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POLITECNICO
MILANO 1863

TEST PLAN: RODI – MILANO ROAD NETWORK MONITOR

SE4G – SOFTWARE ENGINEERING FOR GEOINFORMATICS

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Purpose of the document

This document has as a main objective to explain how will be performed the test plan of the web application "RODI – MILANO ROAD NETWORK MONITOR". The document is also focused in getting some results of manual controls performed in the different sections of the application in order to understand the current level of development of each part and try to figure out possible improvements for each one of them.

Application overview

The users of the application are divided in three main groups:

- *Citizen users:* Common citizens which use the application in order to inform distresses in the road network of Milano. They can also visualize a map with their requests of maintenance and see the status of them.
- *Specialized users:* Members of the Ministry of Transport and Infrastructure of Milano. They use the application with the aim to get data about the distresses that are reported in the road network of Milano and they use that information to plan the interventions and update the status of the different requests of maintenance.
- *Super User: It is the admin of the webpage, the one with higher security permissions. He is the receiver of the requests for being registered as specialized user. He is the only user that can access to '/admin-register' root, and from that register specialized users as such.*

Testing Scope

This testing plan performs tests in each of the core sections of the web app which are the following ones:

1. Registration of citizen users
2. Registration of specialized users
3. Log in
4. Visualization of Map
5. Dashboard visualization
6. Visualization of requests uploaded by citizen users

Out of the scope

Here were not considered in the scope of the current testing plan, tests related with performance and were not performed tests on updating the status of requests of maintenance because that section is under development process.

Use cases Testing

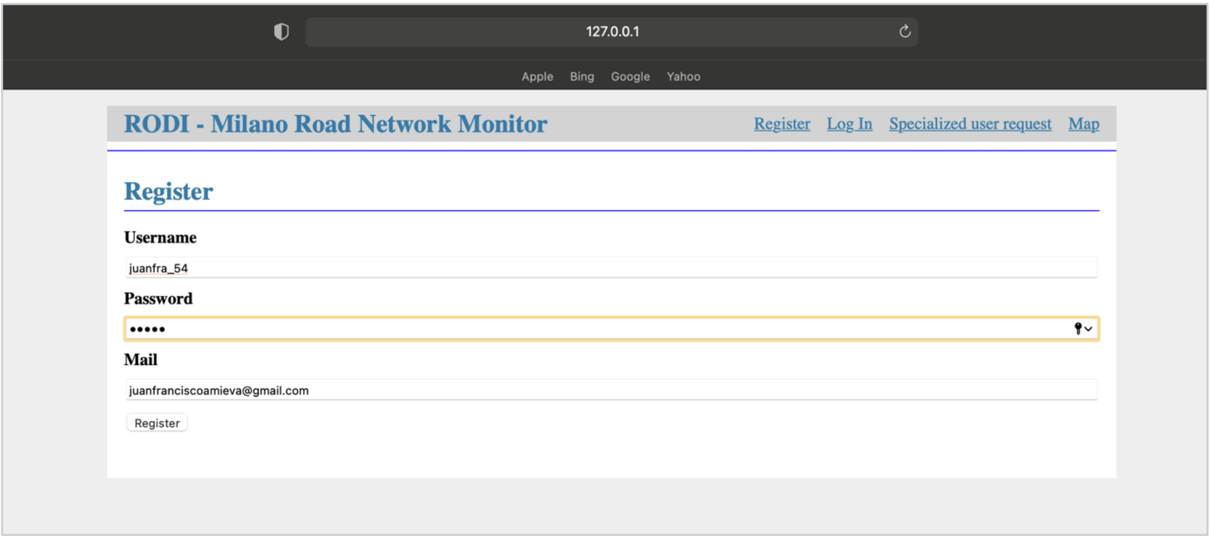
The present section explains how were performed the different manual tests on the different use cases proposed in the RASD document. It is important to highlight that where used the same identification for each of the uses cases because is necessary to uniformize the notation in order to allow a good trazability and recogintion of them along the different documents.

1. RegisterCitizenMember

In order to control this use case was inspected how are performed the different steps in the registration process of a citizen user in the web app.

Considering this, it was necessary to click in the Register link in the web application, then complete the information requiered in the presented form and press the submit button.

Figure 1: Successful normal user registration



RODI - Milano Road Network Monitor

Register

Username

juanfra_54

Password

•••••

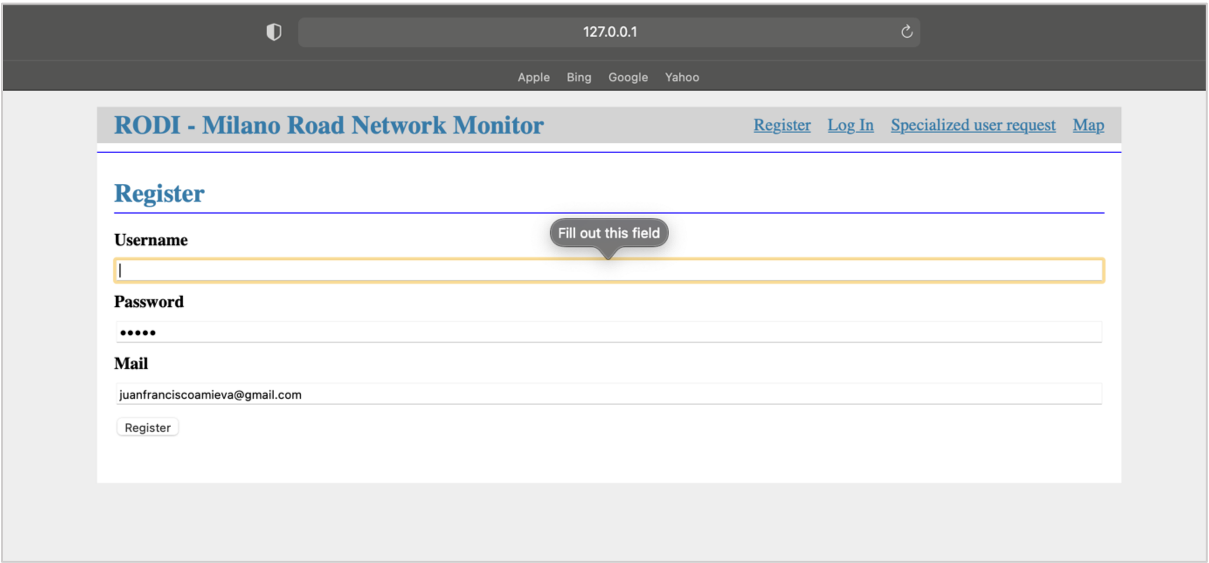
Mail

juanfranciscoamieva@gmail.com

The registration was performed successfully.

Then it was checked the response of the system when a user forgot some of the inputs. In this case, it appears a popup on the empty field that indicates that this data is required.

Figure 2: Missing field in citizen user registration



RODI - Milano Road Network Monitor

Register | Log In | Specialized user request | Map

Register

Username

Fill out this field

Password

•••••

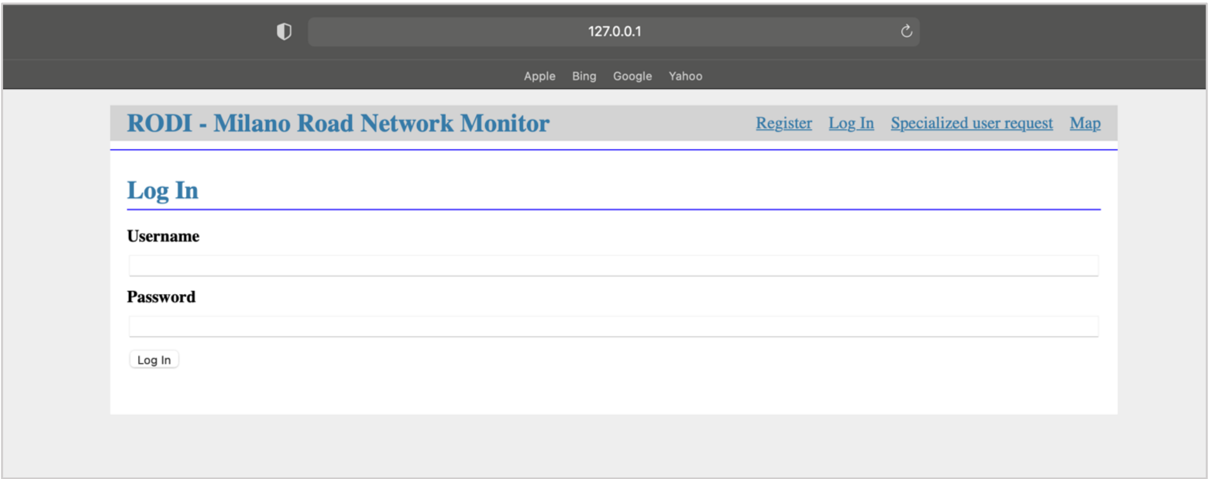
Mail

juanfranciscoamieva@gmail.com

Register

When instead the registration is performed successfully, the system redirects to the login section.

Figure 3: Redirection to login after normal user registration



RODI - Milano Road Network Monitor

Register | Log In | Specialized user request | Map

Log In

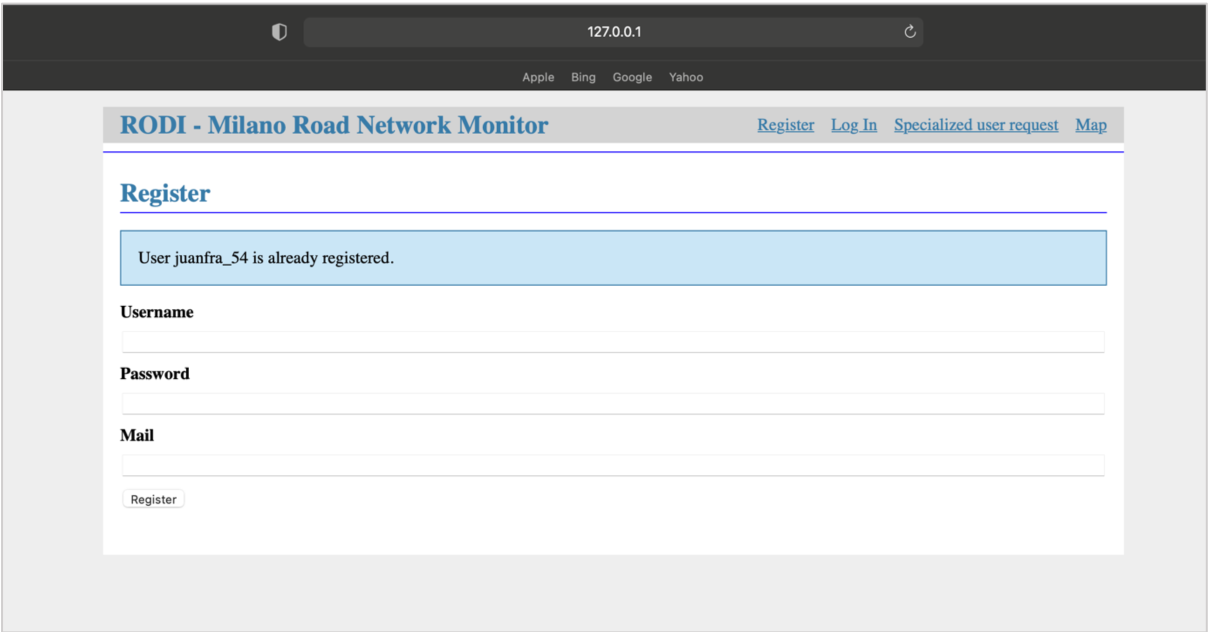
Username

Password

Log In

In case a user tries to regiter its account with the same username than another one already existing, the app will display the following popup.

Figure 4: Already registered username

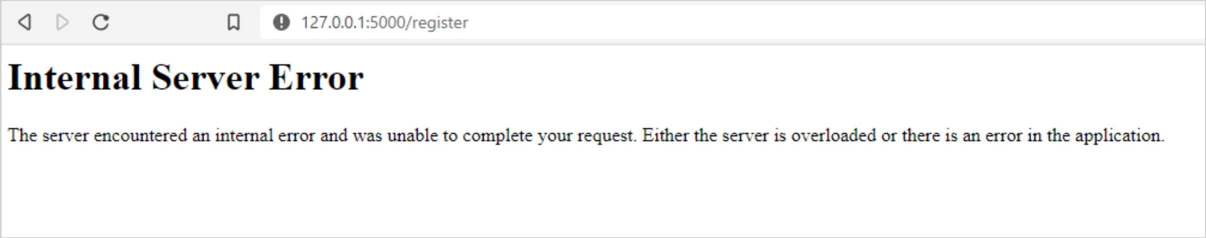

127.0.0.1
Apple Bing Google Yahoo
RODI - Milano Road Network Monitor
Register Log In Specialized user request Map
Register

User juanfra_54 is already registered.

Username
Password
Mail
Register

In the testing process of this use case was detected a fail in case a user tried to register with the same email than another user.

Figure 5: Detected error



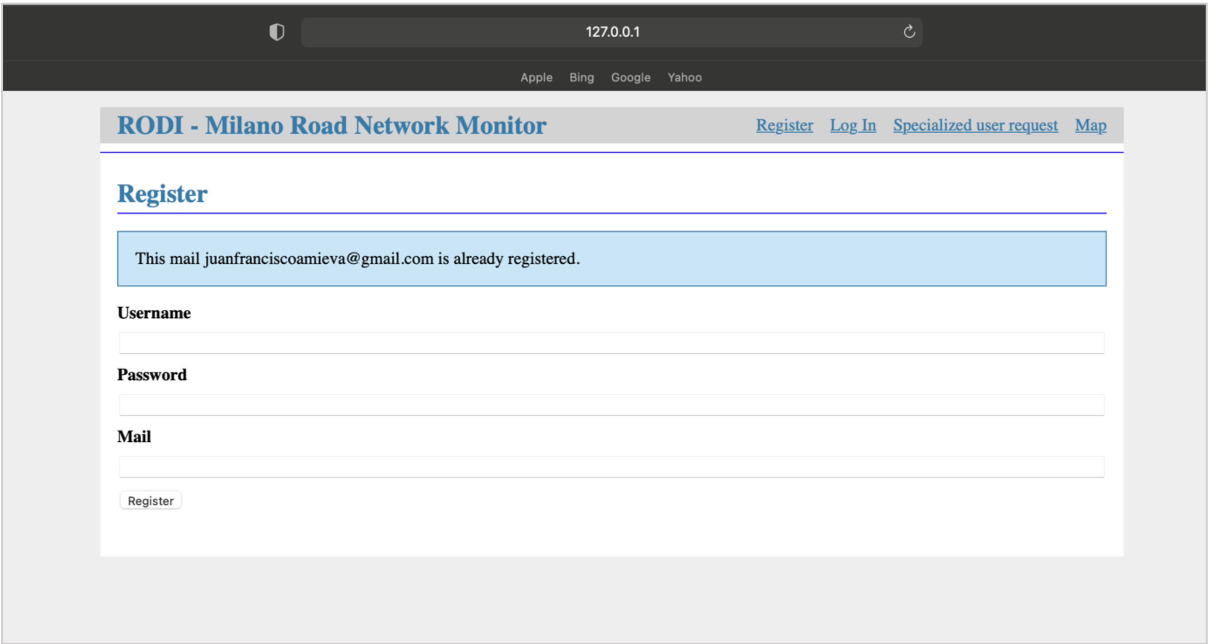
Internal Server Error

The server encountered an internal error and was unable to complete your request. Either the server is overloaded or there is an error in the application.

Although is right to consider that it is not a possible scenario because the e-mail should be unique for each user, the web app should render a page informing the user about the problem in the input received.

For this reason the code was edited in order to solve that. The final result after the control was a popup that indicated the related problem.

Figure 6: Already registered email



127.0.0.1
Apple Bing Google Yahoo
RODI - Milano Road Network Monitor
Register Log In Specialized user request Map

Register

This mail juanfranciscoamieva@gmail.com is already registered.

Username

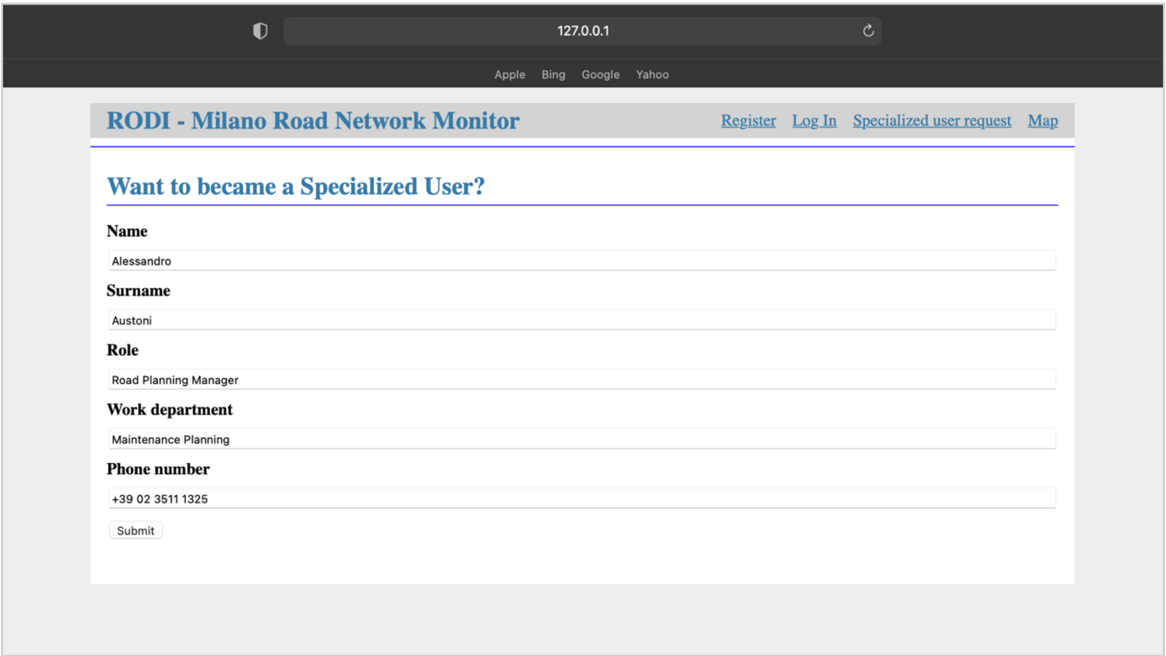
Password

Mail

2. RegisterSpecializedMember

For this use case it was tested the registration form for "Specialized users". In order to develop the test it is required to click on the "Specialized user request" and after that the web page renders the following section that has to be filled with the proper information.

Figure 7: Specialized user correct registration request



127.0.0.1
Apple Bing Google Yahoo
RODI - Milano Road Network Monitor
Register Log In Specialized user request Map

Want to became a Specialized User?

Name
Alessandro

Surname
Austoni

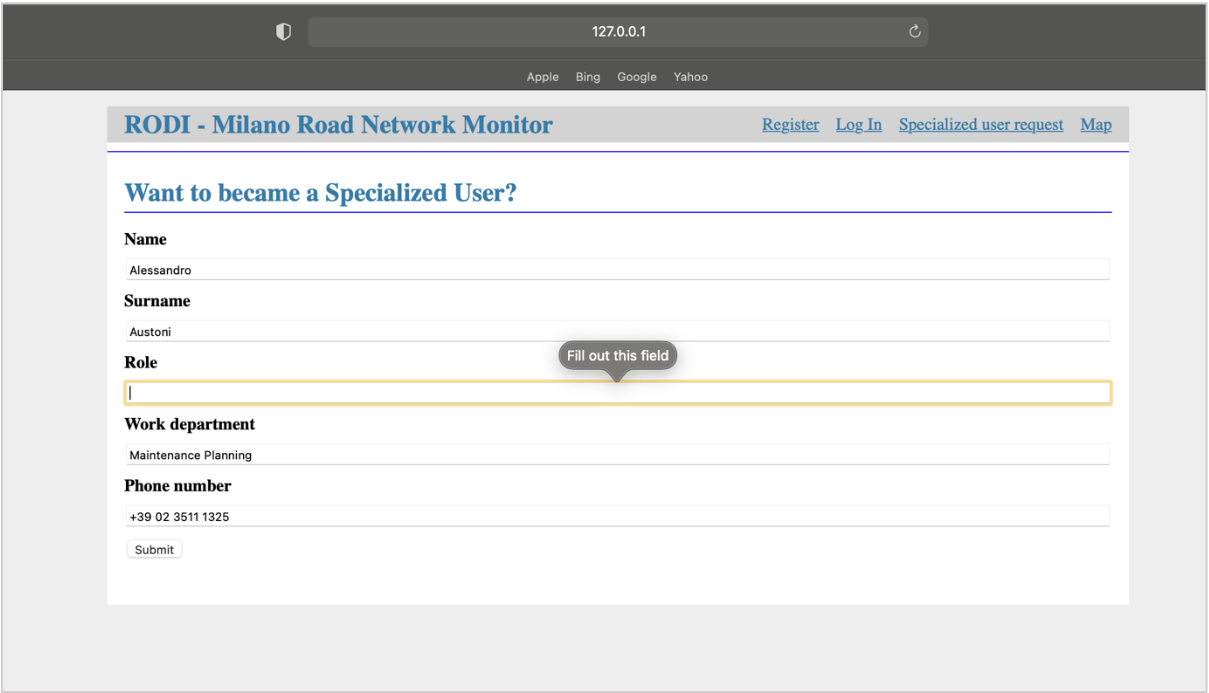
Role
Road Planning Manager

Work department
Maintenance Planning

Phone number
+39 02 3511 1325

This is the result of an user that forgets to insert one of the following fields in the specialized user request section (here just one field missing is reported for simplicity, but the test was successfully performed on each of them).

Figure 8: Role field missing in request submission



RODI - Milano Road Network Monitor

Want to became a Specialized User?

Name

Alessandro

Surname

Austoni

Role

Fill out this field

Work department

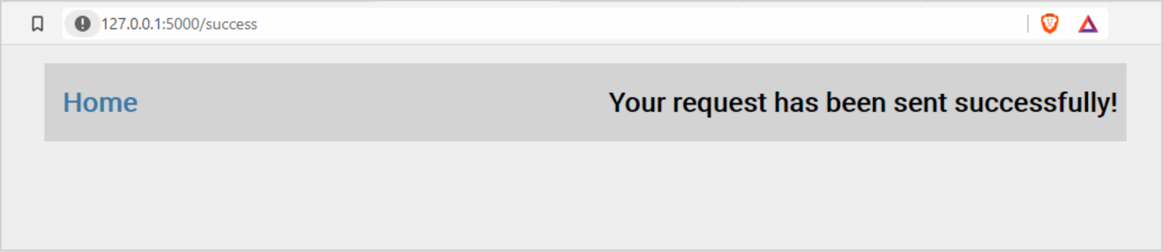
Maintenance Planning

Phone number

+39 02 3511 1325

Once a user asks for becoming a specialized user in the correct way, the web page renders a message indicating that the request for the new user was sent successfully.

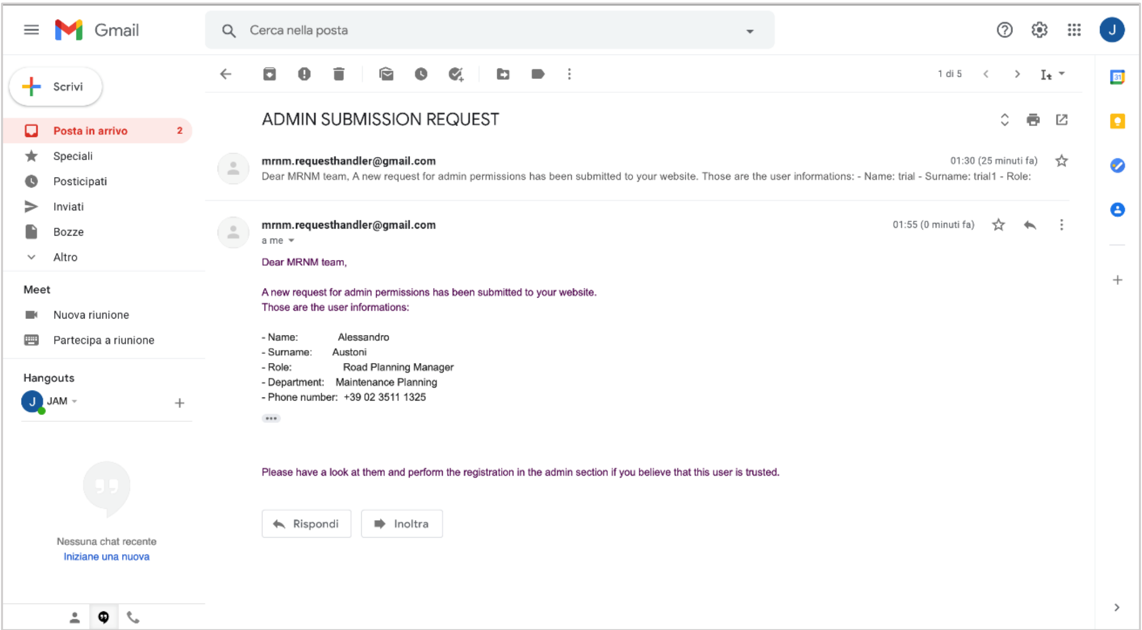
Figure 9: Successfully request



Your request has been sent successfully!

The application considers the role of a Super User (Admin) which manage the permisions for the specialized user requests. After the user compiles this form, the system sends an email to the super user, containing the information filled in the form by the user.

Figure 10: Submission request email



ADMIN SUBMISSION REQUEST

mrnm.requesthandler@gmail.com 01:30 (25 minuti fa)
Dear MRNM team, A new request for admin permissions has been submitted to your website. Those are the user informations: - Name: trial - Surname: trial1 - Role:

mrnm.requesthandler@gmail.com 01:55 (0 minuti fa)
a me

Dear MRNM team,

A new request for admin permissions has been submitted to your website.
Those are the user informations:

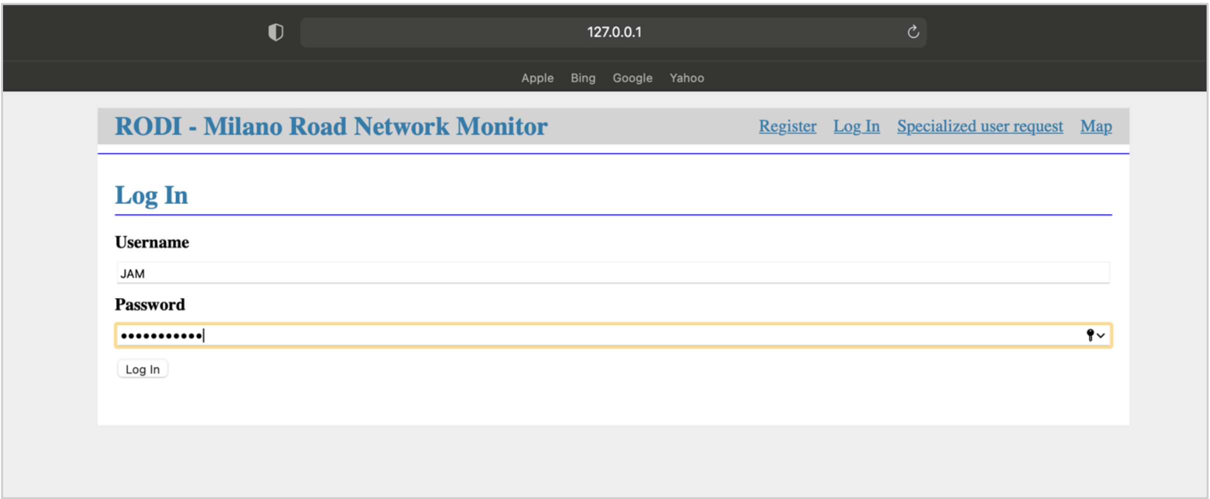
- Name: Alessandro
- Surname: Austoni
- Role: Road Planning Manager
- Department: Maintenance Planning
- Phone number: +39 02 3511 1325

Please have a look at them and perform the registration in the admin section if you believe that this user is trusted.

Finally, if the admin considers that the user is trusted, the super user ("JAM" in this case) can register the specialized user in the web app by accessing the root /admin-register.

Here we can see a test where the Super User, first, logs in

Figure 11: Super User Log-in



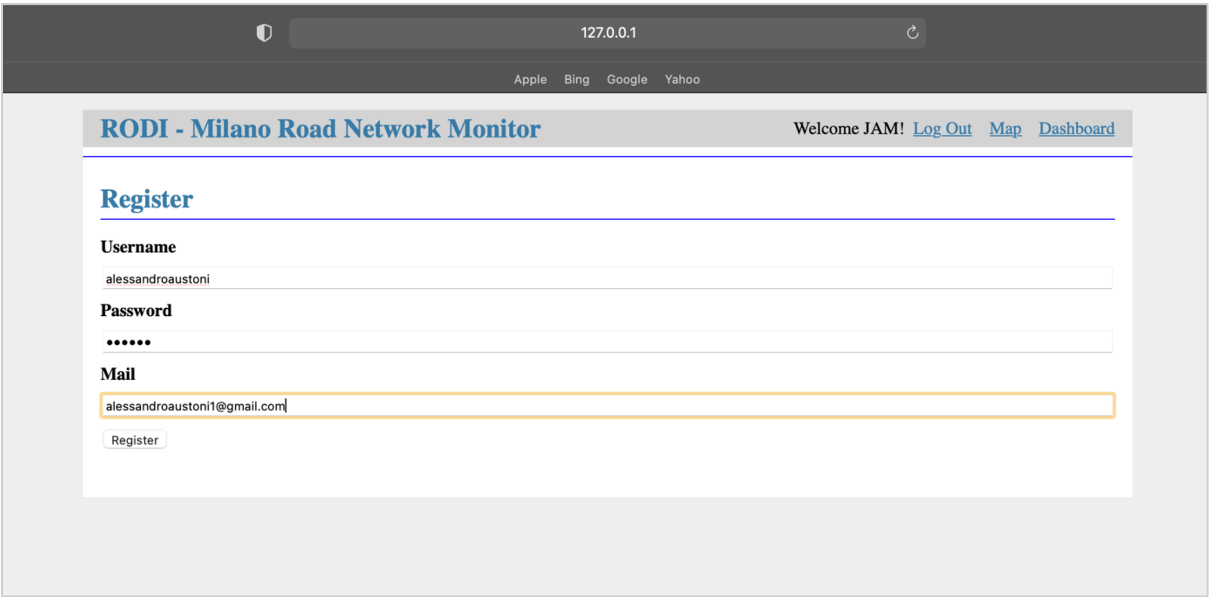
Log In

Username: JAM

Password: •••••••••••

And then access the specialized user registration web page thanks to the '/admin-register' root, and performs a specialized registration (here the specialized user is username: 'alessandroaustoni').

Figure 12: Super User registers Specialized User



Username

alessandroaustoni

Password

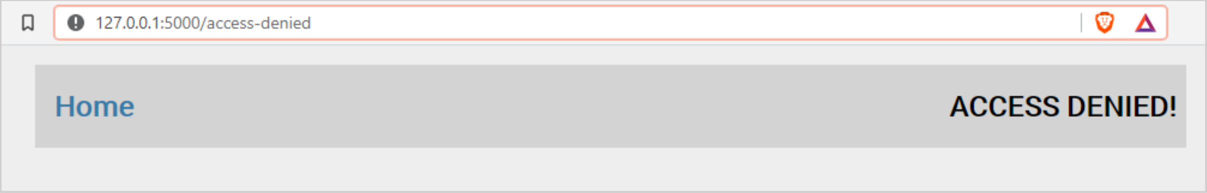
••••••

Mail

alessandroaustoni1@gmail.com

If a user that is different from the Super User tries to register a specialized user, he/she would get redirected to an access denied web page, that prevents the access to the section. This is the result of that trial for a not registered user, a citizen user (Username: juanfra_54) and specialized user (Username: alessandroaustoni)

Figure 16: Access Denied



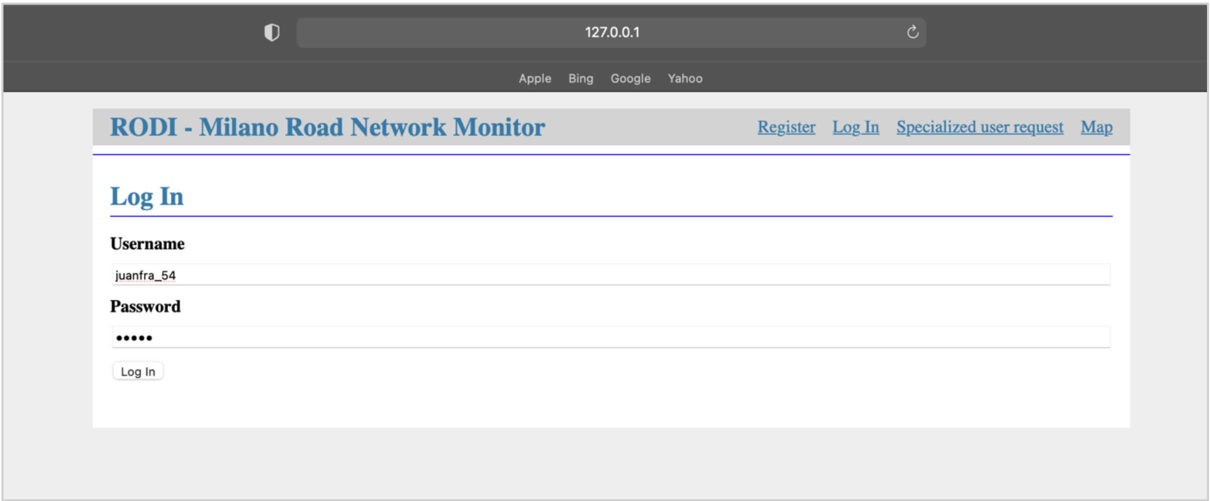
3. LoginMember

All the users log in by implementing the same steps which are the next ones:

- Access to the link "Log in"
- Then inserting their username and password in the system
- Finally pressing the "Log in" button

To control this procedure different tests were implemented for each kind of user. The usernames considered in the tests were the ones exposed in the previous use cases with the objective to maintain the same convention.

Figure 17: Normal user correct Log-in



RODI - Milano Road Network Monitor

Log In

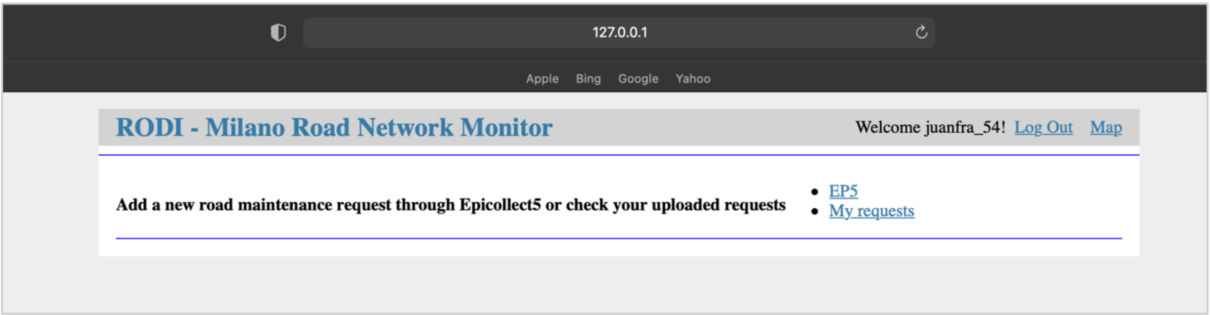
Username

juanfra_54

Password

•••••

Figure 18: Normal User correctly logged in



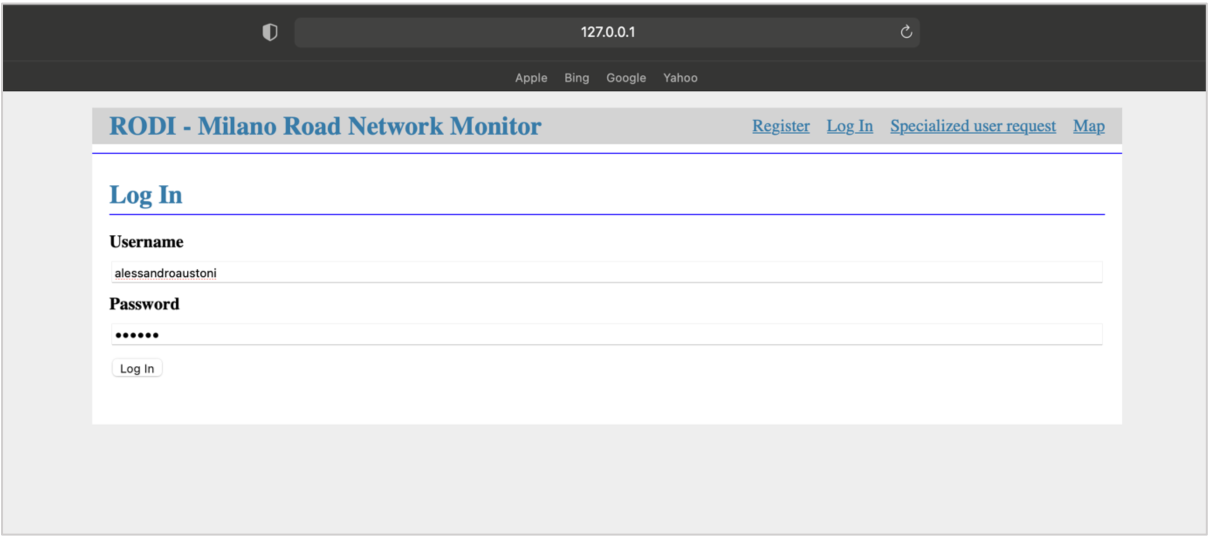
RODI - Milano Road Network Monitor

Welcome juanfra_54!

Add a new road maintenance request through Epicollect5 or check your uploaded requests

- EP5
- My requests

Figure 17: Specialized user correct log-in



RODI - Milano Road Network Monitor

Log In

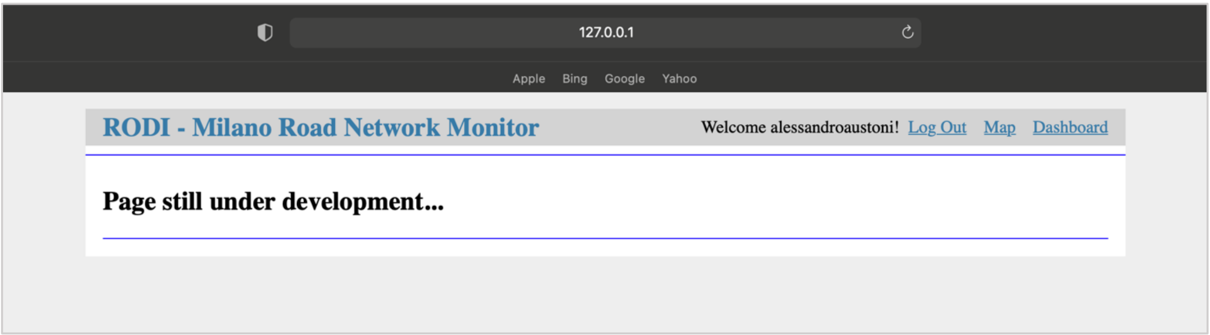
Username

alessandroaustoni

Password

••••••

Figure 18: Specialized user correctly logged in



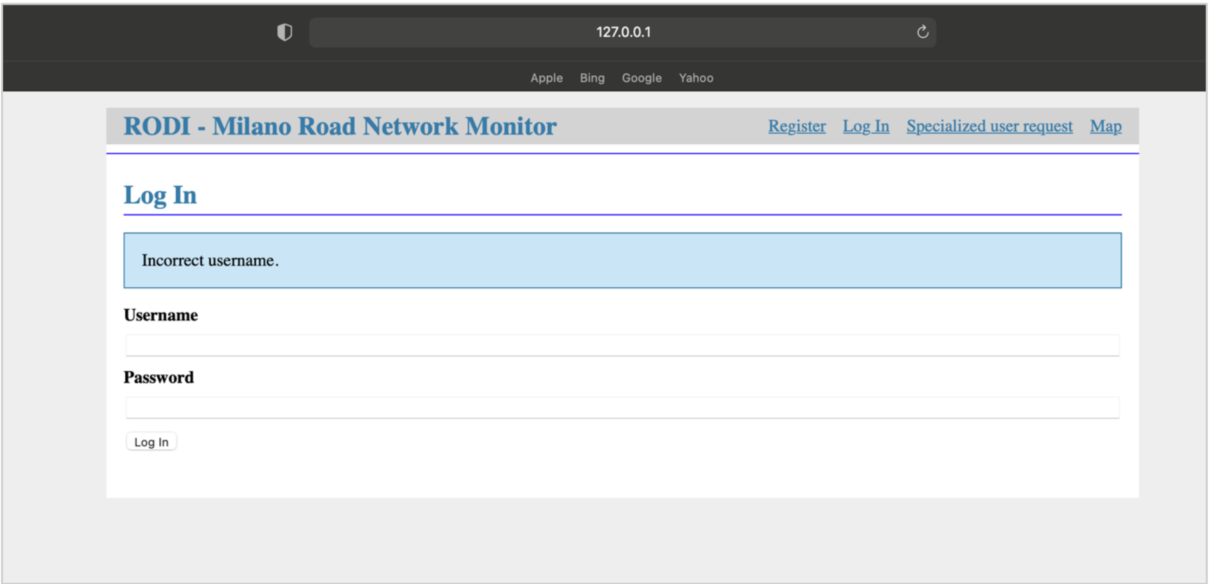
RODI - Milano Road Network Monitor

Welcome alessandroaustoni! Log Out Map Dashboard

Page still under development...

Also were tested also cases with incorrect usernames and passwords and the application displays a popup indicating the errors in the input data received by the user who intends to log in.

Figure 20: Incorrect username



RODI - Milano Road Network Monitor

Register Log In Specialized user request Map

Log In

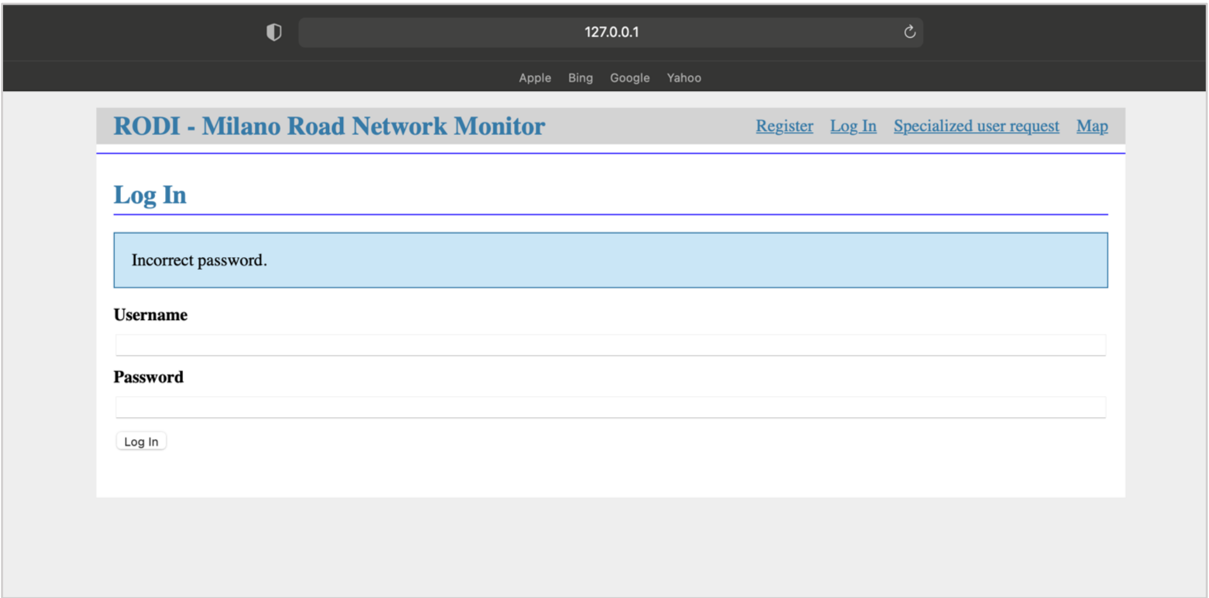
Incorrect username.

Username

Password

Log In

Figure 21: Incorrect password


127.0.0.1

RODI - Milano Road Network Monitor

Log In

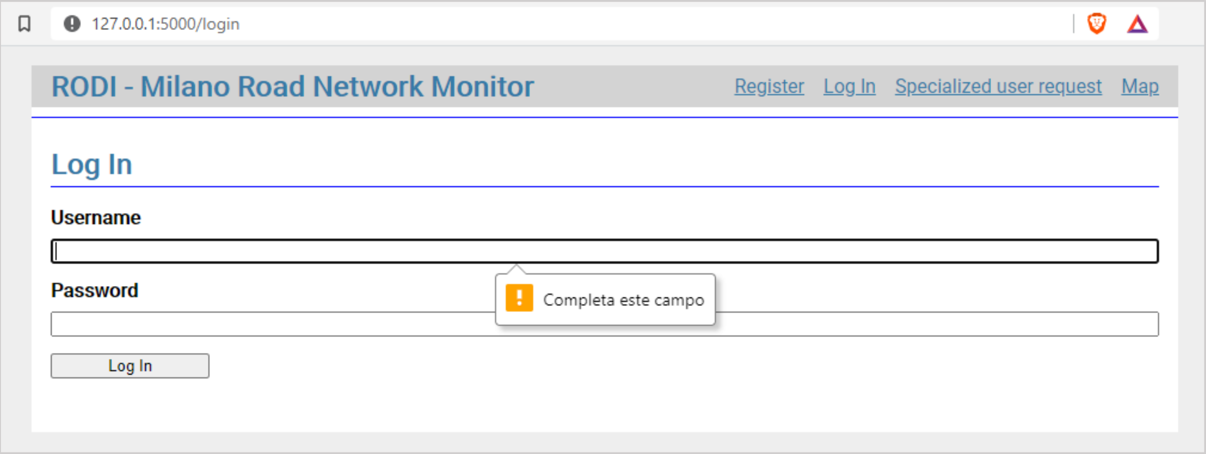
Incorrect password.

Username

Password

Considering the use case in analysis, it was also checked the situation in which the user does not include some of the fields requested in the log in form. In this case the screen shows a label indicating that the field is required to advance with the related task (log in).

Figure 22: Field empty – Log in


127.0.0.1:5000/login

RODI - Milano Road Network Monitor

Log In

Username

Password

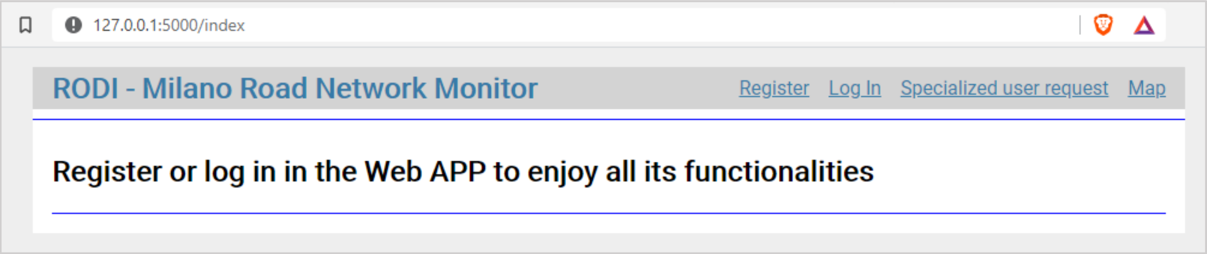
Completa este campo

4. ViewMap

Considering the focus of this use case it was analyzed the possibility of any kind of user to analyze the information rendered in the map displayed in the “Map” section of the web application. This map is available for any kind of user, even for those users which are not registered in the application.

In order to display the map, the user should press the link “Map” in the index page.

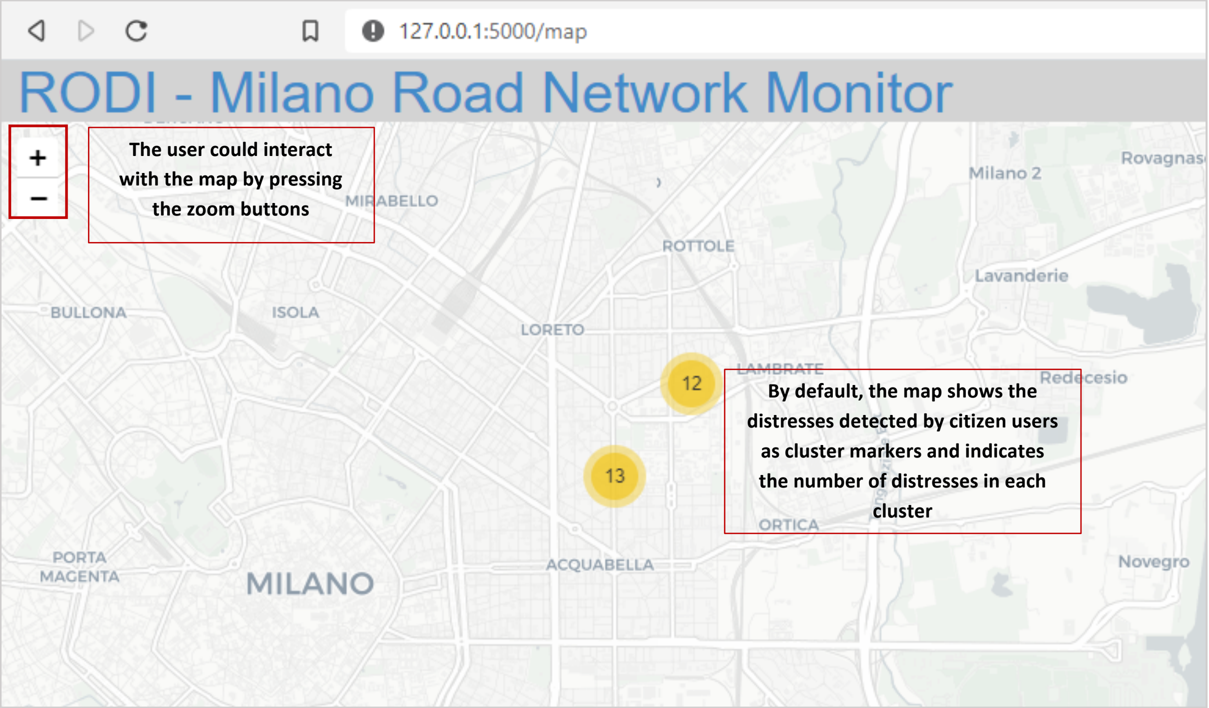
Figure 23: Index page – Map link



Register or log in in the Web APP to enjoy all its functionalities

Then the map is rendered and there are different possible interactions to perform in order to analyze the presented information.

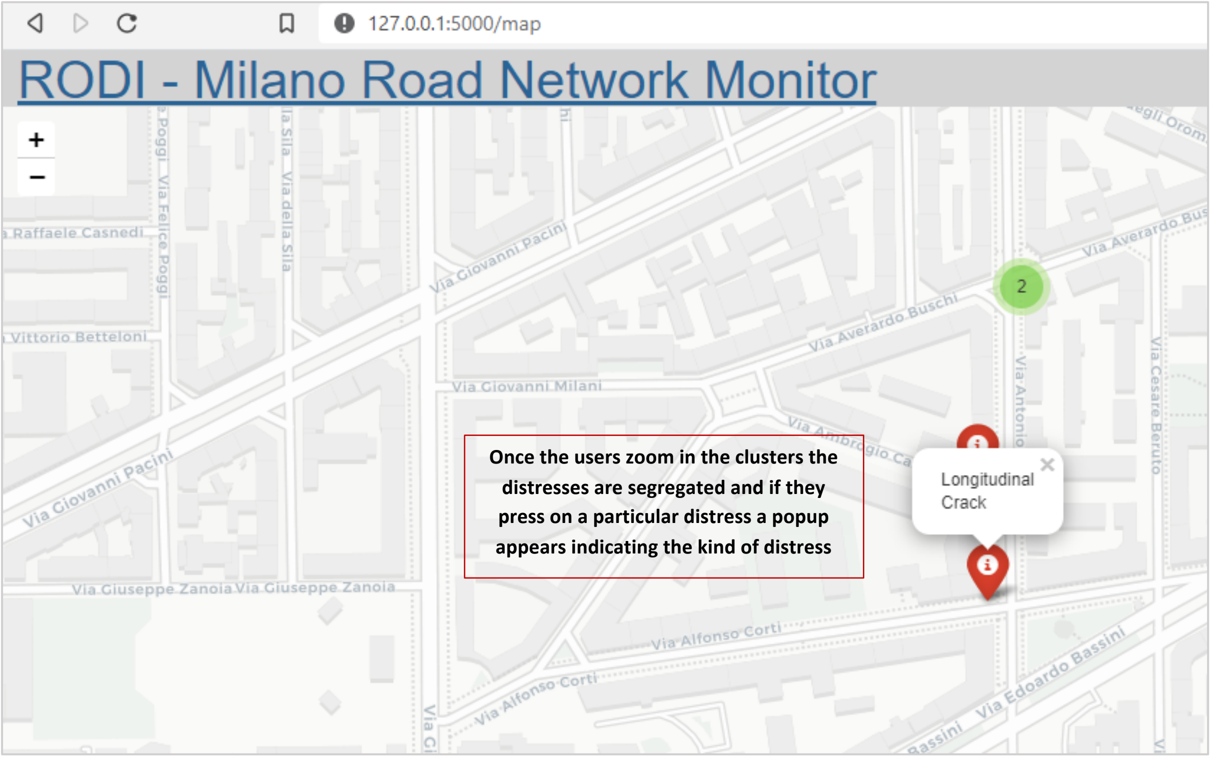
Figure 24: Map functionality testing (clusters and zoom)



The user could interact with the map by pressing the zoom buttons

By default, the map shows the distresses detected by citizen users as cluster markers and indicates the number of distresses in each cluster

Figure 25: Map marker testing



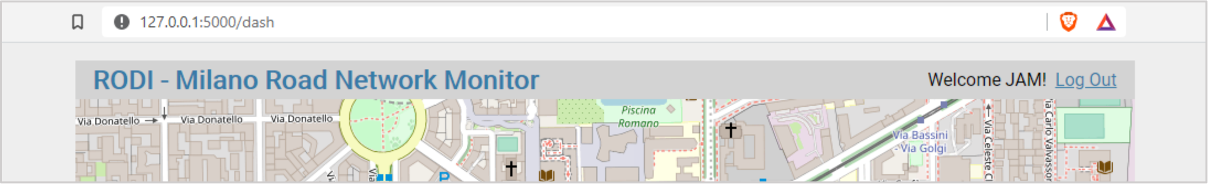
Once the users zoom in the clusters the distresses are segregated and if they press on a particular distress a popup appears indicating the kind of distress

5. VisualizeData

Considering this use case the main objective was to check the interaction with the different graphs that exposes data in the dashboard section of the web app and to control the access of different users to this section.

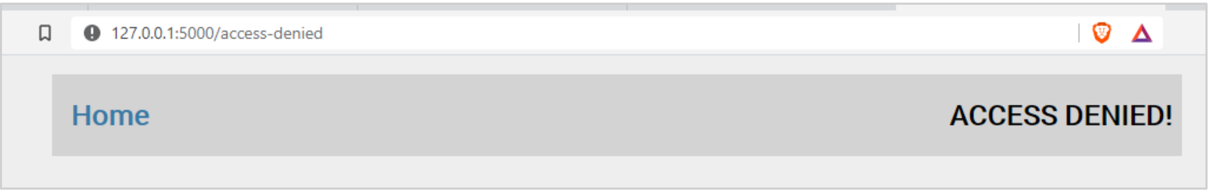
Only the super user “JAM” and the specialized users have permission to access to the dashboard section.

Figure 26: Dashboard section access



In case a citizen user or a non registered user tries to access to this section the app will render a message informing that the access was denied.

Figure 27: Access denied – dashboard section



127.0.0.1:5000/access-denied

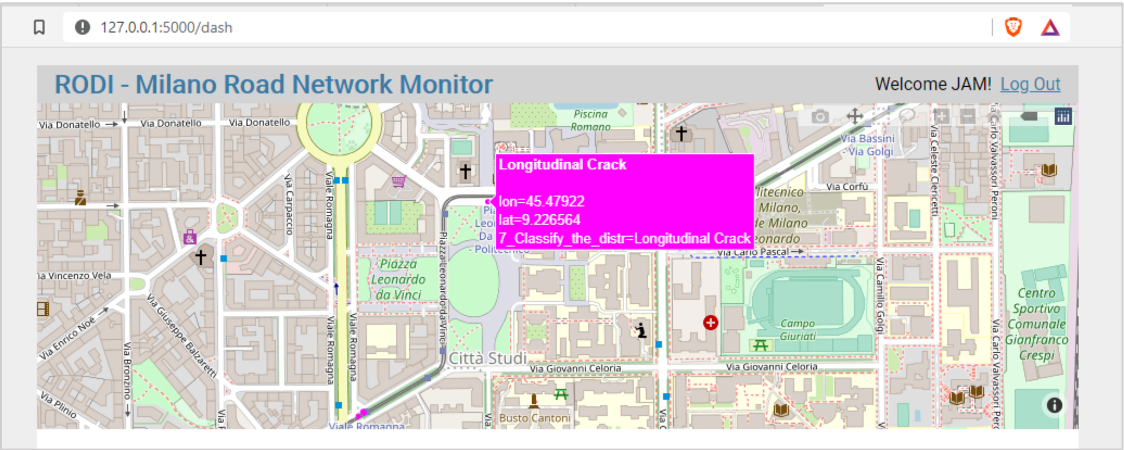
Home

ACCESS DENIED!

Once a specialized user or the super user "JAM" could access to this section there are different interactions that would be performed.

Considering the analytical map, the users could check each distress and control the kind of distress of each marker by visualizing the popup which appears once they move the mouse over a specific distress.

Figure 28: Analytical map features



127.0.0.1:5000/dash

RODI - Milano Road Network Monitor

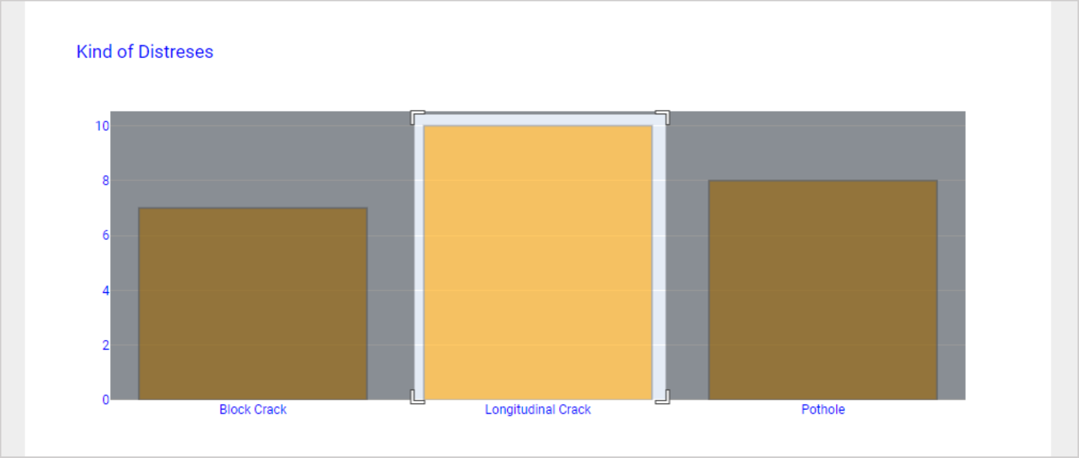
Welcome JAM! Log Out

Longitudinal Crack

lon=45.47922
lat=9.226564
7_Classify_the_distr=Longitudinal Crack

Also were tested the possible interactions with the graphs exposed below which allows to the users to filter different categories in each one of them just by selecting with the mouse.

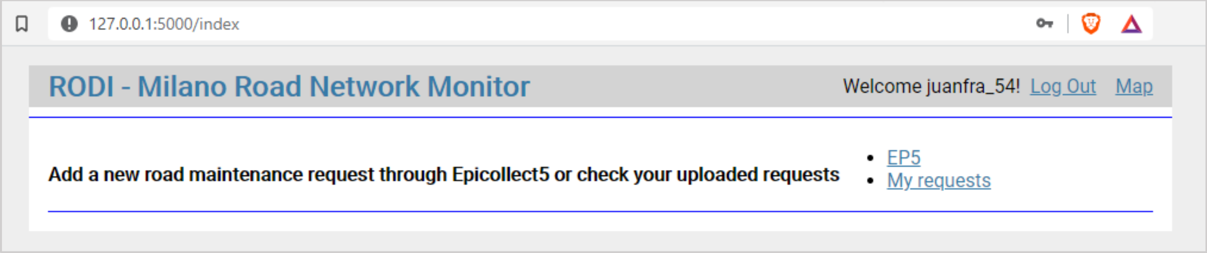
Figure 29: Dashboard graphs testing functionalities



6. MyRequestList

In this case was important to detect if the users could retrieves their own requests uploaded previously and also was checked that different citizen users can not visualize the requests uploaded by others.

Figure 30: Citizen user log in index



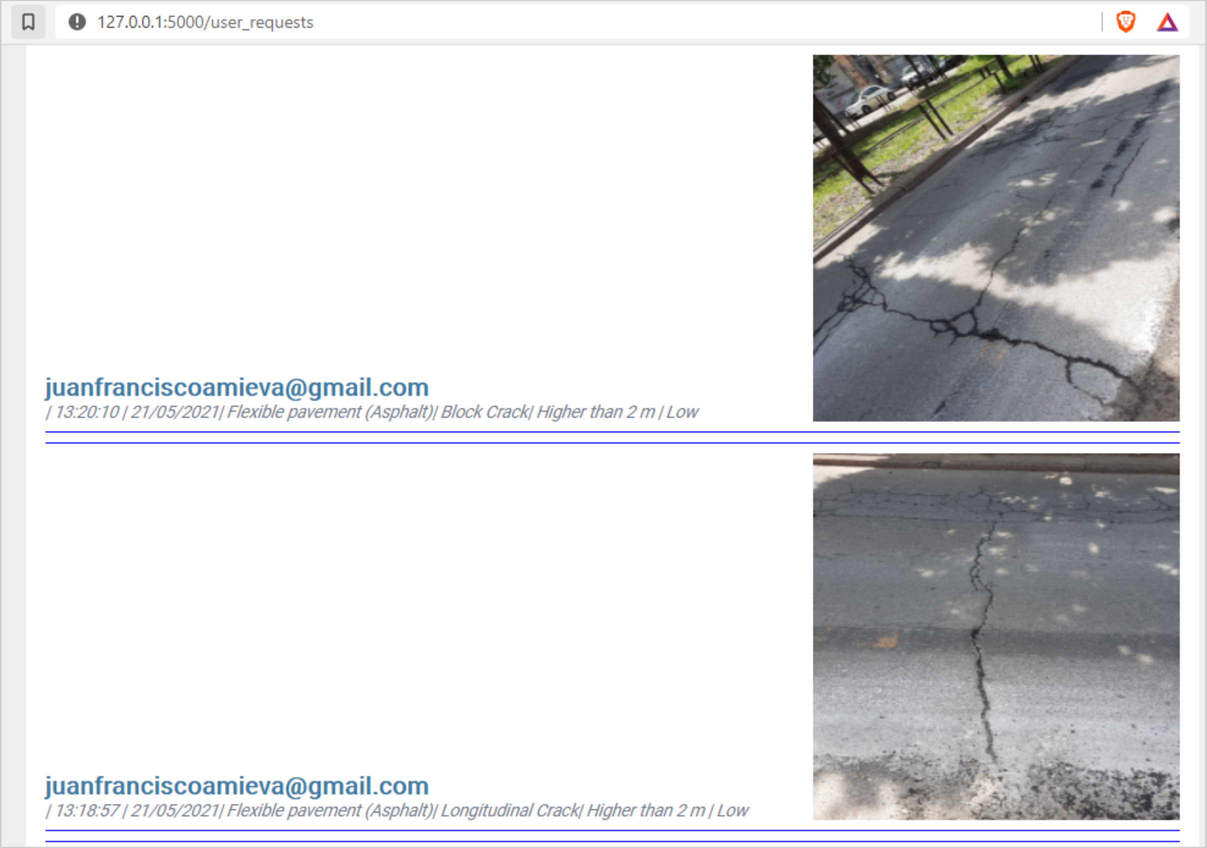
RODI - Milano Road Network Monitor

Welcome juanfra_54! Log Out Map

Add a new road maintenance request through Epicollect5 or check your uploaded requests

- EP5
- My requests

Figure 31: User maintenance requests



127.0.0.1:5000/user_requests

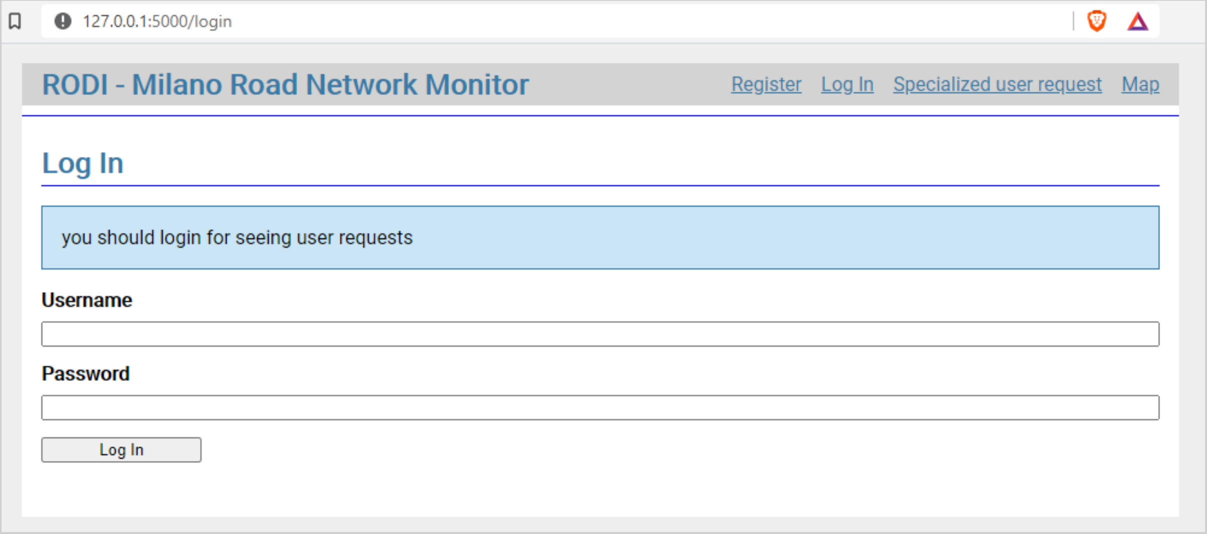
juanfranciscoamieva@gmail.com
/ 13:20:10 / 21/05/2021/ Flexible pavement (Asphalt)/ Block Crack/ Higher than 2 m / Low

juanfranciscoamieva@gmail.com
/ 13:18:57 / 21/05/2021/ Flexible pavement (Asphalt)/ Longitudinal Crack/ Higher than 2 m / Low

This section should be improved by updating the status of the different requests after the interaction of the specialized users or the super user "JAM".

Then, was also fundamental, to inspect if a user without been registered in the web app would access to the request list section of citizen users.

Figure 32: User requests trial without been logged in



127.0.0.1:5000/login

RODI - Milano Road Network Monitor

Log In

you should login for seeing user requests

Username

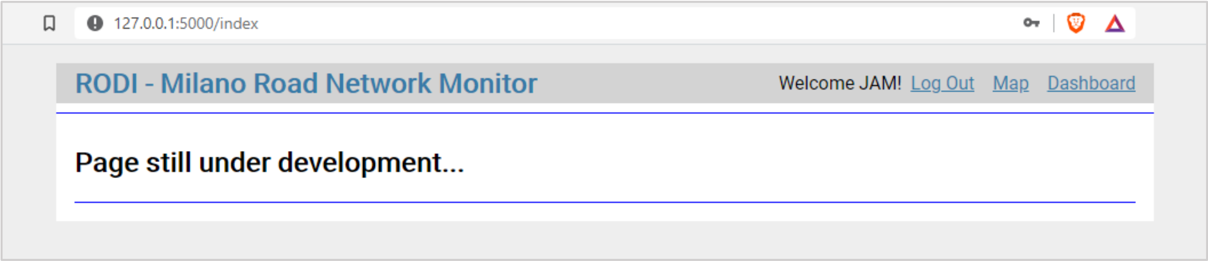
Password

7. RequestStatusModification

The Super User (JAM) and the Specialized users should have the possibility to watch on the screen the different requests uploaded by the citizens and at the same time they should have the option to modify their status in order to update the situation of the requests to the respectives users. Although this use case is an important part in the functionalities of the web application.

At the moment the Super User "JAM" and the Specialized users do not have the appropiated section where would be displayed the different requests of the users. For that reason, in the index page they could observe a message with the legend "Under development".

Figure 33: Page under development



Page still under development...

This will be updated by the final version of the web application.

Conclusion and future work

As an important aspect in these tests which were performed manually, was detected a mistake in the case a user tried to register its account (citizen user account) with the same email than a previously registered user. Thanks to that detection the problem was solved and it is not more a gap to solve in terms of the related requirements for that use case.

A second aspect to highlight is the level of robustness observed in the log in and registration use cases after the previously mentioned correction. As were observed in their related sections, were performed different tests and all of them shows solid results with different advertences for the users in case they complete incorrectly the information required or if they omit some data.

Another relevant point is that the access to the dashboard section was restricted to specialized users and super user and the tests shows that if a non-registered user or a citizen user tries to access to them the access will be denied.

Finally there are some aspects to improve related with the optimization of certain access to the different kinds of users, issues related with the facilitation of some url to perform specific actions (they should be included in one of the existing templates) and the most important point is that the functionality to update the status of the distresses request should be developed.