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Prepaying Fare for Multi-hop Trip with a Single Purchase

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ABSTRACT

Routes involving transportation transfers require users to make multiple separate fare purchases covering different individual segments of the trip. Purchasing tickets for a trip separately from choosing the routing option and needing to make multiple purchases for a single trip is a complex, cumbersome, and inefficient user experience. This disclosure describes techniques that enable users to prepay the fare covering all segments of a desired transportation route with a single purchase. The prepaid fare is represented with a single unique code that can be scanned to verify fare validity at fare readers. The techniques also enable users to purchase multiple tickets for future use and save routes and/or source-destination pairs for easier future purchases and dynamic pricing updates. The techniques improve the convenience, ease, transparency, and efficiency of planning and paying for travel, and reduce the potential for ticketing-related disruption during a trip.

KEYWORDS

- Multi-segment route
- Public transportation
- Multimodal transportation
- Public transit
- Transit connection
- Transit ticket
- Toll booth
- Ticket scanner
- Digital map

BACKGROUND

When traveling from a given location to another destination, users seek directions from navigation applications that include digital maps. In such applications, a user can also specify their intended transportation mode, such as car, bike, public transportation, etc. For any of the modes, such applications typically provide multiple potential routes shown on a map such that the user can choose their preferred option or make adjustments to the query to refine the obtained results.

The route options for public transportation presented within such applications can involve routes that require making one or more connections by switching transportation. Such switches can potentially involve transferring from one mode of transportation to another. For instance, a given route may require a user to take a bus from the starting location to an intermediate point and continue by train from that point to the destination. Such transfers can involve switching from transportation operated by one transit authority to that operated by another.

The information about a given routing option provided by the application typically includes the estimated cost, such as the cost of the public transportation ticket. However, the costs can be unavailable or inaccurate, especially for routes that involve multiple transportation forms and/or multiple transit authorities. As a result, users cannot easily compare various routing options based on cost when choosing the route. Moreover, users may need to purchase tickets for the selected route by using a separate application or website, or a ticket vending machine or kiosk when enroute. Routes that involve transportation transfers can require users to make multiple separate purchases to obtain tickets covering each individual segment of the trip. Purchasing tickets for a trip separately from choosing the routing option and needing to make multiple purchases for a single trip is a complex, cumbersome, and inefficient user experience

DESCRIPTION

This disclosure describes techniques that enable users to prepay the fare covering multiple segments of a desired transportation route with a single purchase within the application that provides the route options, such as a navigation or digital map application. Such purchases can support routes that involve transfers between multiple transportation modes, including those that require changing transit operators.

The prepaid fare covering all transportation segments of the chosen route can be represented with a single unique code, such as a quick response (QR) code, a near-field communication (NFC) token, etc., that can be shown on or communicated to user devices. Users can scan the code on the device at the various fare readers they encounter during the trip. For instance, a given trip can involve starting with a bus operated by one transit operator, switching to a train that travels between two transit regions, followed by another bus operated by a different transit operator. During such a trip, a user can first scan the unique code at the ticket reader in the first bus, then use the same code at the turnstiles to enter the train station, and present the code again when entering the second bus for the last segment of the trip that goes to the destination. At each scan, validity of the ticket for the corresponding segment of the trip can be confirmed via a ticket aggregation service.

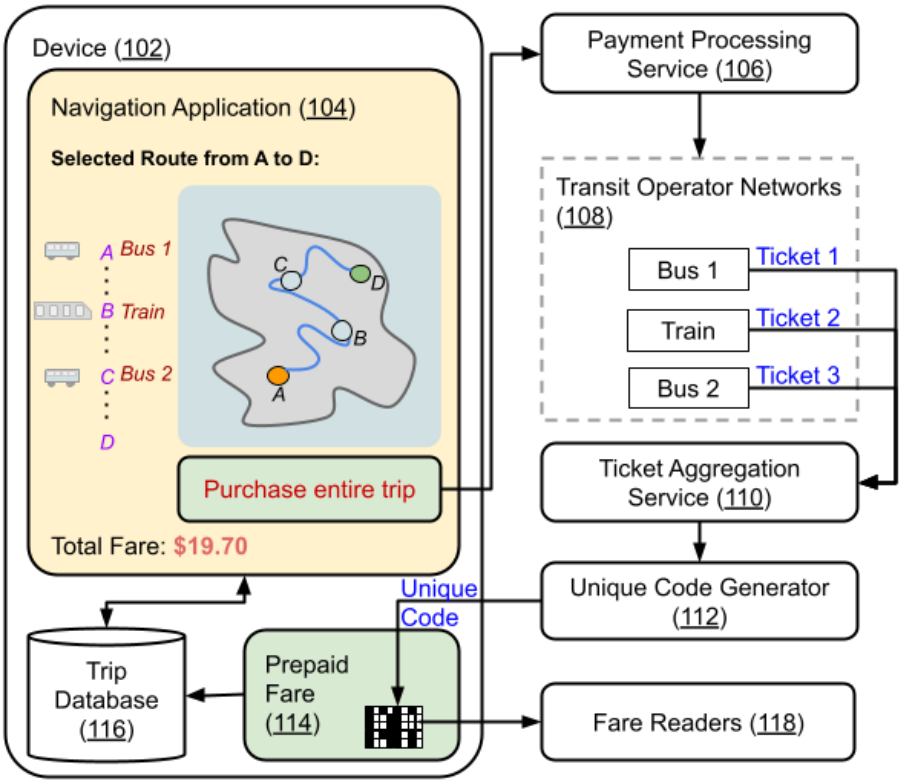

Fig. 1: Prepaying entire trip fare with a single purchase

Fig. 1 shows an example operational implementation of the techniques described in this disclosure. A user seeks directions from a source A to a destination D in a navigation app (104) on the user's device (102). The user selects the routing option that involves traveling from A to B via a bus, changing to a train at B to travel to C, and continuing from C via another bus to the destination D.

The user can prepay the fare for all segments of the trip with the "Purchase entire trip" button that results in payment for the fare being processed with a payment processing service (106) that interfaces with the various operators of transit networks (108). Upon successful payment to the three transportation services involved in the selected trip, tickets for the three respective trip segments are aggregated via a ticket aggregation service (110) to generate a single unique code for the prepaid combined fare (114) via a unique code generator (112).

The code can be presented at any fare readers (118) encountered during the trip to confirm that the user holds a valid ticket for the corresponding portion of the trip. With user permission, a trip database (116) stores any unused prepaid fares as well as routes and/or source-destination pairs the user wishes to save for future reference.

The techniques described herein can be implemented to cover any form of transportation that involves multiple segments requiring ticketed purchases. For instance, the techniques can support vehicle trips in which the route involves one or more road segments that require paying a toll. In such cases, the users can obtain a unique code by prepaying the requisite toll using a similar mechanism as that for buying public transit tickets. The unique code can be presented for scanning at the toll booths along the route.

Users can choose to purchase multiple tickets for any given route and use one of these each time they take that particular trip. In addition, the application can include features to save routes and/or source-destination pairs for future reference to make it easier for a user to purchase tickets for future trips that involve the same routes and/or source-destination pairs. Users can be shown any changes in available transportation options and/or ticket prices for their saved routes and/or source-destination pairs to help them refine and optimize their routing preferences with evolution in available transit choices. Such dynamic updates to saved routes and/or source-destination pairs can additionally enable users to choose optimal travel times for routes that involve fares that change depending on factors such as time of day, demand, etc.

Obtaining a single unique code that serves as the prepaid fare covering multiple segments of a trip can eliminate the need for users to make multiple online and/or offline ticket purchases for different segments of a trip, thus eliminating the inconvenience and potential delays resulting from the time needed during the trip to perform various actions (e.g., searching for apps/kiosks to

pay the fare, interaction effort to find and pay fare, etc.). The ability to prepay the fare for a multi-segment trip in a single purchase transaction (e.g., within the navigation application) can improve the convenience, ease, transparency, and efficiency of planning and paying for travel and reduce the potential for ticketing-related disruption during the trip. Implementation of the techniques can thus enhance the user experience (UX) of choosing and paying for an optimal routing option.

The techniques described in this disclosure can be implemented within any application, service, platform, or device used for navigation and routing, such as digital maps. The ability for users to purchase fares from different transportation providers can be supported by employing any suitable mechanism, such as application programming interfaces (API), web services, etc.

CONCLUSION

Routes involving transportation transfers require users to make multiple separate fare purchases covering different individual segments of the trip. Purchasing tickets for a trip separately from choosing the routing option and needing to make multiple purchases for a single trip is a complex, cumbersome, and inefficient user experience. This disclosure describes techniques that enable users to prepay the fare covering all segments of a desired transportation route with a single purchase. The prepaid fare is represented with a single unique code that can be scanned to verify fare validity at fare readers. The techniques also enable users to purchase multiple tickets for future use and save routes and/or source-destination pairs for easier future purchases and dynamic pricing updates. The techniques improve the convenience, ease, transparency, and efficiency of planning and paying for travel, and reduce the potential for ticketing-related disruption during a trip.