Definitions, Acronyms, and Abbreviations

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| Name | Definition |
| SWR | Smart Wear on your Route |
| Wear device | Smart watch that uses Android Wear OS 4.4 or above |
| Staff | Administrator of website |
| BusMap | Official mobile application developed by Ho Chi Minh Ministry of Communications and Transport -http://www.buyttphcm.com.vn/Detail\_News.aspx?sl=717 |
| RAPTOR | Round-bAsed Public Transit Optimized Router |
| mcRAPTOR | More criteria RAPTOR |
| Station | Distinct location in the network where one can board or get off a vehicle (bus, train) |
| Trip | Represents a sequence of stations a specific vehicle (train, bus, subway …) |
| Connection | A connection models a vehicle departing at one start station to end station of one trip without intermediate halt. |
| Route | Route is a trip with time arrival information at each station. One trip often has many routes. |
| Footpath | Model walking connection between stations. |
| Pareto Set | A subset of the set of feasible points of solutions that contains all points that have at least one objective optimized while holding all other objectives constants. |

Table : Definitions, Acronyms, and Abbreviations

# A. Introduction

## 1. Project Information

* + Project name: **Smart Wear on Your Route**
  + Project Code: **SWR**
  + Product Type: **Website, Android and Android Wear application**
  + Start Date: **September 7, 2015**
  + End Date: **December 20, 2015**

## 2. Introduction

Nowadays, within the strong development of presently economy, time is always one of the priorities in all areas. In particularly, when participating in traffic, how to know fastest route in your journey is the critical condition for user.

Presently, most of an application on market are not support routing through more than two points. For example, Google Map and BusMap just supports on routing through two points at most so that they cannot help user if user has more than one place to go. Moreover, no mobile application supports wear devices, so user must lookup their mobile phone when participating in traffic and this behavior makes some inconveniences such as thief, accident …

Facing above problems, our team build the application named is Smart Wear on Your Route. In our application, we allow user find route through more than two points. We also support user choose their departure time so they can choose suitable route that they can come to place on time. Moreover, our application supports wear devices so user can look up on their wear device when they participating traffic avoiding some above problems.

In additional, we also provide system software on website for staff to manage bus route, bus time information and approve the change from background handler.

## 3. Current Situation

Nowadays, when participating in traffic, user often wants to find route through some locations. This situation becomes more important especially participating by bus or motorbike.  
Currently, mobile market has some applications that support routing such as Google map or BusMap .

Google Map and BusMap allow user enters starting location and ending location into their cell phones (with already networked). After that, Google Map and BusMap will suggest some optimal paths. Finally, user will choose the best route suitable for their need. When user finish selected their choice, mobile application will render route on mobile screen so user can follow the route.

With Google Map, user can optional enter arrival time and departure time. By this constraint, Google Map will find suitable routes that user can start and come to place on time.

## 4. Problem Definition

Below are disadvantages of current situation:

* BusMap doesn't support motorbike route.
* BusMap doesn’t support time constraint (arrival time, departure time) when finding route.
* Google Map and BusMap don't support route through more than two points.
* BusMap doesn’t support using smart watch for finding route, just for phone. There are some disadvantages of using only smartphone to find route such as theft, inconvenience, no safety in motorbike control as well as the bus.

## 5. Proposed Solution

Our proposed solution is to build and mobile application and android wear application named “Smart Wear on Your Route” to resolve the current situations. We also design the system to be scalable so we can extend our system for more platforms (iOS, Windows Phone) in the future and can be used for more transit protocols (train, high-speed train)

SWR system includes a web application, background process, mobile application and wear application with following functions:

### 5.1 Feature functions:

* Web application: For Staff only.
* **Manage routing:** staff edit information for bus route and bus timetable.
* **Notify new update data from server to staff:** if official website (http://www.buyttphcm.com.vn/) has new data, background process will notify to staff and staff will decide approve this update or not.
* Background process:
* **Check new data periodically**: Background process will check new data at 0 AM each day. If background process detects that data has been changed, background process will write new data to temporary database and notify messages for staff.
* Mobile application:
* **Find bus route through from two points to four points**: user inputs start point, two optional middle points and end point and optional departure time. Application will find the best bus route from start point through middle points to end point which optimize condition (shortest time, least number change route)
* **Find bus route through from two points to four points with optimize**: user inputs start point, two optional middle points and end point and optional departure time, then choose “optimize” option. Application will find the best bus route from start point through three points which optimize condition (shortest time, least number change route), no matter order last three points.
* **Find motorcycle route through from two points to four points**: user inputs start point, two optional middle points and end point and optional departure time. Application will find the best motorcycle route from start point through middle points to end point which optimize condition shortest time.
* **Find motorcycle route through from two points to four points with optimize**: user inputs start point, two optional middle points and end point and optional departure time, then choose “optimize” option. Application will find the best motorcycle route from start point through three points which optimize condition shortest time, no matter order last three points.
* Wear app:
* Bus:
* **App will notify for user when bus nears the station that user should to leave**:  if bus in circular range of station of the route's plan, application will show the message name of the next station in two minutes and will notify again one minutes later with special sound and vibrate the smart watch until user out of range.
* Motorcycle:
* **App will notify when user has to turn route**: if user drives in circular range of next turn, application will automatically show message which should to do next and vibrate until user out of this range.
* Map:
  + **Show your current location**: show current user location on map with route user should to go (including bus or motorbike).

### 5.2 Advantages and disadvantages:

* Advantages:
* Support optimization passes through multi points.
* Support bus route timetable so that user can easily find suitable round for their time.
* Support on smart wear. User can look up information easier than using mobile phone. Also using smart wear decreases ability for mobile phone to be stolen.
* Disadvantages:
* Smart wear has higher price than smart phone and these screen is slightly small and hard to use for newbie.
* Application must parse data from third website so cannot update data intermediately.

## 6. Functional Requirements

Web Component: (for staff only)

1. Edit bus route and bus time information.
2. Approve bus route and bus time change from background handler and write to official database.

Parser Component:

1. Parse bus route information.
2. Parse bus timetable information.
3. Periodically, detect the change from official bus website in order to write to temporary database.

Mobile Component:

1. Synchronize data from server to mobile.
2. Find the path’s optimization from two points to four points when using bus.
3. Find the path’s optimization from two points to four points when using motorbike.
4. Sync data from mobile to wear.

Wear Component

1. Receive data from mobile.
2. Notify message when user near the bus station that should to left.
3. Notify next turns when user drive by motorbike.
4. Auto scroll to current user’s location on map.

Bus Driver Component

Record time when bus driver arrived to one bus station.

Synchronize data to server.

## 7. Role and Responsibility

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| --- | --- | --- | --- | --- |
| No | Full Name | Role | Position | Contact |
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**Table 2: Roles and Responsibilities**