

Footpon

Project Proposal
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Team J³

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1. Description

1.1. Abstract

Footpon is an application that operates in two phases, the hunting phase and the retrieval phase.

The hunting phase is when the phone acts as a pedometer. Based on the amount of steps taken and GPS values, a user will gain points that can be used in the retrieval phase. A map will be displayed with marked locations of participating shops and traveling in these areas will result in more points being gained.

The second phase is the retrieval phase and occurs when the person is at a marked location. At a marked location, the person will be able to view coupons for that shop and redeem them with the points that they got from the hunting phase.

This application will benefit both shoppers with savings and participating shops with more business.

2. Objectives

2.1. Mission/Motivation

Shop owners always want their customers to spend more time and look around in their stores because customers may be more likely to actually make a purchase. Offering coupons to customers according to the amount of steps they have taken while shopping would help both shop owners and their customers. It will also provide the shop owners with useful information such as the location of customer hot spots.

2.2. Desired Achievement

Currently there are several ways that coupons are distributed with the goal of motivating purchases. Footpon will provide a new way of offering coupons. It will provide the shoppers with an easy way of receiving the coupons that they want. Shop owners will also gain the benefit of attracting more customers and encouraging them to visit their stores more often. This method of sending coupons is much more effective than randomly dispensing through other methods.

It will also be possible to record the location that shopper are going to and provide them to shops for further improvements to their business.

2.3. Impact

Once Footpon is put to use, it will change the way that stores distribute their coupons to their customers and change the behavior of window shoppers from aimless wandering to shopping effectively.

3. Outcomes

3.1. Features

The following features must be implemented by the end of the project:

1. Pedometer using the accelerometer on the device to count and record step information.
2. Server to manage customer information.
3. Database to store points.
4. Server to load current points.
5. Server to deliver coupons.
6. GPS and Google map integration to detect customer location.
7. User interface that will display the coupons with the required points attached and a map of locations with coupons near a certain spot.
8. Ability to redeem coupons by simply touching them on the screen.
9. Uniform, user-friendly, secure way to display/represent coupons.
10. Social network integration.
11. Record customer location information.

4. Assumptions

4.1. Market

There will be enough participating shops within walking distance of each other to allow users to walk to multiple marked locations comfortably.

4.2. Legal

Users must agree to a legal agreement before using the application. Stores must honor the coupons that they provide if the user has redeemed them. The only exception is if there is an expiration date on the coupon.

4.3. Future Projections

Due to recent economic conditions, people are always looking for ways to save. If the condition continues in the future, the application will be helpful for these people to save. This benefit remains even if economic conditions get better.

5. Constraints

5.1. Patent

1. Pedometer
 - a. Used to record the amount of steps taken by the user.
2. GPS
 - a. Used to locate users when available.
3. Map
 - a. Google map to display location.
4. Wi-Fi location
 - a. Required for locations inside a building when GPS is not available. It has low precision.
5. UWB triangulation locating
 - a. Required for location inside a building when GPS is not available. It has high precision.
6. QR code recognition
 - a. Required for location inside a building when GPS is not available.
7. Barcode creation and recognition
 - a. Required for coupon information.
8. Digital camera
 - a. Required for QR code recognition.

5.2. Technology

The accelerometer doesn't work under sleep mode and the GPS doesn't work inside buildings. Keeping both active for a long period of time might drain the battery quickly.

6. Duration

This project must be completed in 8 weeks after delivering the project proposal. Each team member must work for at least 15 hours every week during implementation.

7. Stakeholders

The main audience of the application is shoppers. The main supporter of the application is shop owners. Both groups will determine the success of the application.

Appendix A: Mission Statement

Our mission statement is to, “Encourage window shoppers to spend more time exploring and shopping.”

Appendix B: Audience Needs

Identify Audience

The use of smart phones has been increasing because of the iPhone, Blackberry, and Android devices. These users have above average income and consumption ability. They are also the main target of stores. Our goal is to provide a way to distribute coupon information directly to these people and give them a reward if they spend more time walking around shopping. The specific audience list is below:

Android Users

Android devices have risen in popularity recently and it attracts users that don't have enough money to spend on an iPhone. It is projected that it will overtake the iPhone by 2012.

Users of applications such as Groupon and Foursquare

These users like to try new services and find good deals, so they are more likely to adapt and use Footpon.

Window Shoppers

These users are usually teenagers to middle age people that like to spend their leisure time on shopping. Footpon encourages these people to spend more time and money in stores.

Social network users such as Facebook

The use of social networks as a commercial method for users to share coupon information with their friends will attract more users.

People that like to exercise

This application can also record the steps that user spend while shopping which correlates to the amount of calories burned. This may be a good option for people who want to be healthy, but don't like to go to gym.

Needs

The needs are presented with a priority value. A higher value means that it is a high priority. The values are a relative value and are subject to change.

1. Server reliability (100)
 - a. The server must remain active so that it can be used at all times.
2. Low response time (100)
 - a. The server must be able to handle the amount of traffic from users of the application and return information in a timely manner.

3. Account (100)

- a. Users must be able to set up an account to use the application.

4. Retrieve account information (100)

- a. The user's account information must be retrieved after they sign in.

5. User agreement (60)

- a. A user agreement must be displayed and accepted to use the application.

6. Security (70)

- a. Provide some form of security for sensitive information that is transferred between device and server.

7. Tutorial (60)

- a. The application must have a tutorial to educate users.

8. User interface (75)

- a. The user interface must be friendly and easy to use.

9. Pedometer (100)

- a. The device must act similar to a real pedometer.

10. Gaining points (100)

- a. The user must be able to gain points for the steps that they walk.

11. Gaining bonus points (50)

- a. The user will gain bonus points for traveling near participating stores.

12. Universal points (100)

- a. Any points that are left over from one trip can be used on future trips.

13. Show calories burned (60)

- a. Show the amount of calories burned based on the amount of steps taken.

14. Fair point accumulation (100)

- a. The amount of points gained for walking must be fair.

15. Deny point transfer/trading (100)

- a. Accumulated points from one user cannot be transferred or traded to another user.

16. Show map (100)

- a. While the user is gaining points, show a map of the area with marked locations of participating stores.

17. Show list (100)

- a. The user can switch from map view to list view so that they can view the current coupons in the area.

18. Organize list (80)

- a. The list must be presented in a neat and organized way.

19. Search list (100)

- a. The user can search through the coupons in list view.

20. Record GPS information (80)

- a. Record GPS information when the user uses the application.

21. Record pedometer information (100)

- a. Record step information when the user uses the application.

22. Record point information (100)

- a. Record point information when the user uses the application.

23. Store coupon information (100)

- a. The database must be able to store coupon information.

24. View coupon information (100)

- a. The database must be able to transfer coupon information to the device.

25. Display only coupons based on location (80)

- a. Only coupons for the nearby store will be displayed.

26. Display coupons even while indoors (80)

- a. Integrate a QR code reader into the application so that coupons can be viewed even without GPS.

27. Redeem coupon (100)

- a. The user must be able to use their points to receive and use the coupon.

28. Non-negative points (100)

- a. Users cannot redeem coupons if it will result in a negative value.

29. Deny the same transfer (100)

- a. Make sure that the user cannot redeem the same coupon multiple times.

30. Deny coupon transfer (100)

- a. Make sure that users cannot transfer coupons to each other.

31. Deny multiple coupon use (100)

- a. Make sure that users cannot use the same coupon multiple times.

32. Coupon readability (100)

- a. The coupon must be readable on the device.

33. Coupon refund (80)

- a. The coupon may be refunded if it hasn't been used.

34. Coupon record (100)

- a. The server must maintain an up-to-date record of the coupons redeemed and used by each user.

35. Barcode (100)

- a. A barcode must be displayed on the device so that stores with certain types of barcode readers can easily scan them.

36. Unique barcode (100)

- a. Each barcode must be unique from each other to prevent confusion.

37. Usability (100)

- a. Make sure that the application functions properly regardless of location.

38. Running in the background (65)

- a. Allow the application to run in the background so that the person can gain points even when they are not shopping.

39. Compatibility (50)

- a. Make sure that the application is functional on older devices.

40. Facebook integration (80)

- a. Integrate it with Facebook, so that users can show how many points they have and the coupons they have redeemed.

41. Integrate with Facebook check-in or Foursquare API (65)

- a. Allow the user to gain more points when they check-in with Facebook or Foursquare.

42. Web interface (100)

- a. A web interface must be created.

- 43. Log in to web interface (100)
 - a. The user must be able to use their application credentials to sign into the web interface.
- 44. Display remaining points on web interface (100)
 - a. The web interface must display the user's remaining points.
- 45. Coupon record on web interface (100)
 - a. The web interface must display the user's coupon record.
- 46. Search coupon record on web interface (30)
 - a. Users can search through their coupon records to view specific coupons that they have redeemed.
- 47. Provide API for developer (30)
 - a. Provide API for developers so they can use the pedometer and point model on other applications.
- 48. Submitting error report (80)
 - a. Users can submit an error report if a problem occurs.
- 49. Register complaint (50)
 - a. Users can submit a complaint if stores refuse to honor a coupon that was redeemed.
- 50. Application reliability (100)
 - a. The application must not crash or cause problems on the device.

Appendix C: Establish Specifications

1. Server

A server is required to handle customer traffic and requests.

2. Database

A database is required for storing user information, coupon, user's points, and location information.

3. Website

A website is required for users to look up their account information.

4. Pedometer

The pedometer is based on the accelerometer on the device to count and record step information. Wi-Fi or triangle localization technologies can be used for more accurate walking distance information.

5. Map Display

A map of the area will be displayed on the customer's phone. We can also show the coupons near the user's location.

6. Client User Interface

A user-friendly way to redeem coupons with points is needed. Customers must be able to check information about the coupons available for them. The way to use the coupons should be convenient and effective.

7. Coupon Representation

The system must have a uniform, user-friendly, and secure way to represent coupons in this application. A picture/information of each coupon is required from the shops.

8. Touch Screen

Users can redeem the coupon with points just by touching the screen.

9. GPS

GPS is needed to detect the user's location when they are in an open location.

10. Locating users inside internal locations

1. Wi-Fi can be used to locate a person to within 10 meters of the user's actual location.
2. UWB triangulation can be used to locate a person to within 2 cm of the user's actual location.

3. The use of QR codes at store locations can be used to locate the users without GPS.

11. Customer Information Loading

After users log in, their previous information, such as points will be loaded. Shoppers can continue to use these points.

12. Barcode

Every coupon will have a barcode that is specified by the stores. It will be displayed to the stores when a purchase is made.

Competition Performance

1. Yowza!!

Yowza!! is a coupon sharing application on the iPhone. It states that over 15,000 stores are providing coupons to it. It has an easy to use interface and good coupon support.

2. Groupon

Groupon is the most successful web coupon service, but the weak point is that the customers who use Groupon have a very low transfer rate to actual customers because they can easily find a better deal elsewhere.

3. Foursquare

Foursquare is a location based social network service provider. It also provides location based coupon for its user. Vendors can use Foursquare to provide coupons to users who check-in on the store. It has an Alexa rank of 667 and has 2 million users.

4. Livingsocial

Livingsocial is a service that sends coupon based on your location by email.

Target Performance

1. Application

The application must be easy to use and be stable. It cannot crash or cause errors on the device.

2. Server

The server must be able to handle all traffic and requests and provide a reply in a timely manner.

3. Database

The database must be able to store all the necessary information that is needed by the application.

Appendix D: Project Evaluation

1. Platform

The platform for the application is the Android device. Using the application, the user can log in and their information will be retrieved from the database. Afterwards, the user can collect points and redeem/use coupons.

There is also a website for users to access to view their account information. This information includes current points and coupon records.

2. Available libraries

There are certain libraries and APIs that are already created that can be integrated into the application. It is possible to use Google Map for the map display and ZXing for barcode generation and QR code recognition.

3. Technology/Architecture

The application will require the use of the Android OS and the built in features of the device. These features include the touch screen, accelerometer, GPS, digital camera, and network access. Since the application will not be using a lot of new technologies, it won't need a high version of the OS. The application will be built using the Android SDK and Java Eclipse. The website will be created using PHP and HTML and is responsible for communicating with the server. The server will be created using C++ and will run on a Linux machine. It is responsible for handling requests between the

application/website and the database. The database will be created using MySQL and will be responsible for storing and providing information.

4. Constraints

The largest constraint is time because the deadline is at the end of the semester. All team members are full-time students and one member is a part-time worker. This makes it hard to meet and complete work.

Another constraint is communication because some members are international students and have difficulty communicating their ideas effectively in English.

5. Project Resources

1. Actual coupons from stores.
2. Technology
 - a. Hardware
 - i. Poly server
 - ii. G1 phone
 - b. Software
 - i. Linux
 - ii. Android SDK
 - iii. Java Eclipse
 - iv. C++
 - v. PHP and HTML
 - vi. MySQL

3. Developers
 - a. Jacky Li
 - b. Te-Chun Chao
 - c. Tang Jiang

6. Existing Patents

There are existing patents/copyrights on the technology that we are planning to use for the project. They are:

1. Touch screen (Multiple patents including 6072475)
2. Electronic pedometer (Multiple patents including 7169084)
3. GPS (Multiple patents including 7649494)
4. Digital camera (Multiple patents including 6774935)
5. Google map (Copyright)
6. Triangulation (Multiple patents including 7468785)
7. ZXing API (Copyright)
8. All development environments and languages (Copyright)

Appendix E: Refine Specifications

1. Server

A C++ server will be created to handle customer traffic and requests.

2. Database

A database using MySQL will be created for storing user information, coupon, user's points, and location information.

3. Website

A website will be created using PHP and HTML for users to look up their account information.

4. Pedometer

The built-in accelerometer on the device will be used to count and record step information.

5. Map Display

Google Maps will be used to display the user's current location and surrounding participating locations on the screen.

6. Client User Interface/Touch Screen/GPS

The device's built in functionalities will handle this.

7. Coupon Representation/Barcode

The coupon will be represented using words and a barcode that will be generated using ZXing.

12. Locating user inside internal locations

The use of QR codes and ZXing will be used to locate the user in internal locations.

13. Customer Information Loading

A user's information will be loaded from the database.