport. iGo will establish a communication with the STM and manipulate data related to OPUS card. This system will allow user to top-up their cards from their home and not wasting time waiting in queue.

A customer will be required to sign up an account with iGo on their first time. In order to top up or make transactions, a traveller is required to link their OPUS card number (displaying on their OPUS card) with their registered iGo Account. Once user has signed up successfully and linked their OPUS card, they shall be able to see all the transactions made over their account. A traveller will be able to use their existing OPUS cards to travel in Montreal (Quebec, Canada) via buses and metros operated by STM. In this way, the solution will have backward compatibility.

iGo must be able to provide the following functionalities to travellers:

Figure 2.1: Sample image of photo-OPUS card with the unique card number displaying on the back side, provided by STM (Montreal, Quebec, Canada)[4]

1. A traveller shall be able to register to an iGo account online, with their email address and be able to link their OPUS card number to their iGo account.
2. A traveller shall be able to make a payment transaction to top-up opus card linked to their account. After login, a traveller will select a top-up amount. The transaction could be made via Credit Card, Debit Card or PayPal.
3. A traveller shall be able to see the OPUS card balance or expiry date of top-up.
4. A traveller shall be able to view the OPUS transactions, and must be able to print out or export that transactions.
5. A traveller shall be able to set up scheduled payment for their OPUS card.
6. A traveller shall be able to use their OPUS card to go through buses or metros. The OPUS scanner at STM gates and STM buses must be able to detect if the OPUS card has a enough balance or not.
7. A traveller shall be able to unlink any OPUS cards under their iGo account.
8. A traveller shall be able to add more than one OPUS cards under one iGo account.

iGo will communicate each transaction to STM System and obtain the confirmation of the transaction. Gradually, a transaction will be considered complete by STM once it has been paid successfully and it has been approved by STM. iGo will connect with STM System to make sure transactions are successfully made.

While sigining up, if IGo System detects the email has been used by another user, the user shall have to sign up using other email. If STM determines that the STM card number is linked to another existing iGo account, a traveller will not be able to link this OPUS card number to their iGo account

unless other user unlink the opus card from their account. In all cases, iGo is required to display an explanation of the problem.

iGo will also maintain its internal log of transactions to facilitates resolving ambiguities arising from a connection failure in the middle of transactions between iGo and STM System. Entries will be made in the log when a traveller registers an account, logs in and working on their their login session.

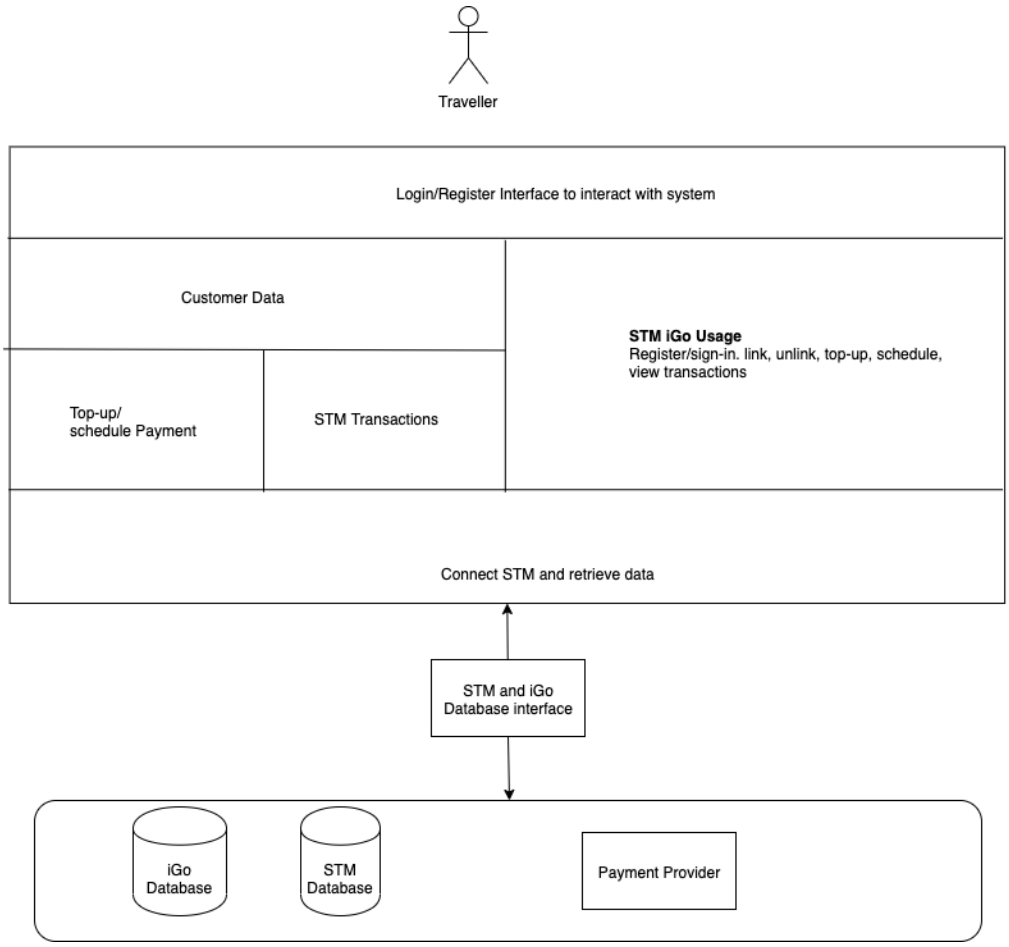

Figure 2.2: Overview of the STM iGo architecture

2.2.1 Project Assumption

For this project, iGo does not implement STM Card Readers which will be installed on buses and metros entries. The supposition that is made that STM will execute and introduce STM Card Readers which will have the option to distinguish a STM card by its number, checking its equalization and refreshing it in STM's framework.

Chapter 3

Context of Use

We use the user-centric context of use framework [2] to identify and classify factors that influence the utility and usability of iGo.

Factor	Description
User	STM Commuters
Experience	The commuters who commute on a daily basis using the mode of transportation as Société de transport de Montréal (STM) Bus service as well as the metro service will have their NFC enabled OPUS cards linked to the iGo web application. The interface of the iGo application will have the interface similar to the current system so that the learning curve will not be high and it would be easy for the commuters to accommodate the technology (i.e. understanding the functionality of the OPUS cards, features, etc.). The users who have experience with online purchasing of the goods would find it easy to familiarise themselves with the web app. Moreover, for the users who are not accustomed to online shopping or any online purchase will be provided with a list of guidelines which are needed to be followed to get the benefits of the system.
Education	The commuters who are not familiar with English and French, wont be able to utilise the iGo web application. Moreover, the users who are not accustomed to the computers or mobile won't be able to use the application. So, it's necessary for the commuters to learn the aforementioned things.

Physical Characteristics	The users who are visually impaired and who cannot understand the aforementioned languages cannot operate the iGo web service because there is no inbuilt translation and text-reading feature inscribed in the application.
Cognitive Characteristics	The people who are familiar with the two languages, as well as have a wide experience of online surfing would get accustomed easily to the iGo app.
Task	Establishing a connection between the OPUS card and the web application. Moreover, logging in to perform the daily operations.
Complexity	The Complexity of any application affects the user response as well i.e. if the complexity of the application is high then the there will be a negative customer response. On the contrary, if the application is easier to understand and more user friendly, then it would boost the customer response.
Demands	There is a high demand for the iGo application, because of the following vulnerabilities pertaining in the current system: 1. Long line and burden that explorers must face when they recharge their OPUS cards. 2. Visiting the STM ticketing machine for recharging the OPUS card which might not be convenient to many. 3. Furthermore, STM provides passes as well, so the commuter might not be aware of the number of passes and may run out of passes while in transit. 4. Montreal city is one of top 3 cutting edge urban communities in Canada and one of 25 innovative urban communities on the planet. iGo suites the interest of individuals who need to appreciate the comfort of innovation in their STM day by day.[**tech˙city**]
Workflow Controllability	The work process of iGo web application ought to be straightforward for clients to get it. Target end clients could be senior natives or little youngsters who are required to utilize iGo effectively.
Safety	As iGo is an online application, authentication and security are the major concepts which were kept in mind while developing the application to incorporate the security features.

Criticality	iGo is expected to work precisely. Commuters who pick iGo to top up and deal with their OPUS exchanges can utilize OPUS on all STM metros and bus services. Any blunders caused during on the web exchange procedures are not acknowledged.
Environment	Online and language specific.
Physical Environment	So, in order to utilize iGo, voyagers are relied upon to have a PC or cell phone associated with the Internet. Gadgets are relied upon to help web perusing.

The above table describes the CUIGO of iGo

3.1 Stakeholders

Due to the context of use of iGo, a stakeholder mind map has five main branches:

1. iGo Development team
2. Quebec Government
3. Federal Government
4. STM
5. General Public who are travelling via STM transportation in Quebec's Montreal city.

iGo development team and STM are two main stakeholder groups without whom iGo project could not succeed. Since iGo and STM are related to a public transportation that operates daily transit services in Montreal, Quebec, Canada, two other stakeholders group must be analysed, which are the Federal Government of Canada and the Quebec Government. The last stakeholder group that directly uses and enjoys benefits of iGo - Montreal city residents must also be analysed.

3.2 Stakeholders description

After discovering stakeholders via mind mapping method, we come up with two main group of stakeholders:

1. Non-User stakeholders: Stakeholders who are not end clients of an iGo framework. They might be influenced by the impact of iGo (emphatically or contrarily) or they may influence the achievement of iGo. We bunch them into Non-User partners gathering.
2. End-User stakeholders: Stakeholders who are end clients of an iGo framework, who legitimately advantage from iGo highlights and who straightforwardly interface with iGo framework.

Non-user stakeholders

Name	Description	Responsibilities
Quebec Government	This is a stakeholders who must offer authorizations to let iGo and STM to coordinate.	Bolster STM and iGo in the law points of view.
Government of Canada and Transport Ministry of Canada	This is a stakeholder who must offer authorizations to let iGo and STM incorporate. This partner gathering has a similar power level with Quebec Government in this task.	Bolster STM and iGo in the law point of view.
STM Office Management	This is a stakeholder who gives the business rationale and the board support for iGo development group.	Verify iGo business requirements. Advise existing clients about iGo Bolster clients during the change from STM TVM to iGo.
iGo Developers	This is a stakeholder who must be included routinely to keep up the improvement cycle of iGo.	Create iGo as per checked business necessities.
iGo Business Analyst	This is a stakeholder that works with Analysts in STM to accurately make an interpretation of solicitations or necessities into prerequisites to be utilized for advancement.	Determines subtleties of iGo's functionalities.
iGo Project Manager	This stakeholder leads the iGo system development.	Acts as a delegate between the advancement group and the STM. Answerable for following the status of the venture inside spending plan and calendar.

STM Developers	This is a stakeholder who must be included routinely to keep up the advancement cycle of iGo.	Develop iGo REST APIs to connect to STM internal system.
STM Business Analyst	This is a stakeholder that works with analysts in iGo to effectively make an interpretation of solicitations or necessities into prerequisites to be utilized for advancement.	Indicates subtleties of iGo's functionalities to be good with STM.
STM Project Manager	This is a stakeholder who is driving for iGo and STM coordination framework advancement.	Goes about as a middle person between STM specialists and the iGO programming supervisory crew.
Local business who do the top up services for STM card	Local organizations have a STM top up charger which enables individuals to top up their OPUS cards without visiting TVM machine in STM workplaces. This partners won't be content with iGo achievement since they will lose their income. [3]	Not applicable

3.2.1 User stakeholders

Name	Description	Responsibilities
Customers who have STM cards	Primary users of iGo	Use iGo online web application for garnish up their OPUS cards and dealing with their STM exchanges.

3.3 Stakeholders model

In the wake of examining obligations of partners , we think of the accompanying partner model, portraying their impact to iGo. The further the partners from iGo, the least impact level that they may bring to iGo.

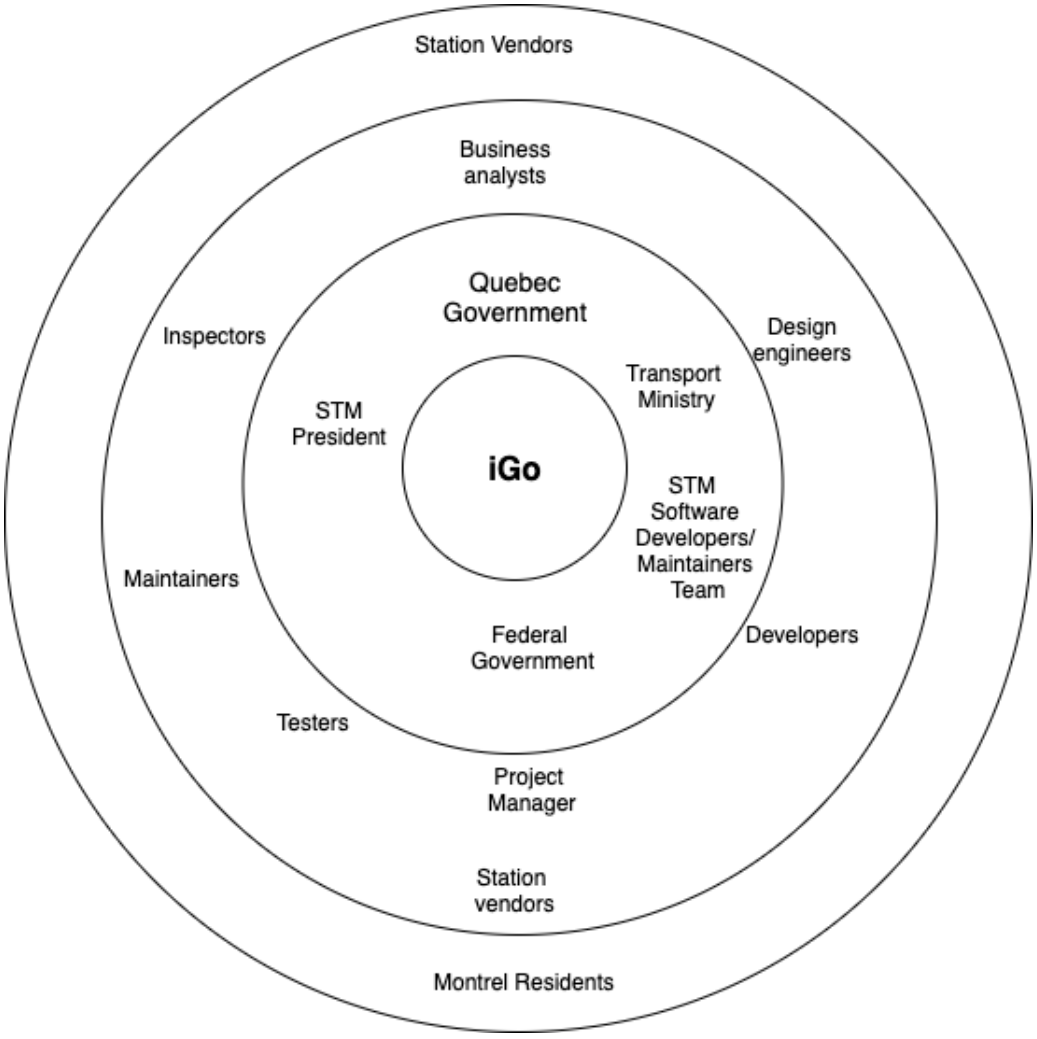

Figure 3.1: The Onion model representation for IGO (SMIGO)

We organize iGo partners dependent on their impact and significance it could be said that without them, iGo will fall flat.

- Critical
  - The Federal and Quebec Governments has the most noteworthy need since they will give authorizations on iGo's association with STM Cloud just as money for iGo.
  - The iGO improvement group and STM advancement group has an equivalent impact since they create and keep up iGo framework.

- Major
  - The STM agents in the significant rundown as they plan and confirm the necessities of the clients and its representatives.
  - Montreal residents are significant partners since they are immediate clients of the framework. Their inputs and their needs are critical to the accomplishment of iGo.
- Minor
  - Neighborhood organizations who administration clients to top up OPUS cards through their OPUS scanners are the least impact partners. They have no duties and less to state about iGO.

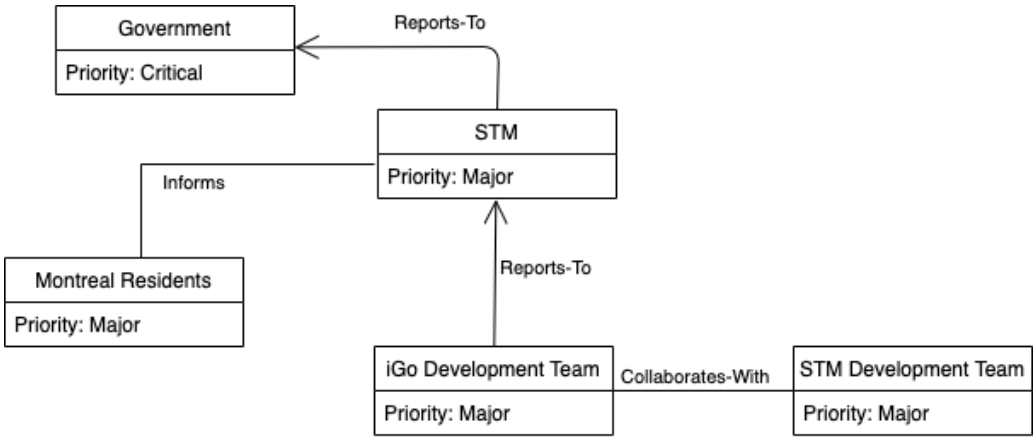

Figure 3.2: Stakeholders relationship model

3.4 Problem Domain Model

Followings are the concepts that are depicted in the domain model:

- STMUser: A generic term of the user who interact with the IGo system, for the IGo system, the potential user including regular citizen, student, senior citizen, children and differently abled user.
- OPUSCard: The physical artifact that helps the user to interact with the system.
- IGoAccount: For the sake of the using the system more convenient, a specific IGo account is created for each user.
- Transaction: A composition of the functionalities included in the system, the user are able to initialize the transaction,including register the account, inquiry the balance, deposit the money, and obtain invoice.

- Payment: Certain transaction will need the user to pay. For example, deposit in the account.

From the domain model of the IGo system, we can clearly see the properties of each concepts listed above and the relationships between these concepts.

- Between the IGoAccount and the STMUser, a one-to-one relationship is exist. For the IGo system, each user in the system will be given a unique account to interact with the system.
- Between the STMUser and the Transaction,a one-to-many relationship is exist. For the IGo system, a user are able to initialize multiple transaction, however for each specific transaction, only one user will be involved.
- Between the Transcation and the payment, a ont-to-one relationship is exist. For a specific transaction, a unique payment operation will be initialized. And for a specific payment operation,exist a specific transaction only.
- There is a generalize relationship between STMUser and several specific user type, as mentioned above, regular citizen, student, senior citizen, children and differently abled user.
- There is a generalize relationship between Transaction and several specific transcation type, as mentioned above, register the account, inquiry the balance, deposit the money, and obtain invoice.

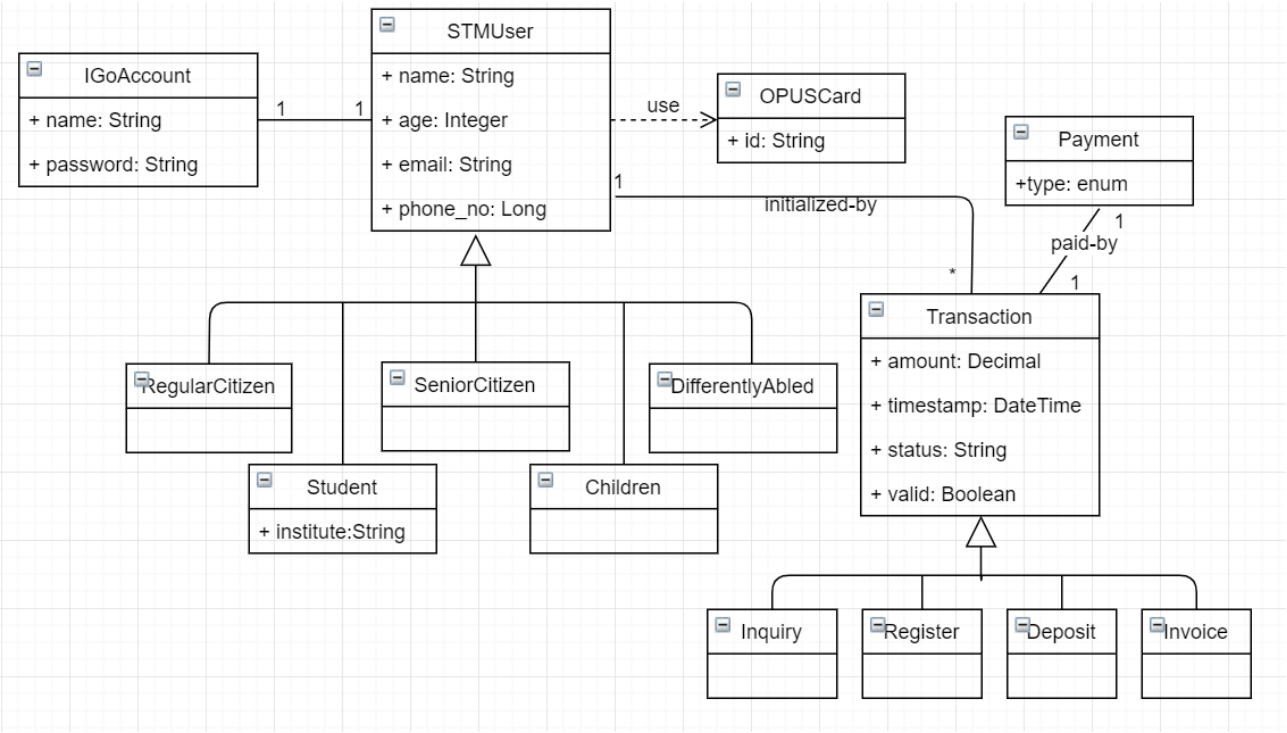

Figure 3.3: Domain Model of IGo (DMIGO)

Chapter 4

Use Case Model

4.0.1 Use Case Diagram

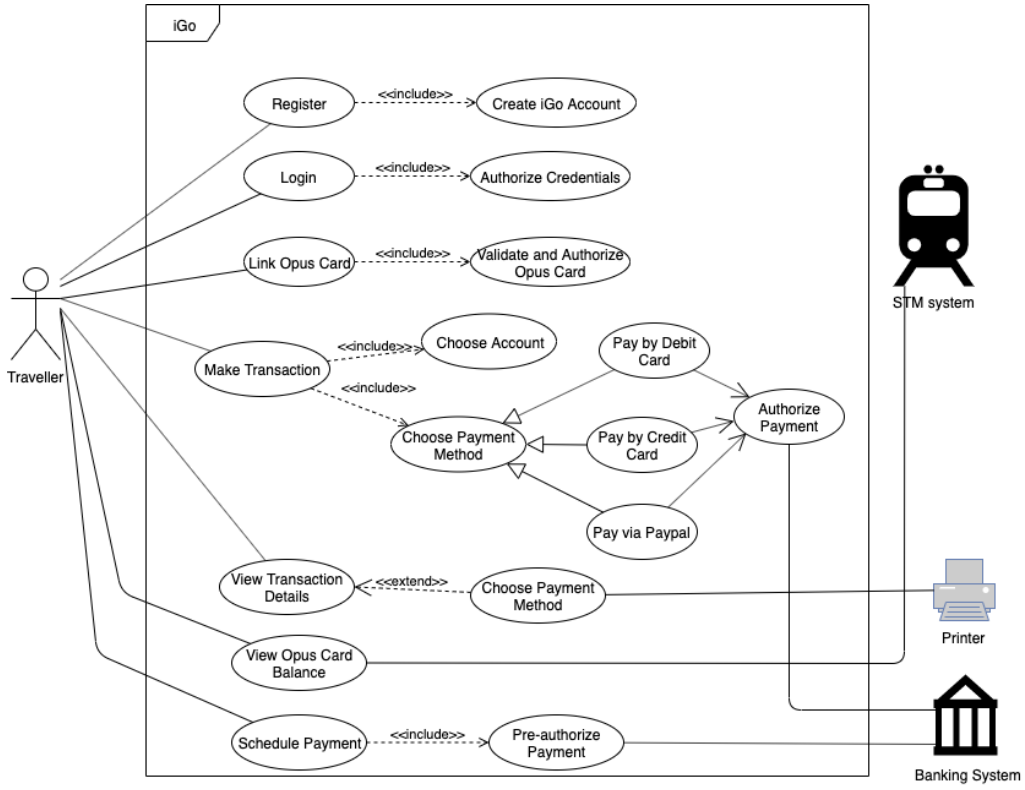

Figure 4.1: Use case model of iGo (UCMIGO)

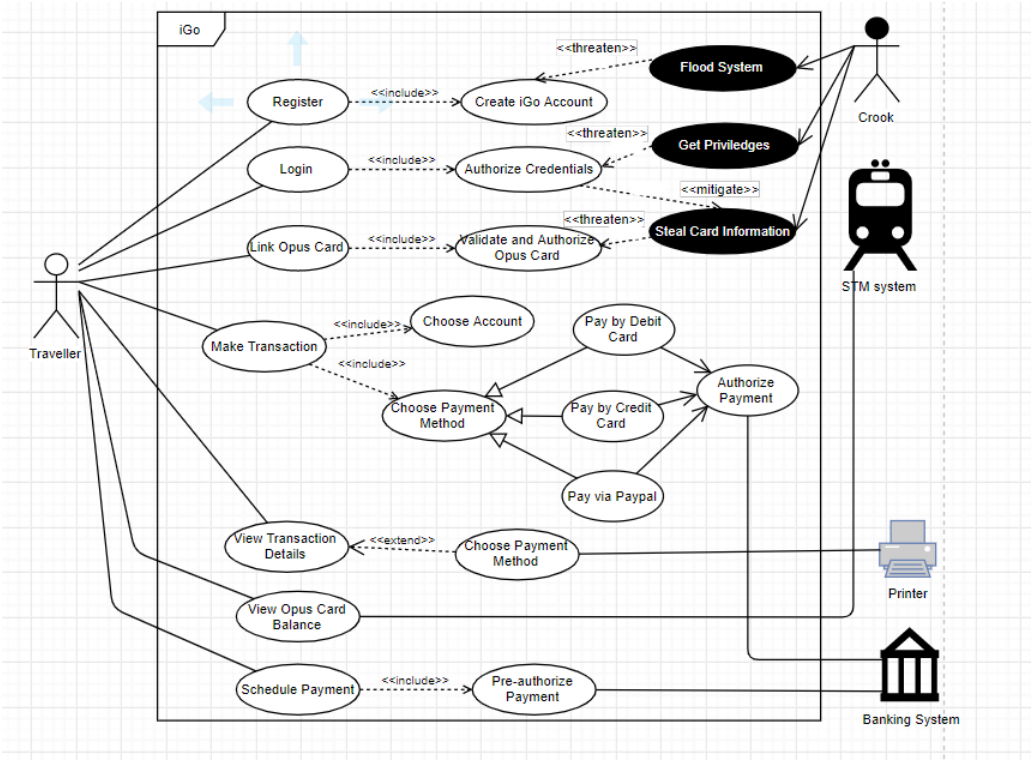

Figure 4.2: Negative Use case model of iGo (UCMIGO)

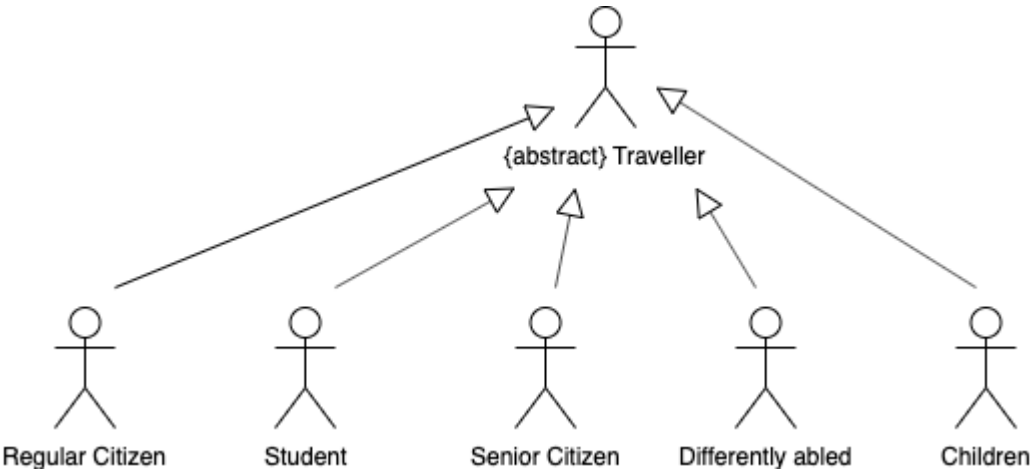

Figure 4.3: Types of Actors and relationship between them in iGo

4.1 Use Case Brief

Register an account in iGo System and carry out successful payment for OPUS card
Actor: STM customers/Travellers

Login : A STM customer needs to register to iGo system using his/her email address. iGo will authenticate a user with STM system via Remote APIs developed by STM developers. iGo will display error or successful message based on the response returned by the STM to the customer.The Customer must wait to receive a notification from STM inorder to make a payment for the OPUS Recharge.

Link OPUS Card : After successful Login the iGo system will Link the customers account to the internal STM system wherein further validation will take place and response will be sent by the STM system to customer to choose and enter appropriate payment details for successful payment/recharge of OPUS card.

Make Transaction : Once the payment details are entered by the customer the iGo will connect to the respective banking system of customer to validate entered card details.Before entering the payment details the customer needs to be careful about the details he/she is entering as the details if leaked can lead to negative effects.

Schedule payment : If the card is validated successfully the payment is done and the opus Card user gets a receipt of successful payment,else the banking system notifies the iGo that card details entered are not valid.The iGo then requests customer to make new account and carry out payment process.

View Transaction details : Once a transaction is complete the customer gets the receipt for the successful payment for OPUS card which includes the details of transaction that customer can verify.

Fully Dressed Use-Case Scenario - Success scenario

Use case Section	Comment
Use case Name	Successful Reload of OPUS at ticket vending machine of STM
Scope	iGo plays as an online platform allowing travellers to load their OPUS cards and manage STM transactions themselves for successful everyday travel with ease with convenience.
Primary Actor	Daily Traveller's/STM users
StakeHolders	iGo Developers/STM Developers/Government of Canada and Transport Ministry of Canada/Quebec Government

Pre-Condition	Customer will try to log in the system with his private credentials.
Post-Conditions	customer successfully reloads the OPUS card for travel and gets the receipt of the transaction from the iGo system.
Main Scenario	Steps: 1. Customer will try to log in the system with his private credentials. 2. After successful login the system will prompt the customer to choose Opus recharge option. 3. Customer will select the Opus recharge option. 4. Customer will choose Payment options. 5. Customer will enter payment details. 6. Card will be validated by the system internally by connecting to correspondent banking system. 7. Card is validated successfully by the bank. 8. Opus card is successfully recharged 9. customer successfully reloads the OPUS card for travel and gets the receipt of the transaction from the iGo system.
Extensions	1. During payment customer can choose between cash or digital payment. 2. customer can select for in paper receipt or email notification of the successful recharge. Not applicable
Frequency of occurrence	monthly or biweekly(rarely)
Open Issues	customer needs and payment details details or could result in negative consequences.

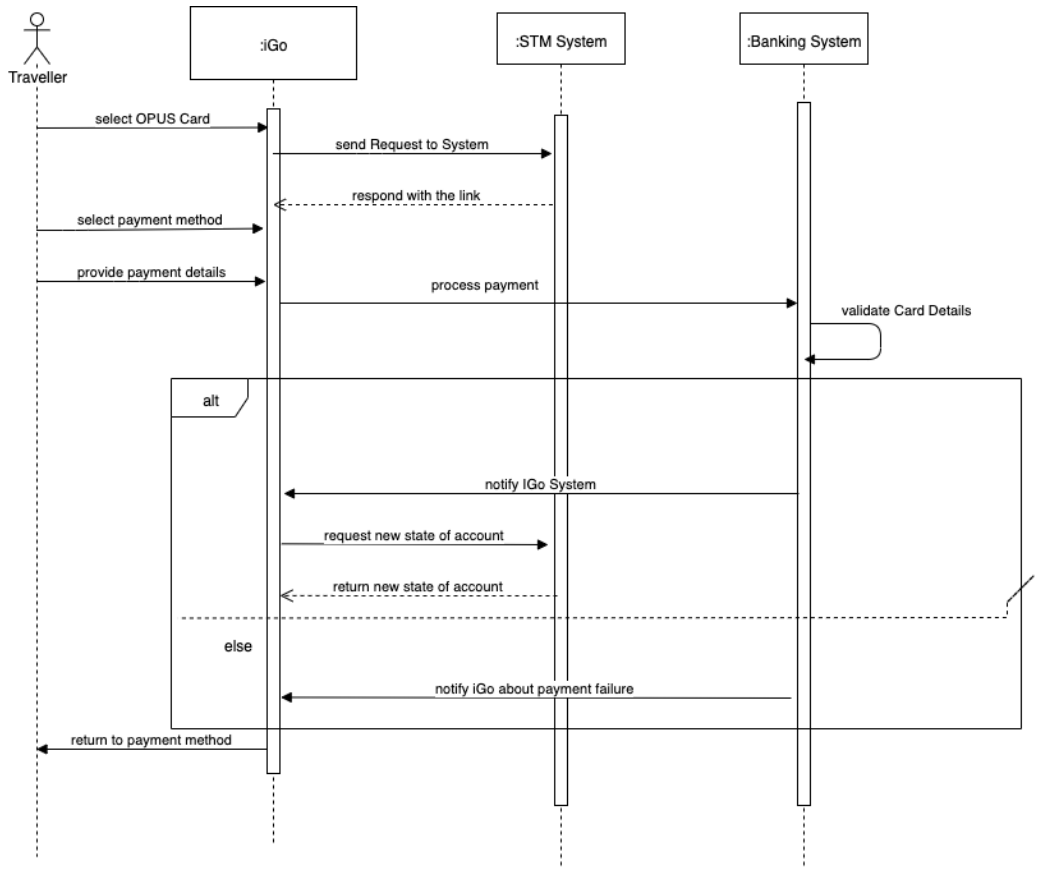

Figure 4.4: Sequence Diagram for TVM

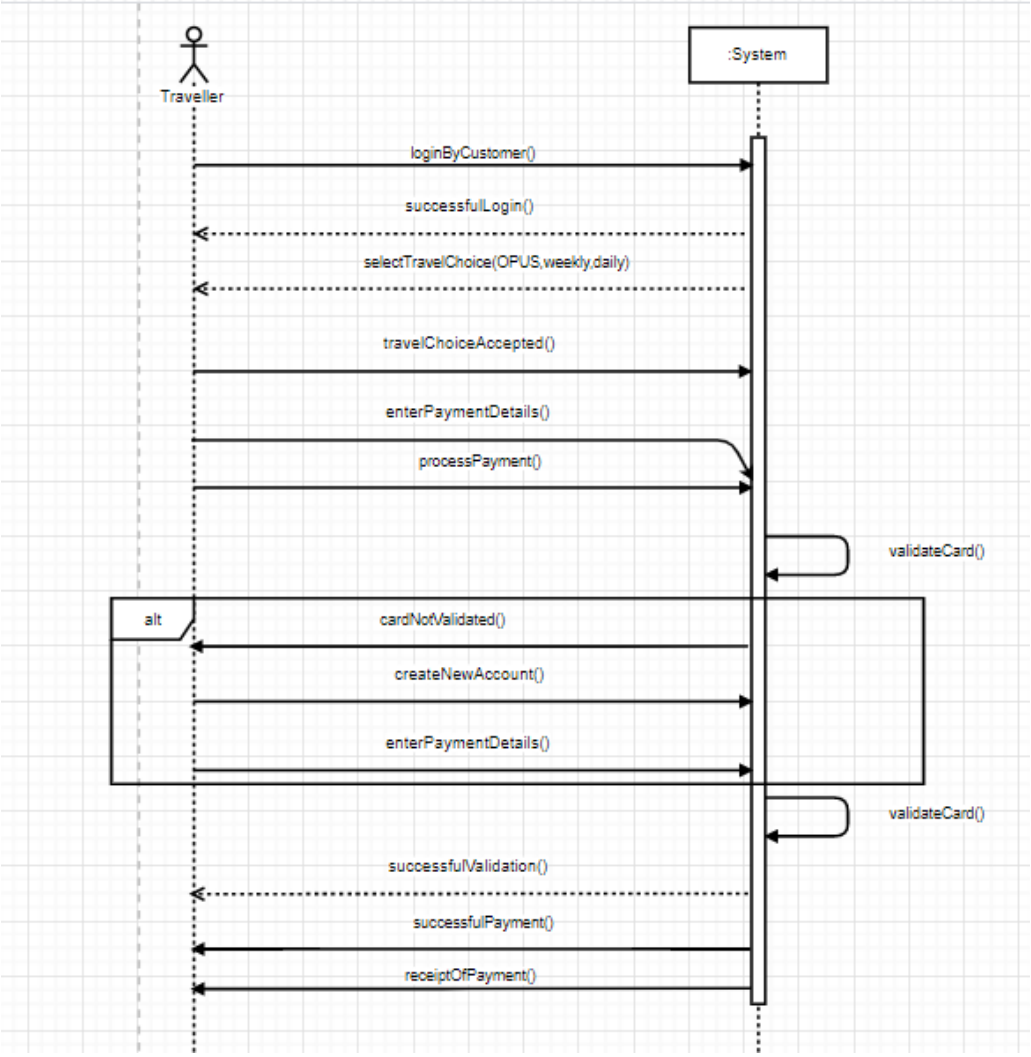

Figure 4.5: System Sequence Diagram for TVM

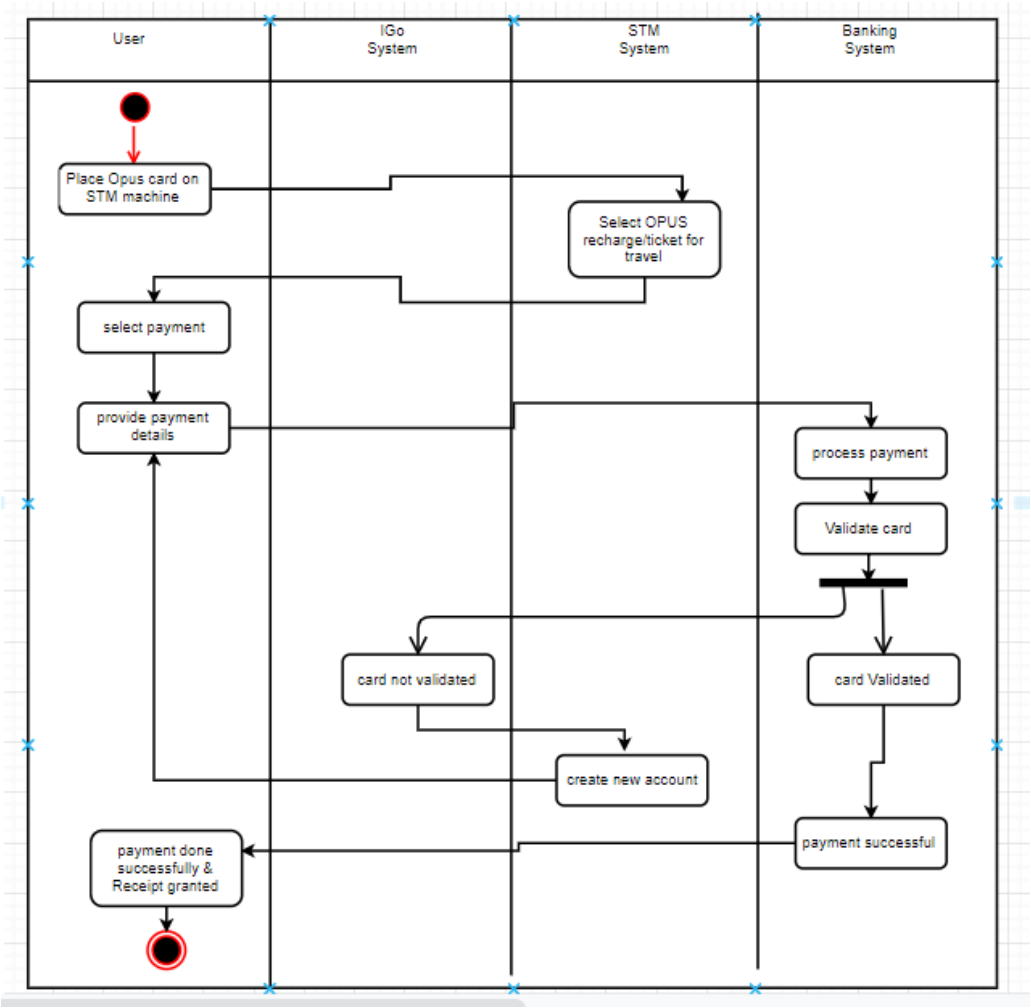

Figure 4.6: Activity Diagram for TVM

Appendix A

Interview

Interviews[1] were conducted with two primary users, an international student and a teaching assistant. Interviews are done to gain more understanding about the system in order to build the correct requirements. The answers to the questions are written in both active and passive voice for the user to have a better understanding. We have done one pilot interview(with TA) and four regular interviews. For the interviews done, we have implemented the funnel technique of interviewing in which we begin from general questions and move to specific questions.

A.1 Pilot Interview

Date- 09-23-2019
Time- 8:45 PM to 9:00 PM
Interviewers:

Name: ROHAN DEEPAK PASPALLU
Institute: Concordia University, Montreal
Industry: Educational sector
Title: Student

Interviewee:

Name: Samia Hilal
Institute: Concordia University, Montreal
Industry: Educational sector
Job Title: Teaching Assistant

Generic Questions:

Question: What do you study at Concordia University?
Answer: I am not a student, I am a Teaching Assistant for the subject Software Requirements Specification.

Transportation Used:

Question: How often do you use STM transportation and why you do you prefer STM over other transportation methods?
Answer: Here in Montreal, the major mode of transportation is the STM. Moreover, I am not the best person to ask the question because honestly speaking I drive my own car. But, I think STM is good and I like using it when I can. At the moment, I use STM twice a month.

Question: How easy is it to access STM services from your residence?
Answer: Actually, its not bad, its quite easy. It takes me 90 minutes to reach the university. Its easy to access the STM, but the travel duration is long.

Gadgets Used:

Question:What gadgets you use on a daily basis?
Answer: I use my mobile phone while travelling.

Question: How often you access these devices?
Answer: I use it to access the schedule of the bus and the map service.

Question: Which do you prefer using the most?
Answer: I prefer driving my own card..

Question: Are you comfortable using these devices?
Answer: Yes, its been a part of our lives now a days.

Family Specifics:

Question: Are there any dependents or young members in your family and how many?
Answer: No, there is no one dependent on me.

Specific Questions:

Question: When do you purchase tickets for your travel?
Answer: I usually take an OPUS card and load 10 tickets into it because I am not a frequent user, I am an occasional user. When there are any events in the downtown and I have to come a lot in the weekend, then I prefer buying the weekend passes.

Question: What are the difficulties you face when purchasing a ticket?
Answer: I have to go to the pharmacy to recharge my OPUS card, so I wish there was something through which I can recharge my OPUS without going anywhere and buy the tickets from your own home.

Question: Do you have any worst experiences with the STM?

Answer: No, its generally okay.

Question: Will you prefer a system that enables you to recharge anytime and anywhere?
Answer: Of course, that would be perfect, because i have kids and I have to buy tickets for them and we have to rush for the tickets in the morning or any time of the day, so its better if we could recharge the OPUS from the home.

Question: Do you encounter the first day of the month problem wherein it is mandatory to load the card even though you have used it only for 15 days?
Answer: Sorry, I am not the right person to ask this question as I am not a frequent user.
Questions: Do you face any problems while performing any transaction ? Answer: No, its actually fun.
Question: What would love to see changed?
Answer: As I mentioned before, that the online reloading the OPUS card would be a great relief for all. I would like to have a digital card, as I have a daughter and she frequently looses her OPUS card.

Question: Assume you are using an online application to buy your tickets. To register into the system, do you prefer providing your phone number, email , both / neither? Why?
Answer: Yes, I'm okay with providing both information.

Question: Do you need an option to save your application logged-in in the device so next time the user doesn't need to login again?
Answer: Yes, I would prefer stay logged-in.

Question: Would you wish to receive an email or message in advance for scheduling your recharge for OPUS card?
Answer: Yes, I would love that because there are many things to remember and we tend to forget things.

Question: If yes, how many days in advance that a user wants to receive an informing email?
Answer: yes, one week would be good according to me.

Question: Do you think that the concept of digitization would be understood and accepted by all age groups ?
Answer: Its a choice, but I see many elderly people using these things. Almost everyone uses virtual cards and so on.

Question:Do you think that the change would create any havoc or problems for the people ?
Answer: I think there should be some security measures for verifying the picture or any such thing for the reduced rate or any such thing.

Question: Do you have some suggestions which could be incorporated by the STM ?
Answer: I think they need to be more efficient and reduce long queues and waiting times. Moreover, the interface is very bad, so the user interface should be better.

Thank you so much for your time. Mrs. Samia Hilal! It was a pleasure speaking with you.

A.2 Interview 1

Date- 09-27-2019
Time- 11:15 AM to 11:45 AM
Interviewers:

Name: Nirav Patel
Institute: Concordia University, Montreal
Industry: Educational sector
Title: Students

Interviewee:

Name: Darshan Patel
Institute: Concordia University, Montreal
Industry: Educational sector
Job Title: Graduate Student

Generic Questions:

Question: What do you study at Concordia University?
Answer: I study Master's of Mechanical Engineering at Concordia University.
Transportation Used:

Question: How often do you use STM transportation and why you do you prefer STM over other transportation methods?
Answer: I use metro on a daily basis. It helps me commute to university and work many times. I also take bus on weekends if I'm about to sightsee or walk in Walmart or Costco.

Question: How easy is it to access STM services from your residence?
Answer: It's easy to access it from my home. It's only 2 min away from home.

Gadgets Used:

Question:What gadgets you use on a daily basis?
Answer: I use my mobile phone while travelling.

Question: How often you access these devices?
Answer: I use almost for an entire journey actively or listening songs.

Question: Which do you prefer using the most?
Answer: I prefer using metro.

Question: Are you comfortable using these devices?
Answer: Ye, because I use them on daily basis.

Family Specifics:

Question: Are there any dependents or young members in your family and how many?
Answer: No, there is no one dependent on me.

Specific Questions:

Question: When do you purchase tickets for your travel?
Answer: I reload my card every month.

Question: What are the difficulties you face when purchasing a ticket?
Answer: Sometimes, it's very difficult, I will have to wait in a long queue to reload my card..

Question: Does it irritate standing in long queues?
Answer: Yes, when I'm in rush it takes a lot time.

Question: Will you prefer a system that enables you to recharge anytime and anywhere?
Answer: Of course, I would love that. It would be easy and fast.

Question: Do you encounter the first day of the month problem wherein it is mandatory to load the card even though you have used it only for 15 days?
Answer: Yes, it is difficult.

Question: Have you used any web application for your transactions previously? If yes, which one?
Answer: Yes, I have used applications like Tim Hortons.

Question: What did you like about the application?
Answer: The application are good and easy to use. It saves time also.

Question: Was it easy to use?
Answer: Yes, very easy.

Question: Any difficulties you faced when performing a transaction?
Answer: No, actually not.

Question: What would love to see changed?
Answer: The application we use, should be very secure. Security should be prioritized.

Question: Assume you are using an online application to buy your tickets. To register into the system, do you prefer providing your phone number, email , both / neither? Why?
Answer: No preference, I'm okay with providing both information.

Question: Once you register, do you prefer the account verification to activate your account to redirect to email/phone to make it more secure?
Answer: Yes I would. If it's more secure then I would do it.

Question: Do you want to receive a confirmation message via their registered phone/Email?
Answer: Yes, I would like to have that.

Question: Do you need an option to save your application logged-in in the device so next time the user doesn't need to login again?
Answer: Yes, I would prefer stay logged-in.

Question: Which are the online payments that you use?
Answer: I would prefer paypal, as it's more secure and does not require credit card information on end site.

Question: What is your predominant mode of transaction?
Answer: Just Tap and Pay.

Question: Do you want to save their payment credentials to save time during your upcoming transactions?
Answer: Yes

Question: Do you wish to receive in advance email informing that your schedule payment will be in, let's say, next 2 days?
Answer: Yes, that would be helpful, that would help me keeping track of my transactions.

Question: If yes, how many days in advance that a user wants to receive an informing email?
Answer: yes, 5 days would be good according to me.

Thank you so much for your time. Mr. Darshan! It was a pleasure speaking with you.

A.3 Interview 2

Date- 10-03-2019
Time- 15:30 PM to 15:45 PM
Interviewers:

Name: Jingya Pan
Institute: Concordia University, Montreal
Industry: Educational sector
Title: Students

Interviewee:

Name: Bingyu An
Institute: Concordia University, Montreal
Industry: Educational sector in Finance Falcuty
Job Title: Graduate Student

Generic Questions:
Question: How many times you use the STM system per week in Montreal?

Answer: I use it almost everyday. Because i do not live in Dt, therefore i need to take the metro to get to school. Except the day i have class, i also go to the library to review the lessons. During the weekend, i will go to the old port to have a walk or go to the supermarket, so i am really a regular customer for STM.

Question: For the STM system, what is feature that you like most?

Answer: I think the STM system is considerable which provides several type of ticket to satisfy the people's needs. For me, I get a student card, so I can get a student discount with fixed amount of money and take the metro and bus unlimited times. As I know, the metro also provides a specific ticket type after 5pm which is less expensive than the normal ticket type.

Question: What is the main problem of the STM system from your perspective?

Answer: That should be renew the OPUS card especially on the weekend. I still remembered once that happened. It was a Saturday, so there was no cashier service, the only way to renew the card is to do it through the machine in the metro station, it was so many people in line, which took me a long time to wait.

Question: If the STM system provides an extra service for the online charging, do you think it will be helpful?

Answer: I think it would be much better, as the majority people are able to be accessible to the

internet and most of the people are familiar with the online service, so at least half of the people probably will use the online service and rest can still go to the cashier or use the machine in the metro station. At least, it will not be that crowded.

A.4 Interview 3

Date- 09-29-2019
Time- 15:15 PM to 15:45 PM
Interviewers:

Name: Divya Pandit
Institute: Concordia University, Montreal
Industry: Educational sector
Title: Students

Interviewee:

Name: Aditya Surve
Institute: Concordia University, Montreal
Industry: Educational sector
Job Title: Graduate Student

Generic Questions:

Question: What do you study at Concordia University?
Answer: I study Master's of Software Engineering at Concordia University.
Transportation Used:

Question: How often do you use STM transportation and why you do you prefer STM over other transportation methods?
Answer: I use metro on a daily basis. It helps me commute to university and work many times. I also use STM buses mostly as it helps me reach places quicker and smoothly where metro might take some longer time.Its convienient some time like going to walmart or shopping places that are mostly located away from metro stations.

Question: How easy is it to access STM services from your residence?
Answer: It's easy to access it from my home as I have a bus stop just below my building.

Gadgets Used:

Question:What gadgets you use on a daily basis?
Answer: I use my mobile phone while travelling.

Question: How often you access these devices?
Answer: I use my phone almost for an entire journey actively, listening songs,watching youtube videos sometimes.

Question: Which do you prefer using the most the metro or the bus?
Answer: I prefer using metro as well as both. I like both of them.

Family Specifics:

Question: Are there any dependents or young members in your family and how many?
Answer: No, there is no one dependent on me.All live in my home country.I live here with my friends.

Specific Questions:

Question: When do you purchase tickets for your travel?
Answer: I reload my card every month.Its anyways hectic to recharge on the first day of the month as the stations have long queues to recharge opus card on the first day of the month.

Question: What are the difficulties you face when purchasing a ticket?
Answer: Sometimes, it's very difficult,I mentioned on the first day its too much rush on station.

Question: Does it irritate standing in long queues?
Answer: Yes, when I'm in rush it takes a lot time of my precious time.I am in a hurry to reach somewhere.yes its damn irritating

Question: Will you prefer a system that enables you to recharge anytime and anywhere?
Answer: Of course, I would love that. It would be easy and fast.

Question: Do you encounter the first day of the month problem wherein it is mandatory to load the card even though you have used it only for 15 days?
Answer: Yes, it is difficult.
Question: Have you used any web application for your transactions previously? If yes, which one?
Answer: Yes, I have used applications like Tim Hortons,amazon,starbucks etc.
Question: What did you like about the application?
Answer: The application are good,portable and easy to use. It saves lot of time also.

Question: Was it easy to use?
Answer: Yes, very easy.

Question: Any difficulties you faced when performing a transaction?
Answer: No, actually not.Sometimes its due to internet issues but thta still fine.

Question: What would love to see changed?
Answer: The application we use, should be more privatized and portability importantly should be prioritized.

Question: Assume you are using an online application to buy your tickets. To register into the system, do you prefer providing your phone number, email , both / neither? Why?
Answer: No problem im okay with that but it needs to be taken care of.The information should remain confidential.

Question: Once you register, do you prefer the account verification to activate your account to redirect to email/phone to make it more secure?
Answer: Yes I would. If it's more secure then I would do it.

Question: Do you need an option to save your application logged-in in the device so next time the user doesn't need to login again?
Answer: Yes, I would prefer stay logged-in.

Question: Which are the online payments that you use?
Answer: I would prefer paytm,transferwise as its more secure and easy to go with family and friends.

Question: What is your predominant mode of transaction?
Answer: Digital anytime.

Question: Do you want to save their payment credentials to save time during your upcoming transactions?
Answer: No

Question: Do you wish to receive in advance email informing that their schedule payment will be in, let's say, next 2 days?
Answer: Yes, that would be helpful, that would help me keeping track of my transactions.

Thank you so much for your time. Mr.Aditya! It was a pleasure speaking with you.

Appendix B

Team Contribution

Problem 1: Brief description	Nirav Patel,Rohan Deepak Paspallu,Jingya Pan, Divya Pandit,Koshaben Patel
Problem 2: Context of use model	Nirav Patel,Rohan Deepak Paspallu,Jingya Pan, Divya Pandit,Koshaben Patel
Problem 3: Problem domain model	Nirav Patel,Rohan Deepak Paspallu,Jingya Pan, Divya Pandit,Koshaben Patel
Problem 4: Use case model	Nirav Patel,Rohan Deepak Paspallu,Jingya Pan, Divya Pandit,Koshaben Patel
Interview	Nirav Patel,Rohan Deepak Paspallu,Jingya Pan, Divya Pandit,Koshaben Patel

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Glossary

CUIGO Context of use model for iGo. 8

DMIGO Domain model representation for iGo. 13

iGo The online Ticket Vending Machine Web Application integrating with STM system. 2

OPUS OPUS is the name of STM travelling card which used by people to travel by STM services, manufactured and distributed by STM agencies. 2

STM Société de transport de Montréal (Montreal Transit Corporation). 2

traveller People who use STM metros and buses to travel daily in Montreal, Quebec, Canada. 3

TVM Ticket Vending Machine. 2

UCMIGO Use Case modelling for iGo. 14, 15