Programming & Systems on the Web

Laboratory Exercise Academic Year 2023 – 2024

Subject: Volunteer coordination platform during natural disasters

Objective

The aim of this project is to develop a collaborative system for registering requests for assistance (emergency items) and serving the needs of a community affected by a natural disaster (e.g. flood, earthquake, etc.). Through the platform, a citizen can declare that they have specific needs for various items (e.g. water, food, medicine) or declare that they have a surplus and can donate specific items.

We believe that citizens cannot move and serve each other, but in the area of the disaster there are civil protection vehicles or volunteers (rescuers), which can pick up or deliver the items (tasks). Also in the area there is the "base" of the rescuers, which functions as a central warehouse.

Rescuers can see all requests or offers from citizens on a map display and each vehicle can undertake one or more pick-up/delivery missions. Citizens respectively can access from their mobile phone and declare their needs for various items. The base can at times of its choice announce various needs for items that are in short supply, and these announcements are displayed on citizens' mobile phones. Each citizen can then indicate whether he or she has the items requested by the base so that they can be picked up by rescuers.

Functional Specifications

There are three types of users in the system: Administrator (base), Rescuer and Citizen.

Administrator

1) Login - Logout: the administrator can log in to the system via an appropriate username/password and log out of the system. The system should not allow any content to be displayed in case a user is not logged in. In case of attempting to access any page without prior login, a redirection to the login page shall be made.

2) Base Warehouse Management: The administrator defines the items to be handled and the details concerning them by defining categories of items, and then for each category by adding or modifying the relevant items via an appropriate form. He also has the possibility to load the item descriptions and their categories from a json file (see Archiving). Updating the database for new categories and products is done a) by

a direct call to the JSON URL in the common repository and b) by uploading a separate JSON file that should have the same structure as the repository. Based on the defined products and categories, the administrator adds or removes available products to be moved from the database and their quantity. The quantity is then updated automatically when processing tasks by the rescuers (adding or removing quantities) and manually by the administrator.

3) Map view: The administrator sees with appropriate markers on a map the base, the location of all rescuer vehicles, requests and item offers from citizens that have not yet been processed (see Rescuer, item 5). Requests/offers taken up by rescuers to be processed are displayed in a differentiated way from pending ones (e.g. different marker colour). Requests are also visually differentiated from item offers (different marker type). Clicking on each marker displays a pop-up balloon with the following information:

a. Vehicles: The username of the vehicle, the load of the vehicle, its status (see rescuers section) and also if there are active tasks for the vehicle, the marker of the vehicle is joined with straight lines to the markers of the tasks it has taken over.

b. Requests: The name and telephone number of the citizen, the date of entry, the type and quantity requested by the citizen, the date of pickup by vehicle, and the user name of the vehicle (if picked up). In the case of a pickup, the vehicle marker is joined by straight lines to the request marker

c. Offers: The name and telephone number of the citizen, the date of entry, the type and quantity offered by the citizen, the date of takeover by vehicle and the user name of the vehicle (if taken over). In case of takeover, the marker of the vehicle is joined by straight lines to the marker of the offer

The administrator can set the location of the base on the map by clicking and dragging its position (with confirmation before any change is validated)

4) Implementing filters on the map: in the map view, filters (toggle) should be implemented regarding: requests that have been undertaken, requests that are pending, offers, vehicles with active tasks, vehicles without active tasks, straight lines.

5) View warehouse status: The administrator sees a detailed status of all available items, whether they are in the base or loaded on vehicles, in tabular form. The contents of the table are filtered by item categories, so that only items from the selected categories (1 or more) are displayed.

6) Service statistics: The administrator sees a graph showing the number of new Requests, new Offers, processed Requests and processed Offers with the option to select the time period covered by the graph.

7) Creation of rescuers' accounts: The administrator can create new rescuer accounts so that they can login to the system.

8) Create notices: the administrator creates new notices that will appear in the citizen's application, concerning needs for various items. In each announcement, new announcements will be created to create new citizens' notices that will appear for the different types of services one or more items are added from those in the database.

Rescuer

1) Login - Logout: as for the administrator.

2) Load management: We assume that there is no limitation on the load that each vehicle can carry (for simplicity of the project). The rescuer can see the items in his vehicle at any time. When the rescuer is within 100 meters of the base, he can click on the "load" button and select as many items (and their quantity) as he wishes from the base inventory. These are added to his load. Similarly, the "unload" button transfers all the items in the rescuer's load to the base inventory.

3) View map: The rescuer sees with appropriate markers on a map his/her location, base, all requests and offers not already serviced by another vehicle, and requests or offers he/she has taken over. Requests/offers that have been taken over by the rescuer to be handled are displayed in a differentiated way from the pending ones (e.g. different marker colour). Requests are also visually differentiated from Item Offers (different marker type). If there are active tasks for the vehicle, the vehicle marker is connected with straight lines to the markers of the tasks he has taken over. Clicking on each Request or Bid marker displays a pop-up balloon with the following information:

o Requests: The citizen's name and phone number, the date of entry, the type and quantity requested by the citizen, the date of pickup by vehicle, and the user name of the vehicle (if picked up). The rescuer can choose to take delivery on the request by pressing an appropriate button if it has not already been taken.

o Offers: The citizen's name and phone number, date of entry, the type and quantity offered by the citizen, the date of pickup from vehicle and the user name of the vehicle (if taken up). The rescuer can choose to take over the offer by pressing an appropriate button if it has not already been taken over.

Please note that a rescue vehicle can take on up to 4 tasks at the same time (Requests or Offers). The rescuer can set the location of his vehicle on the map by clicking and dragging its position.

4) Apply filters to the map: Similar to the administrator.

5) Management of current tasks. For each task the name and phone number of the citizen, the date of entry, the type and quantity requested or offered by the citizen are displayed. Also displayed for each task are two buttons:

a. "Completed": once the rescuer has completed the task he can press this button. The status of the task changes to completed and no longer appears on any map of

any user. The vehicle load is updated based on the details of the task (item removed or added). This button is only activated when the rescuer is within 50 meters of the task.

b. "Cancel": the rescuer can at any time choose to abandon a task he/she has been assigned to. In this case the task can be taken over by any other rescuer.

Citizen

1) Create an account: The citizen can create his/her account by selecting username and password. He/she also gives his/her personal details (name, contact number) and his/her position on the map.

2) Login - Logout.

3) Request Management: the citizen can create a new request by selecting one of the available items, without indicating quantity (e.g. "I want water"). Along with the item, the citizen also indicates the number of people concerned by the request. A separate request is created for each item. For his convenience, he can choose between categories and items, or search for a specific item (with autocomplete). The citizen can see a list of his current and past requests, as well as their details (whether they have been accepted, when they were accepted, when they were completed, etc.)

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