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Project Backlog: BoilerNav (Team 13)

Problem Statement:

We would like to solve the issue of individuals being unfamiliar to Purdue's campus and its building layouts. While current maps provide outdoor navigation on Purdue's campus, they do not provide indoor navigation inside buildings. Our goal is to develop an application that features both outdoor and indoor navigation capabilities as well as other interesting features.

Background Information:

The problem we wish to solve is that there is no overall navigation system for Purdue University's campus that encompasses both inside of buildings and outside of buildings. The domain would be within the Purdue campus. Our targeted users would be Purdue staff and faculty, Purdue students, and guests of the Purdue campus. There are other systems that function similar to our application. Google Maps, Apple Maps, etc all serve as outdoor navigation. They do not, however, provide indoor navigation within buildings. We will be implementing indoor navigation specifically on the Purdue campus to address such limitations and develop additional navigation features that current applications do not provide such as custom routes, a feedback system, and more.

Requirements:

Functional:

- General:
1) As a user, I would like this app to be available on web browsers
2) As a user, I would like this app to be available as a native app (if time allows)
3) As a user, I would like to view a map of Purdue's Campus upon opening the app.
1) As a user, I would like to select which building to travel to on Purdue's Campus.
2) As a user, I would like to see the duration of routes for outdoor navigation
3) As a user, I would like to select Purdue's buildings to view their indoor floor plans.
4) As a user, I would like to select which room I am closest to for indoor navigation
5) As a user, I would like to select which room I would like to travel to in Purdue's buildings
6) As a user, I would like to see the duration of routes for indoor navigation
7) As a user, I would like to go through a tutorial for using various parts of the app

- Developing maps/floor plans:
8) As a user/developer, I would like to mark locations and rooms in buildings to help scale the app.
9) As a user, I want to be able to add buildings to the app should Purdue build new buildings.
10) As a user, I would like to help create navigation graphs for new buildings or for buildings that have their layout changed.
11) As a [user/Purdue Administrator], I want an easy way to create a building map if a floor plan does not exist already

- User accounts:
12) As a user, I would like the option to create an account
13) As a user, I would like to be able to login to my account
14) As a user, I would like the option to change account information, like email, password, (username?), etc.
15) As a user, I would like to be able to delete my account and associated data
16) As a user, I would like my past routes to be saved when using the application while logged in
17) As a user, I would like to be able to add personal route and route times on my account
18) As a user, I would like to know if a route I take regularly is unavailable
19) As a user, I would like my routes to be private and secure unless I opt into sharing one or all of my routes
20) As a user, I would like to be able to submit a schedule and be given paths for each location.

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- Statistics/Visualizations:

21) As a user, I would like to view visualizations of the most popular routes and rooms on Purdue's campus
22) As a user, I would like to see a graph of congestion vs. time for a particular route.
23) As a user, I would like to see a real time map that shows congestion on a navigation map (like a heat map)

- Security/Accuracy:

24) As a user, I would like to be able to flag a map if it has been vandalized
25) As a user, I would like a system to highlight small errors in maps for map maintainers and other users
26) As a user, I would like a system to report system bugs to the developers (e-mail, etc)
27) As a Purdue Administrator, I would like protections against map vandalism
28) As a Purdue admin, I would like a user hierarchy so trusted users can moderate and make changes, while preventing untrusted users from causing damage. (if time allows)
29) As a map maintainer, I would like to view previous versions of maps and rollback to a previous version if needed (if time allows)

- Routing:

30) As a user, I would like to get multiple choices of routes to a given room/building
31) As a user, I would like to be rerouted if I stray off the path

- Feedback:

32) As a user, I would like to be able to submit feedback on the given routes.
33) As a user, I would like to send durations of the routes I take to help the algorithm predict future routes.

Other:
34) As a user, I would like to be able to specify I can only take elevators. (if time allows)
35) As a user, I would like to share suggested routes with visitors (family and friends). (if time allows)
36) As a Purdue visitor, I would like to get a map of interesting Purdue locations.
37) As a user, I would like to see distances in metric and imperial (choice).
38) As an international student, I want to switch the app language to my native language so that I can navigate more comfortably. (if time allows)
39) As a user, I would like to be able to navigate to general things (computer labs, dining courts, water fountain, bathroom, bike racks, etc) based on distance.
40) As a user, I would like to choose to navigate through buildings when the weather is bad. (if time allows)
41) As a visitor, I want to locate parking areas near specific buildings so that I can plan my visit efficiently.
42) As a student, I want to receive push notifications when I'm near points of interest so that I can learn more about campus landmarks.
43) As a user, I would like to record the location of my vehicle to navigate back to it.
44) As a user, I would like to be shown public transportation routes around Purdue.
45) As a user, I would like to be shown bike paths.

Non-Functional:

1) Usability:
   - Application should have intuitive ui
   - The users should be able to use the application through a web browser
   - Application should be easily usable as an outdoor and indoor navigation tool as well as a tour guide
   - Mobile support (may double front-end work) (if time allows)
   - Hardware support (Altimeter(elevation), Gyroscope(Accurate rotational data), GPS, Touch? Screen), Arduino/Raspberry Pi/ESP32 (if time allows)
   - Live real time interior location data (if time allows)
2) Security:
   - Application should be secure and protect against map vandalism.
3) Performance:
   - Application should provide duration of routes to the nearest minute.
   - Application should support requests from multiple users (1000+) and have reasonable response time (< 5 ms)
4) Scalability:
   - Application should allow users to mark locations and rooms in buildings, which will help scale the app.
5) Deployment:
   - The application will be hosted on Heroku, Render, or another service and should be available to users 24/7.