Proposal for Enhanced Charlottesville Area Transit Mobile Application

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Abstract

A proposal is presented regarding aesthetic and functional improvements to the Charlottesville Area Transit (CAT) mobile app. A peer application and the community context surrounding the app are considered. Recommendations center on making the app more accessible to a wider community, and streamlining the graphical user interface for rapid information retrieval. Given that CAT serves a historic college town, the improvements suggested are believed to optimize route visualization and timing, while increasing revenue by recognizing more affluent customers (who are more likely than others to own a smartphone) along with the traditional working-class commuter base.

Keywords: `Charlottesville Area Transport, public transport, mobile app`

A developed country is not a place where the poor have cars. It's where the rich use public transport.

—attributed to Enrique Peñalosa, former Mayor of Bogotá, Colombia

1 Problem Definition

In 2014, the Charlottesville Area Transit (CAT) organization commissioned a new mobile app meant to help bus riders better understand their public transportation options and reduce dependence on the outdated paper- and phone-based timetable systems (NBC29 WVIR Charlottesville, 2014). Though basically functional, the graphical user interface (GUI) of the mobile application leaves much to be desired. Unlike its web-based counterpart (see Fig. 1) the app provides no obvious way of obtaining arrival estimates for all of the operational area's bus stops. Furthermore, it may crash or otherwise fail to boot up on many devices. Though

the app has received praise from public officials, having been awarded the 2015 Governor's Technology Award as a submission featuring "the strategic use of IT to increase productivity, boost efficiency, and reduce overall operating costs" (NBC29 WVIR Charlottesville, 2015), there still remains work to be done.

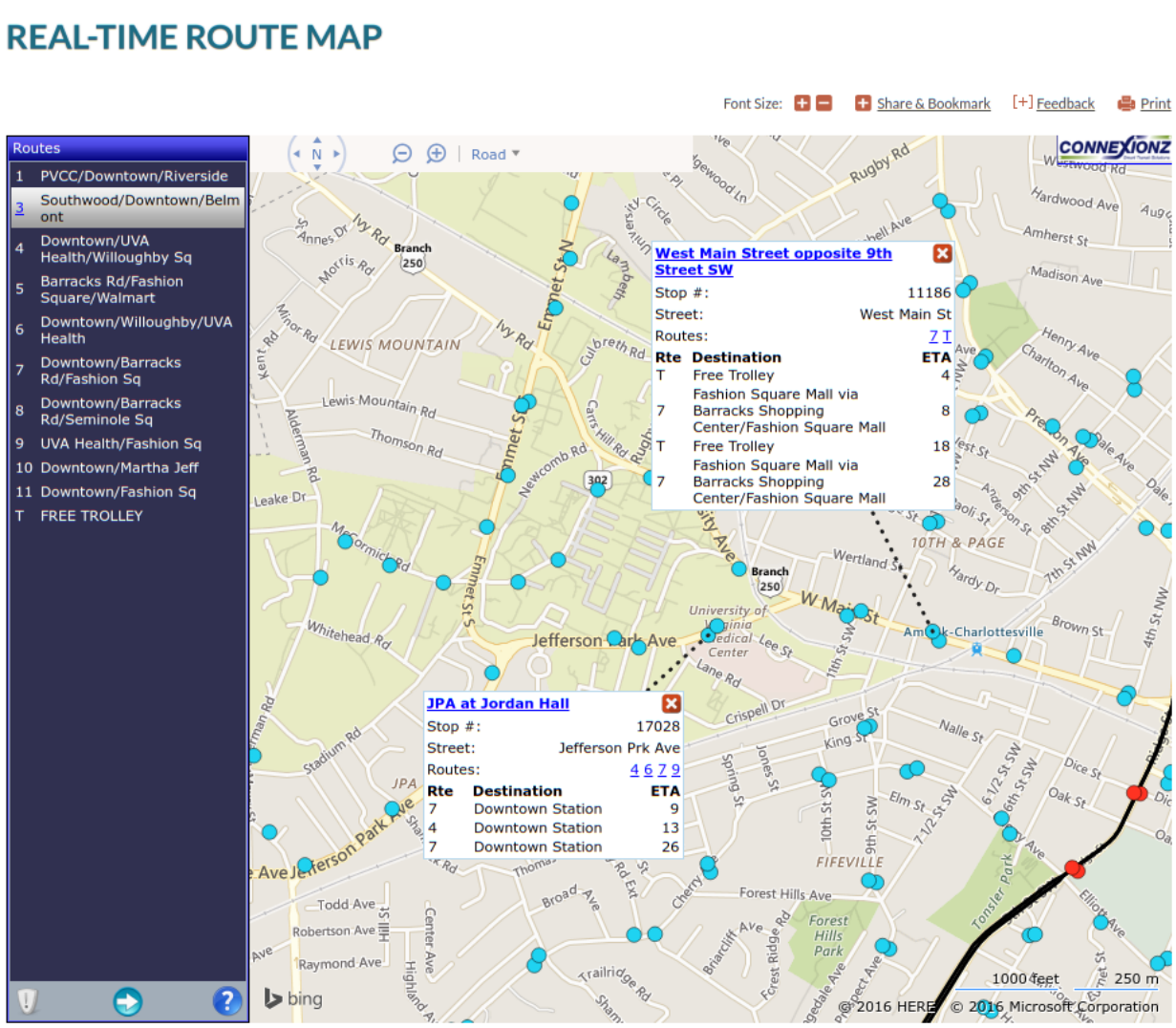


Figure 1: The CAT "Real-Time Route Map", a website designed for desktop use that shows a system map, complete with all stops in the service area, along with timetable options (City of Charlottesville, n.d.).

By introducing the arrival estimate system and improving app stability and design, it is hoped that the application will better serve the Charlottesville community and increase the individual's access to public transit. College towns like Charlottesville are relatively unique in that they often feature a close relationship between schools and the local and municipal governments that surround them. A result of this mutually-beneficial arrangement, we find that many college town mass transit options feature unique challenges.

In the case of Charlottesville, where two primary bus systems[1] intersect within city limits, the bus-riding population is significantly more diverse in age and income-level than the country at large. Whereas riders on CAT bus routes are a steady mix of work-commuters, students, and shoppers of varying ethnic background (CAT, 2011, p. 48–49), Taylor & Morris (2015) contend that bus transit in the United States is generally skewed towards commuters and minority riders. The limited availability of parking and other contraindications for travel by car result in a heavy reliance of city residents from all backgrounds on the bus transit system. It is therefore expedient that the area continue to invest in the convenience of travel by mass transit for all of its citizens—their livelihood depends on it.

The improvements suggested in this document to the existing CAT mobile app are hoped to address a broad cross-section of the community, providing enhanced utility to all users within.

2 Prototype Brainstorming

Our proposal suggests implementing minor fixes and æsthetic tweaks to the existing mobile app. The version current at the time of writing (Charlottesville Area Transit, release 3.8) is displayed in Fig. 2

We will categorize this proposal into three areas of development.

2.1 Modernization of GUI

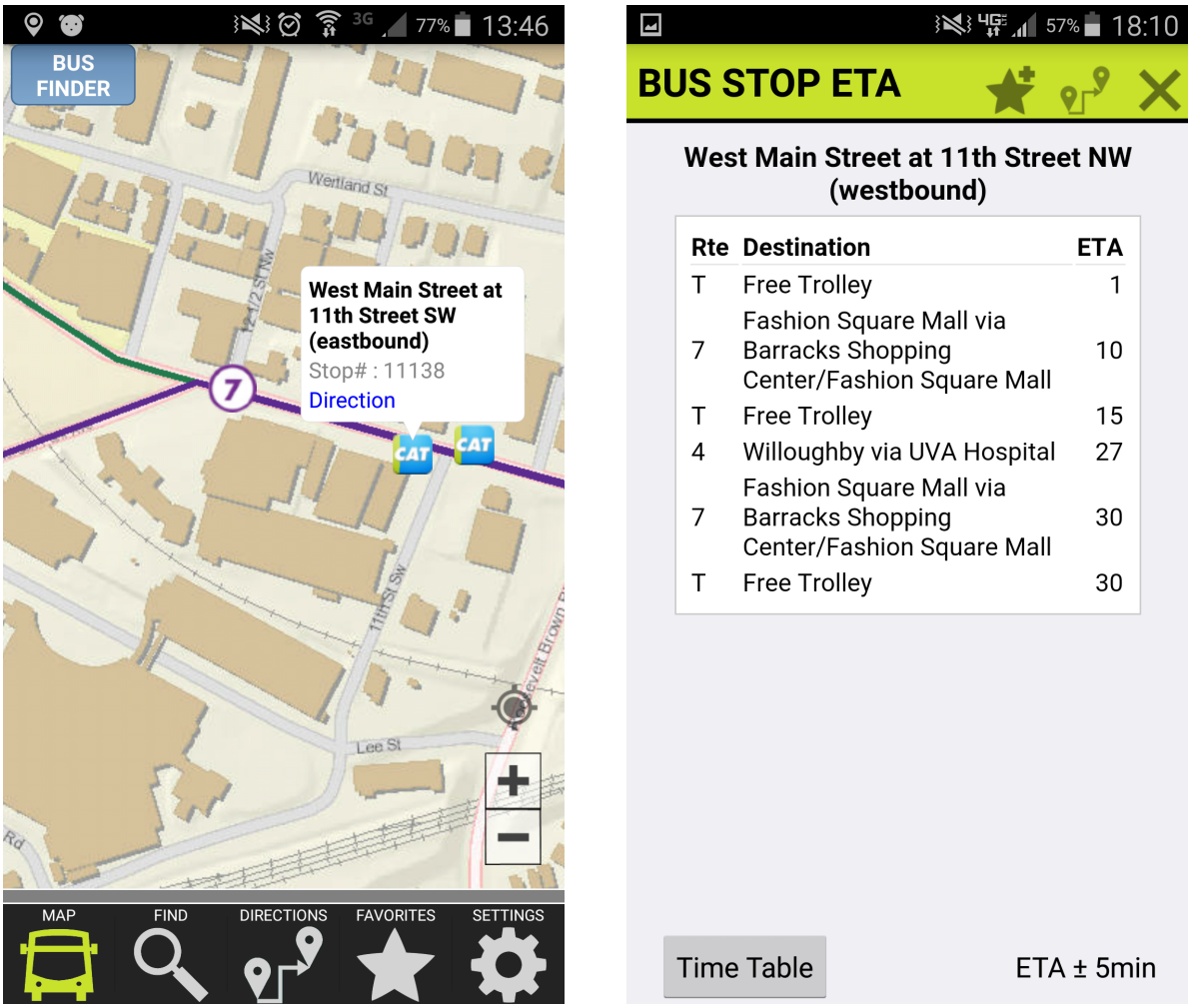
Though the current graphical user interface (GUI) for the mobile app is generally quite functional, some minor cosmetic tweaks are advisable in order to reduce user cognitive load necessary in learning the application for the first time. For example, the button display bar at the bottom of the screen that allows one to switch from one widget to another lacks demarcated borders between neighboring elements. Additionally, the bar is not readily apparent to the end user as a functional—they may appear to be part of the route visualization above.

Our proposed solution to this problem is to redesign these buttons natively; that is, to utilize the host operating system's pre-existing (Android, iOS, or other) design features to best familiarize the user with the app. If funding permits, developers might add on to this integration by introducing phone notifications when a bus is about to arrive at the current stop or left-right swiping to switch between one widget and the next.

2.2 Lessons to Learn from Peer Software

In this section, we will present the TransLoc (2015) mobile app as a point of comparison. The TransLoc app is designed to perform the same overall function as the CAT app, and

[1]The University Transit System (UTS) serves primarily students and employees of the University of Virginia. The territory covered by Charlottesville Area Transit overlaps in many cases with that of the UTS—the CAT Free Trolley, for example, connects the University area to the Downtown Mall. CAT is also funded, in part, by the University of Virginia (CAT, 2011, p. 6), and students and ID-carrying employees of the University of Virginia may ride CAT buses free of charge.



(a) View of a bus route, stop selected

(b) View of a timetable for the stop

Figure 2: The Charlottesville Area Transit mobile app, depicted on a Samsung Galaxy S4 running Android Lollipop (version 5.0.1). Published by the City of Charlottesville (2016).

is is recommended by the University of Virginia to students as a way of visualizing their University Transit Service routes.

A quick comparison of the apps shows some distinct advantages to either app. For one, the CAT app features much building shapes and more map features, perhaps making it more useful to travelers navigating city streets on foot. However, the TransLoc app details stops in a much more effective way than the CAT app. Points of transfer between two or more different bus lines are visualized using a pie chart, where a circle is evenly divided into colors representing each route. The CAT app requires to the user to go through the additional steps of twice tapping on a CAT icon to reveal the timetable, showing all available buses through that stop. No visual aid is provided in the application to show transfer points on the system map.

Because the transit system is inherently time-based, the additional steps necessary to view stop information and time tables in the CAT app present a particularly inefficient solution to the end user's needs. The goal of the CAT app would be better met by implementing a combined stop information/timetable interface, as found in Fig. 3b.

Along a similar vein of logic, we find in Fig. 2a that the CAT app fails to adequately depict shared routes—stop №11129 is shared by both Route 7 and the Free Trolley, yet only Route 7 is shown intersecting with it on the map. In contrast, TransLoc (refer to Fig. 3a) solves this problem by using dashed lines of alternating color to demonstrate that both routes travel past a given stop.

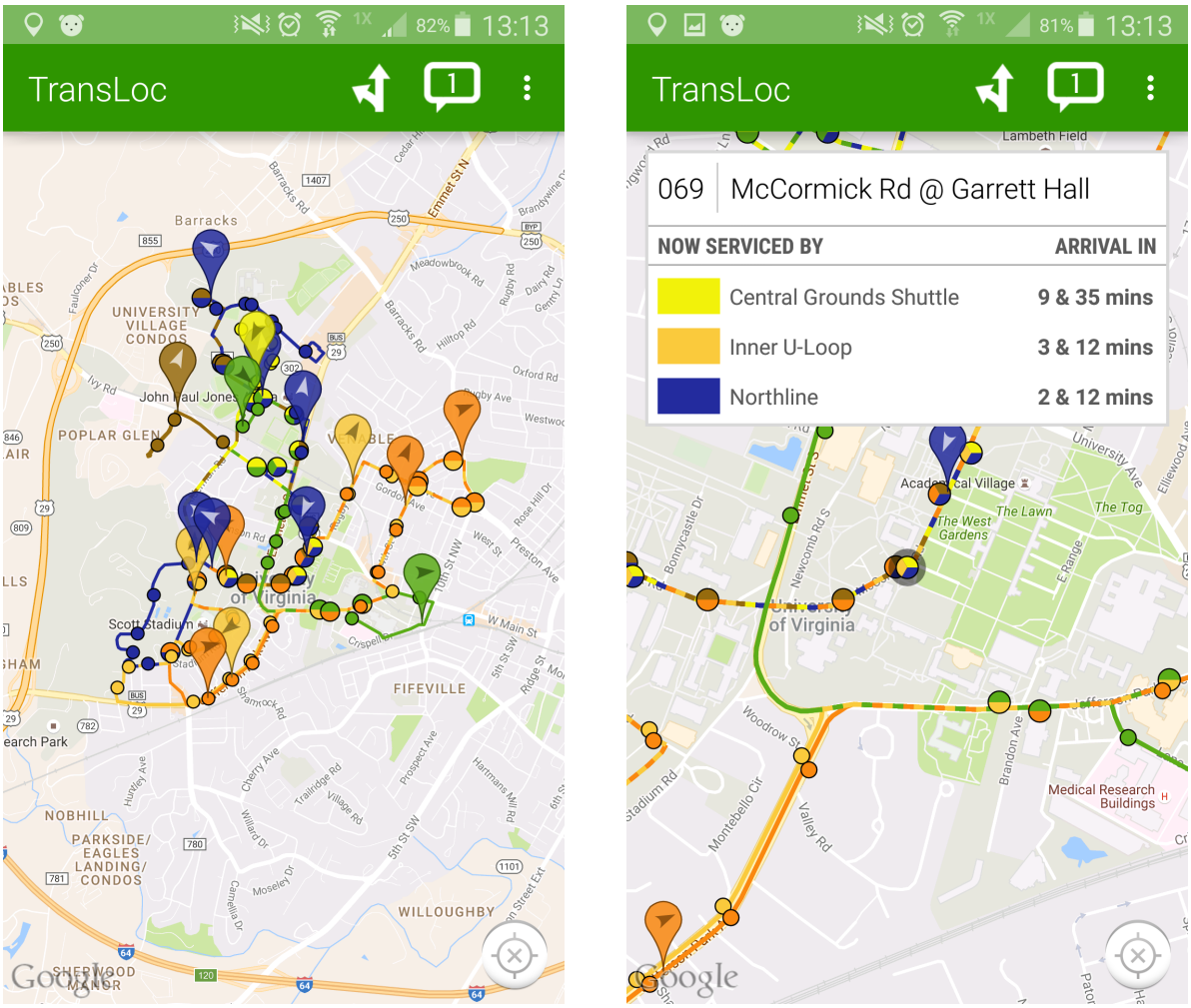
2.3 Application Stability

From anecdotal evidence, it appears that the CAT mobile app tends to freeze on a loading screen or crash entirely at certain points. The cause is believed to be transferring from one networked access point to another, or from Wi-Fi to mobile data. Further quality assurance ought to be implemented subject to improved source code access.

3 Expected Results

We believe that implementing these suggested changes will significantly enhance the user experience and improve access to public transit—especially amongst those unfamiliar with the area, where easy to follow transportation directions are key to successful tourism. As it stands currently, the Charlottesville Area Transit app is rated at 4.0 out of 5.0 stars on the Google Play Store. An improved app is likely to garner more positive reviews, which in turn will effect in increased downloads and revenue streams.

Taylor & Morris (2015) suggest that transit generally acts at a low level of cost-effectiveness. By including not only transit typical customers, who tend to be less affluent, but tourists and students in the target audience, one may expect revenue to increase. Tourists tend to spend more money on more trips than do commuters, who are more likely to purchase several days' worth of rides at a time; and an increased student-rider population provides CAT with more bargaining power with the University of Virginia and/or Piedmont Virginia Community College, who subsidize their students' tickets.



(a) Visualization of the University Transit System (b) View of a timetable for a specific stop

Figure 3: The TransLoc Transit Visualization mobile app, depicted on a Samsung Galaxy S4 running Android Lollipop (version 5.0.1). University of Virginia–UTS routes shown. Published by TransLoc (2015).

In short, accepting this proposal is expected to increase customer satisfaction, improve access to public transit options, and raise additional revenue.

4 Acknowledgments

The author wishes to recognize Luther 29 WVIR 74 Charlottesville, 2015) University of Virginia, for his seminars introducing basic cognitive load theory, which heavily influenced the changes suggested in this proposal.

5 Honor Code

On my word of honor, I have neither given nor received any unauthorized aid on this assignment.

Andrea Shaw _____ 2016–08–25

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