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Contextual User Interface that Reflects Stages of Travel in Multi-hop Public Transport

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ABSTRACT

Travelers on a public transport system such as metro rail are often engrossed in viewing content on their mobile devices and may forget the route segment they are currently on and can miss an upcoming transfer point, leading to time-consuming re-routing. This disclosure describes techniques that provide, via a mobile device and/or a wearable computer, subtle visual hints to a traveler regarding their current location on a multi-hop public transport system such as metro rail and upcoming transfers. The visual hints can be provided by matching the color of operating system controlled user interface elements such as wallpaper, status indicators, notification panels, etc. or via application UI. Application behavior can also be updated to account for the traveler's present location and travel route, e.g., by displaying search results that match the route, displaying search results with a similar color as a route segment that it is close to, etc.

KEYWORDS

- Context-aware user interface
- User interface theme
- User interface color
- Public transport
- Metro rail
- Digital map
- Navigation
- Route guidance

BACKGROUND

Metro rail (also known as subway or metro) or other public transport networks in large cities often comprise multiple color-coded lines. For example, a blue metro line might run north-south while a yellow line might run east-west. A passenger can transfer between lines at junction stations that are at the intersection of the lines. While efficient, a metro network can be daunting for visitors or other users that are unfamiliar with the metro network. To effectively use a metro,

a user can use a digital map application to identify the closest metro station, the color of the line to initiate travel, the route to the destination including colors of the intermediate lines, and the junctions that enable transfer across lines.

While commuting, commuters use their mobile devices for other activities such as browsing the web. When engrossed in such other activity, it is easy for the user to forget the color of the metro line they are currently on and the upcoming junction where they need to transfer. Further, if the commuter is listening to audio over headphones, they can miss audio announcements provided in the metro compartment. Unless a commuter pays close attention to onboard electronic signage and remains alert to their present location and upcoming stops, they can fail to alight at the right junction to transfer between lines. This can lead to a potentially time-consuming rerouting that may require additional queries to the digital map application.

DESCRIPTION

Digital map applications access user location with user permission for the purposes of providing navigation guidance, local information, etc. At present, the user interface of a mobile device (e.g., the OS interface or that of an app in use) is agnostic to the user location. For example, if the user is commuting, the user interface provides no clue to the user's current position, even though the user's location is used to provide contextual search results or to enable navigation. With appropriate user permissions, detecting the user's location (e.g., while they are commuting via metro or other public transport system) can be done using global/local positioning and/or the user's recent search history, recent transaction history, daily commute patterns, current speed, etc.

This disclosure describes techniques that provide, via a mobile or wearable device, subtle visual hints to a traveler as to their location on a multi-hop or multi-mode public transport system

such as metro, bus, suburban rail, cab, etc. (or a combination thereof). Some examples of ways by which visual hints can assist the traveler include:

- Enabling the traveler to keep track of their present location within the public transport system and providing alerts for upcoming junctions.
- Contextualizing app behavior, e.g., search results, to the traveler's present location and travel route.

Visual hints to enable a user to keep track of their location

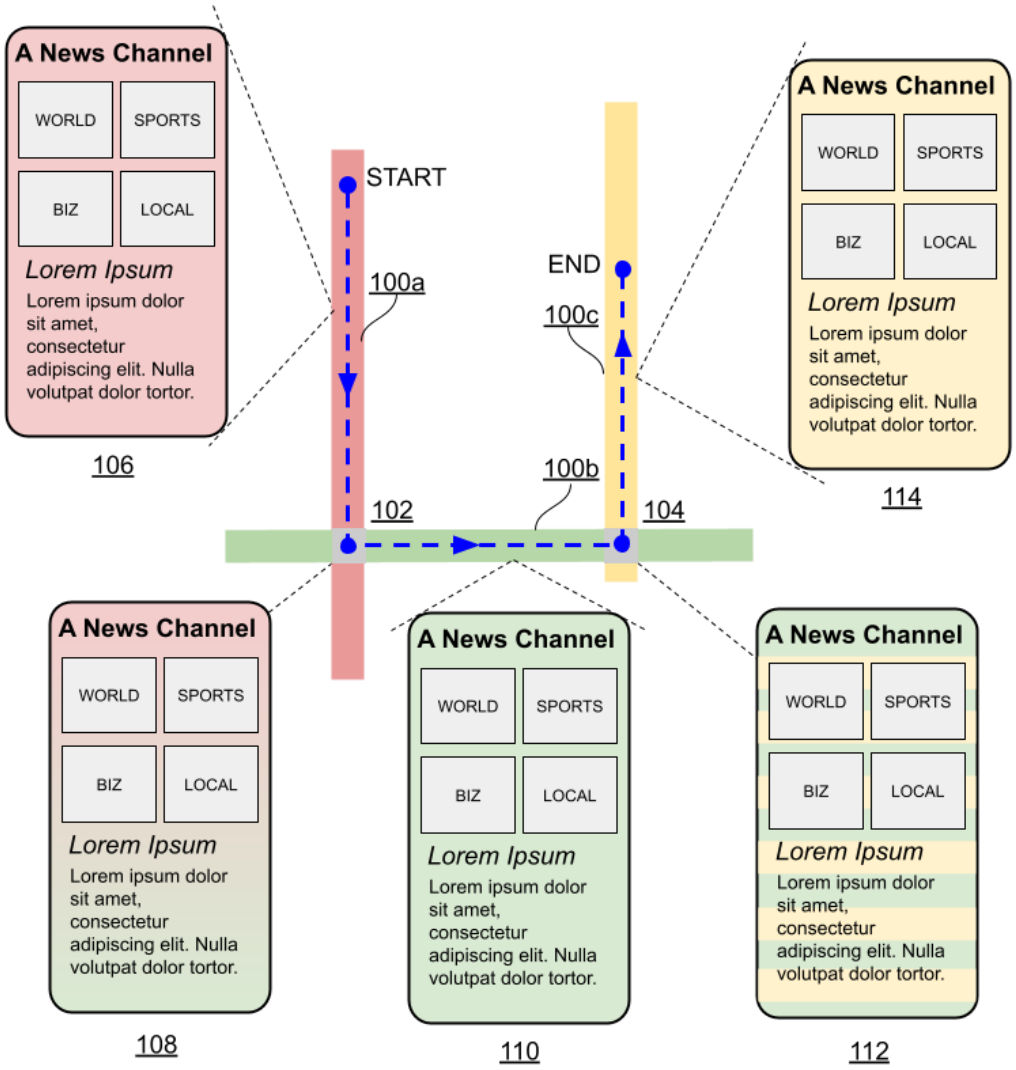

Fig. 1: Visual highlighting of the user interface during travel by multi-hop public transport

Fig. 1 illustrates automatic visual highlighting of the user interface during travel by multi-hop public transport. The route of a user comprises sequential rides on the red (100a), green (100b), and yellow (100c) segments of a metro rail. When the user boards the metro on the red line (at the station labeled START), the user interface on their mobile device (e.g., smartphone) or wearable computer (e.g., smartwatch) is automatically updated to use a red theme (106), thereby hinting to the user that they are presently on the red line.

The change to the red theme can be made across the entire user interface or to selected portions thereof, e.g., the search bar of an app; the clock and/or wallpaper on the lock screen; operating system (OS) user interface elements such as notification panels or status indicators; application UI; etc. Similarly, the tint of smart glasses or other eye wearables can change to reflect the color of the metro line the user is presently on.

Just before the user reaches the junction (102) of the red and green lines, another visual hint is provided to the user indicating that it is time to alight. An example visual hint can be the user interface transitioning from red to green (108), e.g., shown as a gradient. Other visual hints can be the paling of the color of the user interface (or part thereof) from the metro-line color to a neutral color such as white, black, or gray. A notification in the color of the next metro line can also be issued suggesting that the user alight to change lines.

Similar to the red portion of the journey, the user interface is switched to a green theme (110) during the green portion of the journey. Shortly before the junction (104) between the green and yellow lines, the user interface can be modified, e.g., to show alternating green and yellow (112) (or a gradient from green to yellow, or as a yellow tint). When the user boards the yellow line, the user interface is updated to a yellow theme (114). The visual theme reflects the user's current position in the metro system. In this manner, even if the user is engrossed in

viewing content on their mobile device, they are provided subtle hints about their location on the public transport system that enables them to stay on track.

Visual hints to contextualize app behavior

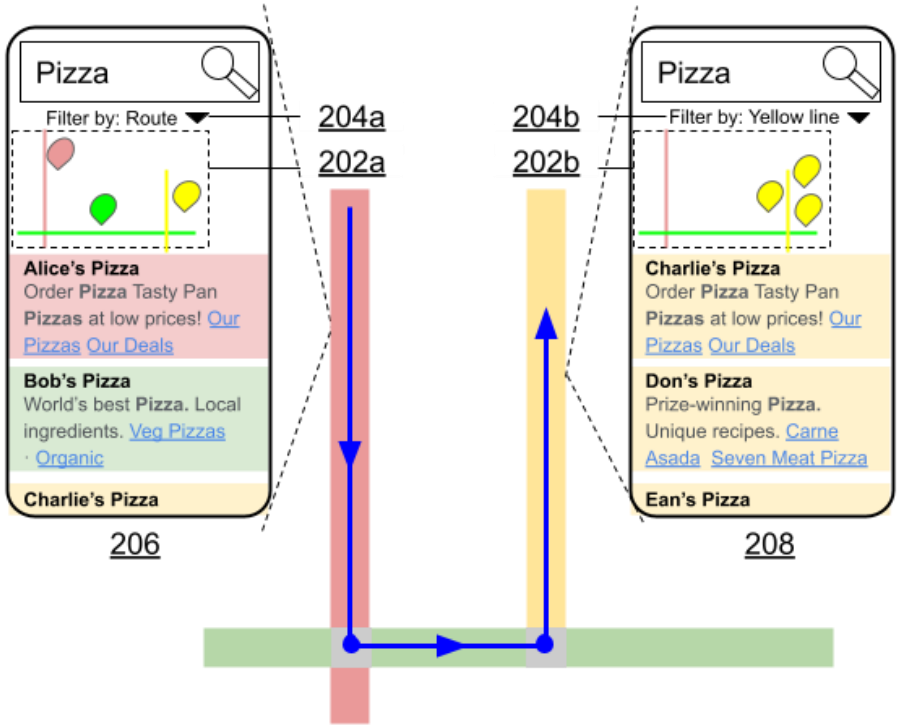

Fig. 2: App interactions colored based on user location within a public transport system

Fig. 2 illustrates app behavior contextualized to the user's location within a public transport system. In the example of Fig. 2, the user searches for pizza. The user is provided options (204a) to filter results by their route. The route-aware search engine presents results along the user's route (202a) on the public transport system. For ease of decision making, the results are colored by the segment of the public transport system that is closest to the pizza vendor (206). As another example of contextual filtering, the user can filter by the color of a metro line (204b), which results in the display of pizza vendors closest to the selected metro line (202b). For ease of decision making, the results can be provided in the color of the selected metro line (208).

Another example of adjusting an app interface is a chat application that uses color based on the geographic area that the people in the conversation are talking about. With user permission, if it is determined that the chat conversation is about a restaurant that is located along the pink metro line, the chat bubble can be shown in pink to indicate the location of the restaurant. Other examples of contextualized app behavior include increasing font sizes for easier reading, making UI buttons larger for easier interaction, changing screen contrast depending on dynamic lighting conditions, etc. Such contextualized app behavior can be triggered with user permission based on various factors such as the user's posture, position, speed, etc., e.g., if the user is detected as being seated on a moving train or other public transport.

Further to the descriptions above, a user may be provided with controls allowing the user to make an election as to both if and when systems, programs, or features described herein may enable the collection of user information (e.g., information about a user's route queries, location-related queries, a user's preferences, or a user's current location), and if the user is sent content or communications from a server. In addition, certain data may be treated in one or more ways before it is stored or used so that personally identifiable information is removed. For example, a user's identity may be treated so that no personally identifiable information can be determined for the user, or a user's geographic location may be generalized where location information is obtained (such as to a city, ZIP code, or state level) so that a particular location of a user cannot be determined. Thus, the user may have control over what information is collected about the user, how that information is used, and what information is provided to the user.

CONCLUSION

This disclosure describes techniques that provide, via a mobile device and/or a wearable computer, subtle visual hints to a traveler regarding their current location on a multi-hop public transport system such as metro rail and upcoming transfers. The visual hints can be provided by matching the color of operating system controlled user interface elements such as wallpaper, status indicators, notification panels, etc. or via application UI. Application behavior can also be updated to account for the traveler's present location and travel route, e.g., by displaying search results that match the route, displaying search results with a similar color as a route segment that it is close to, etc.

REFERENCES

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