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MAPPING BICYCLE MOVEMENT IN TORONTO

Technicity Final Project, 2013

INTENT OF THE PROJECT

To better understand bicycle movement within the City of Toronto, using GPS, GIS & mobile technologies.

This document highlights my proposal to create a mobile application and web based portal that encourages users to track their bicycle movement using their smart phones. Focusing on the City of Toronto these rides will be recorded and sent to a central database that can be used to improve bicycle infrastructure investment and inform city planners where bicycle movement is most prominent within the City of Toronto.

With statistics indicating that the number of cyclists in Toronto grew 6% from 1999-2009, and between 2001 & 2006 the number of prople riding a bicycle to work increased by over 30%, there is a need to better understand ridership within the city. Aligning this project with the upcoming bicycle month, I hope to continue to engage cyclists and residents of Toronto to improve upon this project proposal and take the next steps toward implementation.

As this becomes a reality, I think it can be applied to other cities around the world to contribute to our ongoing efforts in understanding mobility within cities.

Technicity I Final Project

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SECTION ONE (1)

INTRO TO THE PROJECT

"FROM 2001-06 THE NUMBER OF PEOPLE RIDING A BICYCLE TO WORK INCREASED BY OVER 30 PERCENT"

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City of Toronto

INTRO TO THE PROJECT

Why track bicycle movement in Toronto?

Description:

This project focused on the topic of bicycle movement & mobility within cities. As an avid cyclist, I am interested in the way people flow through the built environment and how this affects social and economic interactions as well as the relationship between ridership and infrastrure investment.

Having lived in the City of Toronto for the past 6 years, I have noticed a significant increase in cyclists in recent years and have not seen any studies that analyze how this movement occurs within the city, at what times of day, where the clustering of activity is occurring etc.

This interested me to focus my project on the development of a mobile application and web portal that takes advantage of the GPS tracking system embedded in our smartphones to track movement within the city. While there are a number of mobile applications that can be utilized to track movement already, none of these amalgamate the information into a single database fo the purposes of urban planning and design initatives. I think this affords the City of Toronto with an opportunity to be innovative in its understanding of cycling movement within the City and proactively plan improvements to entice further increases in bicycle ridership.

This can also help in understanding the effectiveness of existing bicycle infrastructure investments (such as bicycle lanes). The end goal is to improve infrastructure investment, promote bicycle safety and ridership within the City of Toronto and create a system for tracking mobility within cities that can be applied both locally and globally to contribute to our understanding of the urban environment.

Components

Realizing the short time frame to complete this project, I focused my efforts on the following components to act as the basis for tracking bicycle movement within the City of Toronto:

1. Bicycle Survey

Using an online survey tool - Survey Monkey - I created a very brief survey to better understand the demographics of ridership within the City, the ownership of smartphone devices and the willingness to use smartphone technology to track movement. This survey can be found at the following link: http://www.surveymonkey.com/s/NS9YPG3

This survey is supplementary to the bicycle application that is being designed and is intended primarily to understand the viability of a mobile application to understand and track movement within the City of Toronto.

This survey was shared via facebook, linkedin and email to friends, however only a handful of participants have completed the survey thus far making the data unreliable. To obtain further input, I will be targeting local bicycle shops and workshops throughout Bicycle Month (May 27 to June 30th) to promote the survey.

2. Mobile Application Prototype

As the main component of my final project, I have designed a mobile application that is intended to track bicycle movement within the City of Toronto. This application is described in more detail in Section Two; which highlights the design and features of the application as well as how the information will be used to create detailed maps that illustrate bicycle movement in the City of Toronto.

There is also a video explanation of how the application works, which can be viewed on my youtube channel: http://www.youtube.com/watch?v=cmoyEPehwq4

3. Engagement Strategy

The final component of my project is an engagement and implementation strategy that will guide this project through to completion over the next few months.

Aligning this project with Bicycle Month in the City of Toronto, I have strategically positioned this project to take advantage of the many activities that are planned within Toronto over the next few weeks. This strategy is the next step to my project and if you would like to follow along, I will be updating my website as I complete this section: www.robertgiusti.com

http://www.blogto.com/city/2011/04/cycling_in_toronto_a_reference_guide/

http://blog.moleishorlando.com/blog/wp-content/uploads/2013/02/web-cyclist1108.jpg

How to Prototype a Mobile App.

As a side note to this project, there are some amazing technologies available to quickly prototype and design a mobile application. The One that I used to prototype my application design is called POP - Prototyping on Paper. This application is available for the iPhone and can be downloaded from the App Store.

This application allows you to quickly test your design and user interface prior to completing any complex programming. Simply create your designs on paper or using the software of your choice, upload the images to the application and link areas of the images to varous screenshots to test how an application would function in real time.

You can view the results of my application on Youtube via the following link: http://www.youtube.com/watch?v=cmoyEPehwq4&list=HL1369595257. Also check out my website www.robertgiusti.com for more information.

SECTION TWO (2)

MOBILE APPLICATION DESIGN

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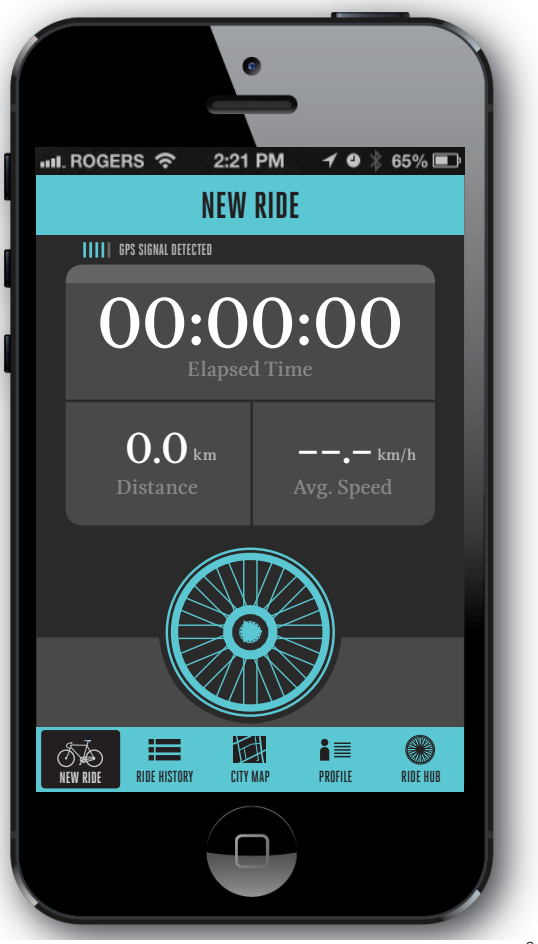
Mobile Application Design

BIKE T.O. MOBILE APP

Encouraging cyclists to track their movement within the City of Toronto, using their smartphones.

Bike T.O. is a mobile application that is dedicated to tracking bicycle movement within the City of Toronto. It utilizes the GPS tracking system within our smartphones to map movement onto a static map.

How it works: Each user is required to download the mobile application and sign-up. After doing so, they are encouraged to track their movement in by recording rides each time they use their bicycle. As they engage with the application, users will receive points for completing various tasks and users can use their accumulated points to redeem real rewards that are donated by local bicycle shops (e.g. bicycle gear, tune-ups, safety gear, etc.). As users track their rides, each one will create a data set that contributes to a central database. This central database will then be used to map bicycle movement within the city (see Mapping Bicycle Movement for more detail). This information will then be used to better understand and analyze bicycle movement patterns within the City of Toronto, informing urban planning and design initatives. The following pages illustrate visually how the app will look and work.



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Key Features

Shown above this is one of the five key features that will be availble for users who download the mobile application. The bottom legend will act as an anchor for users to browse the features of the application which include:

New Ride - Enables users to record a new ride

Ride History - Provides users with a detailed ride history and maps their movement on a static google map

City Map - provides users with a map of the City of Toronto that highlights bicycle routes and safe ways for cyclists to navigate the city streets

Profile - enables users to create a profile that will be used to redeem rewards, engage in social activity in the mobile application and via a website that would be supplementary to the application

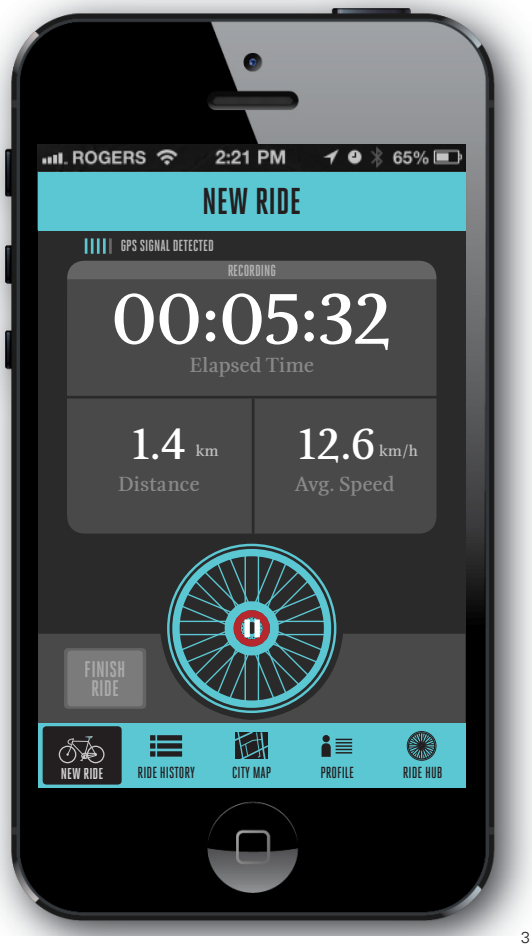
Ride Hub - Is a centre for engagement where users can find out how to achieve points, and links to the website.

Each of these features is illustrated and described in more detail in this section.

New Ride

When the application is opened the user is automatically entered into the new ride option. This is how users will be able to record their bicycle movement and begin simply by hitting the play button at the centre of the bicycle wheel.

As shown on the left, this will provide the user will information regarding the elapsed time, the distance travelled, and the average speed. Once the user hits the play button they can simply put the phone in their pocket and ride. When they are finished their ride, there will be an option to finish the ride (shown below), and the user simply clicks on that option and saves their ride. This will then be saved in the users ride history and is sent to a central database that will overlay multiple data sets onto a single map.



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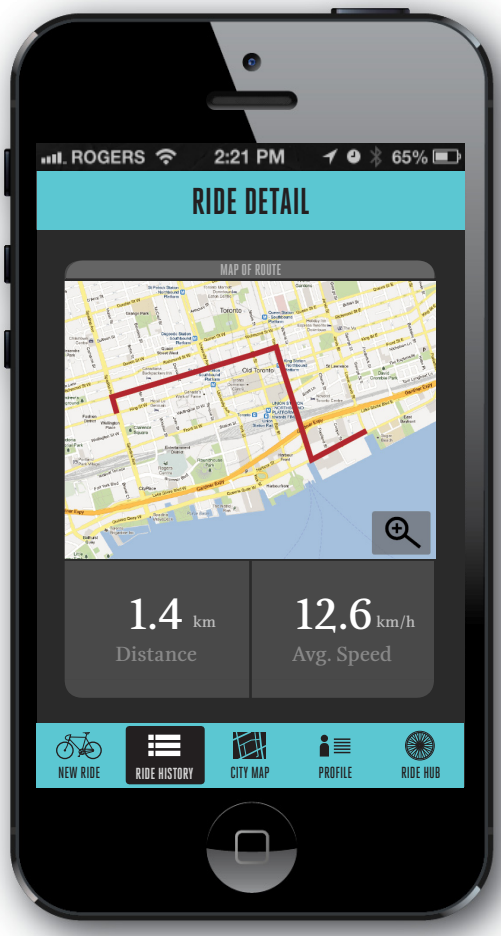
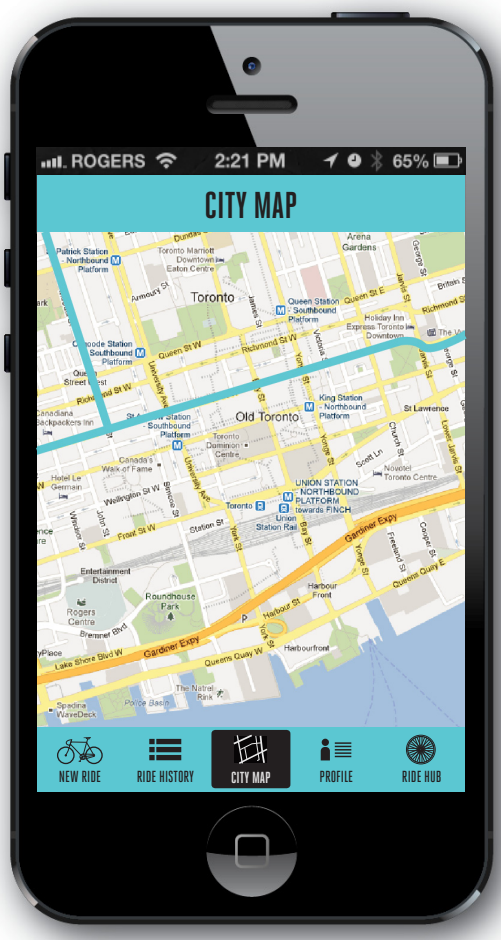
1 BIKE T.O. MOBILE APPLICATION ICON
2 NEW RIDE SCREEN DESIGN
3 NEW RIDE RECORDING & FINISH RIDE OPTION

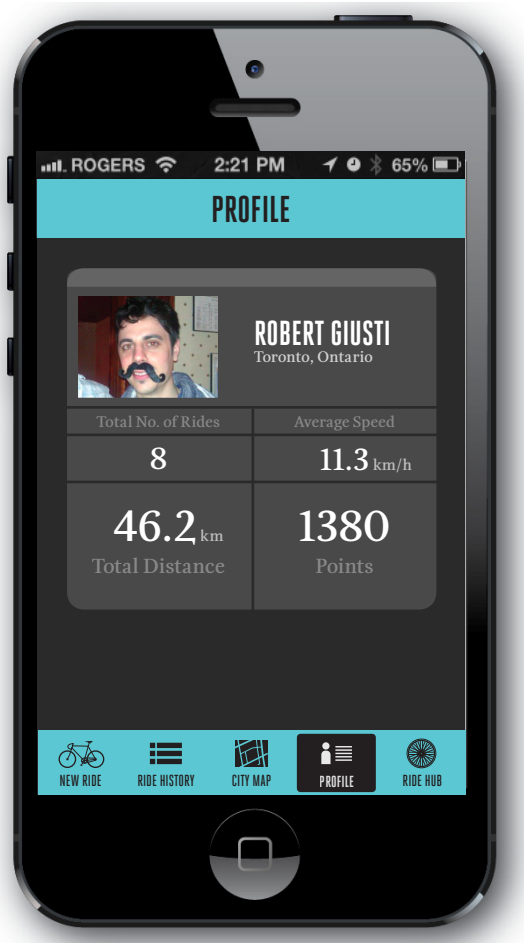
Ride History

The ride history simply lists the ride hstory of the user. This allows the user to keep track of their ride history, view their movement within the City of Toronto and provides options to share their rides via social media outlets such as facebook, twitter, linkedin, etc.



If the user clicks on one of the rides, it will take him to the screen above. This provides more detailed ride information including the distance travelled during that ride, the route that was takem and the average speed. This creates a single data set that is sent to the central server. As multiple users record multiple rides, the database will grow and patterns and trends will be able to be analyzed by planners and designers.





Profile

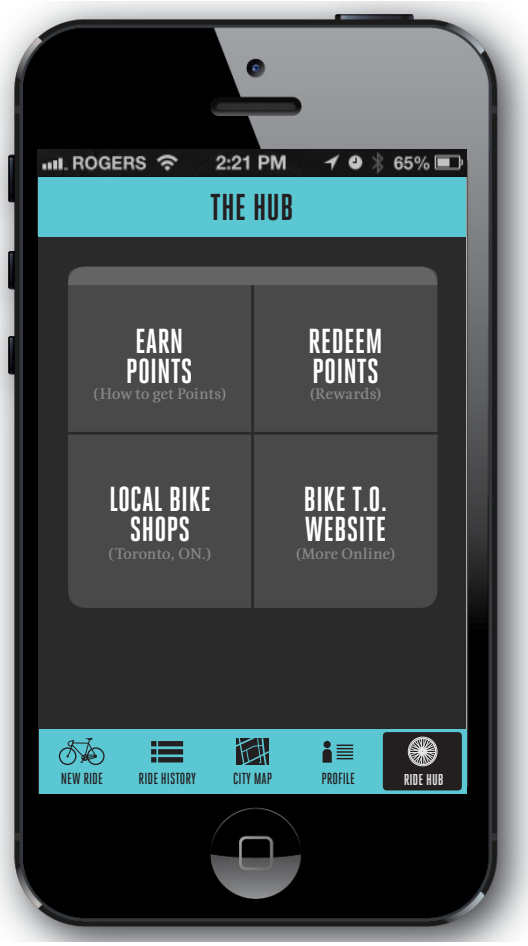
This feature of the application allows the user to create a profile. Once their profile is created, they will be able to earn points by completing specific tasks, view their total number of rides, the distance in which they have travelled, their average speed and the points that they have accumulated thus far. The example above shows my profile and illustrates the configuration of data.

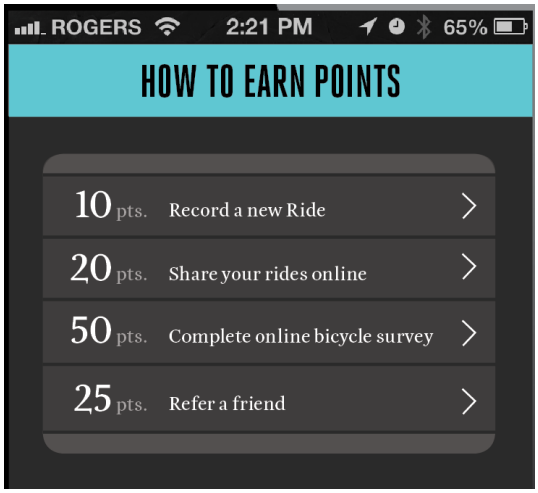
"Cars, motorcycles, cyclists, and pedestrians all use the same roads. Toronto needs to have a plan to make the roads safe and useable for anyone who has a right to use them."

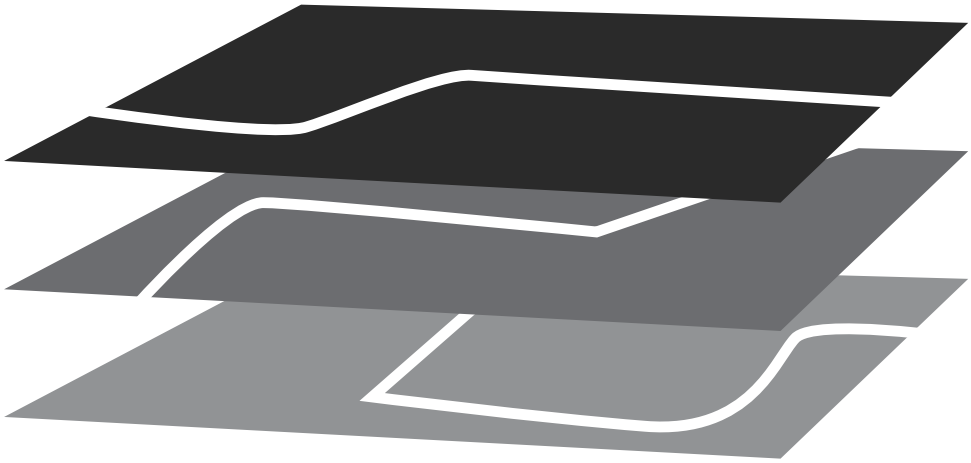
- Sarah Thomson, Toronto (http://sarahthomson.ca/blog/sarah-thomsons-bike-city)

Ride Hub

The Ride Hub is the final feature of the mobile application and provides the user with the ability to redeem points, understand how to earn points, access a map of local bicycle shops and sponsors, and will provide a direct link to a web portal. This is intended to be engaging for users, and encourages them to contribute to ongoing dialogue. Below is the hub and to the right are some screenshots of how these components may work.







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Mapping Bicycle Movement in Toronto

MAPPING MOVEMENT

How the data sets from each user will contribute to a detailed map of bicycle movement in Toronto.

As users engage with the application and record their rides and movement in the City of Toronto, each ride will create an individual data set. These data sets will be compiled in a central server and stamped with information including the time, date, user and the path of movement through the City. These will then be overlayed onto a static map of the City of Toronto to help identify patterns, movement and areas of high activity within the City.

The above diagram illustrates how the mobile application is used to create multiple data sets, which are then converted to movement diagrams and overlayed onto each other to create a single map. The more people that use the application will generate better results and more reliable information that can be used by planners. This is why it is improrant to have an engaging factor or reward system that entices users to record their rides with the application and earn points.

Mapping Bicycle Movement within Toronto

A PROJECT BY ROBERT GIUSTI

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