iCare43s: A Trees Information and Management System for Trees Coalition in Angeles City

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Abstract

Tree coalition management system is a web application that is helpful for the organization. There are three types of users in this application. Member, Non-Member, and Admin. The admin can add new information, modify existing information, and remove information from the application. On the "News and Events" tab, the members may post their comments. The Non-Member has access to the website only to view the information that is included in the application. The management system will assist the organization to work easily by inputting the data more easily.

Keywords
Tree awareness, Tree Mapping, Trees, Website, Google Maps

1. Introduction
Trees are significant to most living beings. They supply us with oxygen and in exchange, we provide them with the Carbon Dioxide that they require. In addition, trees are one of the providers of some of the resources that we require in our everyday lives. Lastly, trees also provide a link between the past, present, and future, thus we must care for them for future generations. As we all know, due to road expansion projects, numerous trees are being felled. In result, the researchers are developing a technology that will assist people and organizations in monitoring trees and keeping their numbers balanced.

The Tree Map Management System will monitor the health of trees in a specific area. It will be designed for people who are interested in trees and those who care for them. The study will be held in a particular location where the Angeles research team will conduct experiments. Angeles's city is widely recognized for its tree-planting programs, that's why the project aims to count the trees that will be cut down and eventually record them in our database. We must evolve to keep up with fast-changing technologies. This effort combines the advancement of technology with the preservation of trees. Today's technology is advantageous and makes the task easier. Keeping track of the trees and registering them in our database is a massive assistance in tree preservation. With this technique, all trees in a particular place may be tracked and monitored. The participant may interact with other tree enthusiasts on the website and search the map for trees of interest.

Tree Measurement and Simultaneous Localization and Mapping System for Forest Harvesters It is now feasible to obtain information on the surrounding forest, such as tree diameters, positions, and stand density, using new sensor and processing technology. This data may be accessed online via the operator's console. Off-line in a forest asset management system or decision support system. Their existing automation methods have reached their limits in many ways. (Omental.,N.D)

1.1 Objectives
The general objective of the study is to develop a Tree Information and Management System for the Save the Trees Coalition in Angeles City, this would help the client to maintain the proper maintenance and health of the trees in the city.

1. To create a web application that will enlighten people and raise their knowledge about trees
2. To develop a web application that informs the community about the 259 trees' health and condition
3. To record all tree-related data into the database we'll create so that anyone may check the website to see what's happening to the 259 trees

2. Literature Review
Some people quoted cities as a place for better life since they provide quality education, innovation and technology. Most of the world's population now resides in cities and further urbanization cannot be stopped. Deforestation is described as a process of permanently destroying trees to create space for more than just forestry. In an urban environment, this might be owing to a variety of factors, including housing to create more vacancies for the people coming to the city. Human-caused urban deforestation not only reduces the overall health in our cities, but it also worsens the consequences of an unpredictable shifting climate. Since most of the urban trees shield our cities from the effects of stronger storms and more intense heat waves (Galle 2020). A factor that may affect those who live in the cities is flooding due to intensive removal of trees, though to some, cutting trees may look conventional, it may become a bigger problem for the preceding years.

One of the most viable choices to alleviate climate change is through planting more trees. Establishing trees has rapidly arisen as a way of preventing serious flooding that may come in time. Expanding tree cover has different advantages, from safeguarding biodiversity to overseeing water and making a position. Furthermore, to lessen climate change, deforestation should stop.

Air pollution in urban areas because of the high rise in industrial, transportation, and construction activities that have a negative impact on the quality of the air. It has been demonstrated that the environment and human health in urban centers are negatively impacted by this degradation in air quality (Eisenman et al 2019). Urban city greening can enhance social, human health, economic, and environmental conditions as well as provide color to an ordinarily gloomy urban landscape. Thus, there is a connection between green infrastructure and human health (Kumur et al 2019).

3. Methods
The researchers used Angular JS to build a Web application which is the iCare43s, a platform for Tree Coalition Management System. It is used for monitoring the trees in a certain area. The trees that are documented in the system are permanently recorded to the system. The researchers came up with an idea of implementing this kind of Management and Information System because the client is requesting for a website where they can compile and manage the information that they have and so that they can spread information about the trees. The researchers created a prototype that has a comparable structure to a Tree Map in NYC, where the client can view the location of the trees on the map. The researchers have used Azure for our website database. The google maps is used for the map that can view the location of the trees by knowing their exact latitude and longitude. There is a News and Events that is being simulated by the admin where the admin can manipulate the data that will be posted to the system. The researchers added a feature where you can view a gallery of the trees that the clients are taking care of. The researchers included a data report that can be printed so that the client won't have a hard time summarizing what is happening to the trees.
In order to make a presentable and a friendly user system the researchers gathered more information to the client and used CSS, HTML, and a Model-View-Controller. After finishing the system, the researchers conducted a test to the client and collected the client's feedback to know if there is in need of a revision or if there is an error that they encountered. The following figure is a visual presentation of the process.
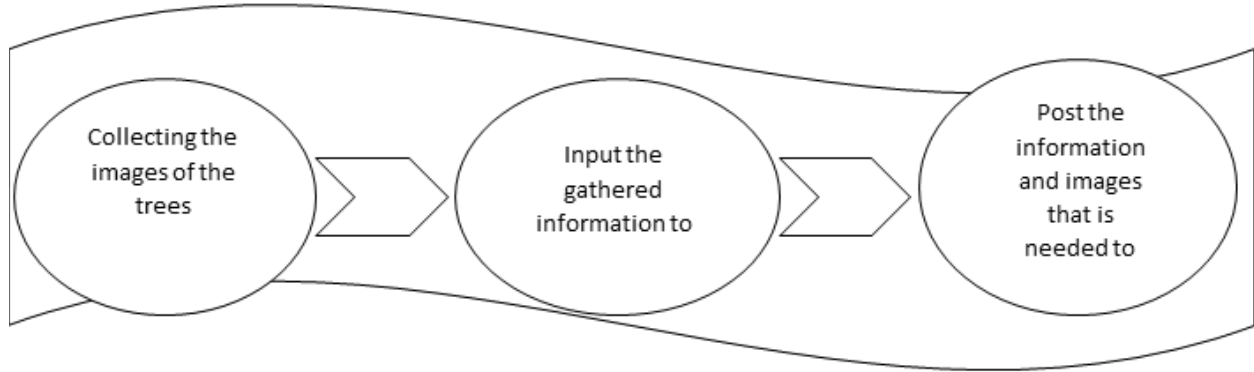
Figure 1. Data Preprocessing Flow

Once the information and images of the trees are on the database of the system, it will be posted automatically only the admin can change the information that is shown. By inputting the longitude and latitude if the trees the exact location of the tree will be pinpointed to the map, and it will have a tree icon. The researchers did a heat map feature also so the clients can identify the tree's health.

To test the actual performance of the system we've conducted another test survey to a Professional IT and to other people who are interested in trees.

4. Results and Discussion

Use of Admin side of the system

As an administrator, the user would typically have access to a range of management tools and data related to the operation of the system they are managing.

Tree management: The administrator may be able to add or remove trees and monitor their health.

News management: This would involve managing the news section of a website or application. The administrator may be able to add or remove news articles, edit existing articles, and delete the users' comments and feedback.

Event's management: The administrator may be able to add or remove events, edit event details.

Gallery management: This would involve managing image galleries or collections. The administrator may be able to add or remove images, edit image descriptions.

User log: This refers to the system's log of user activity. The administrator would be able to view who logged in on the system.

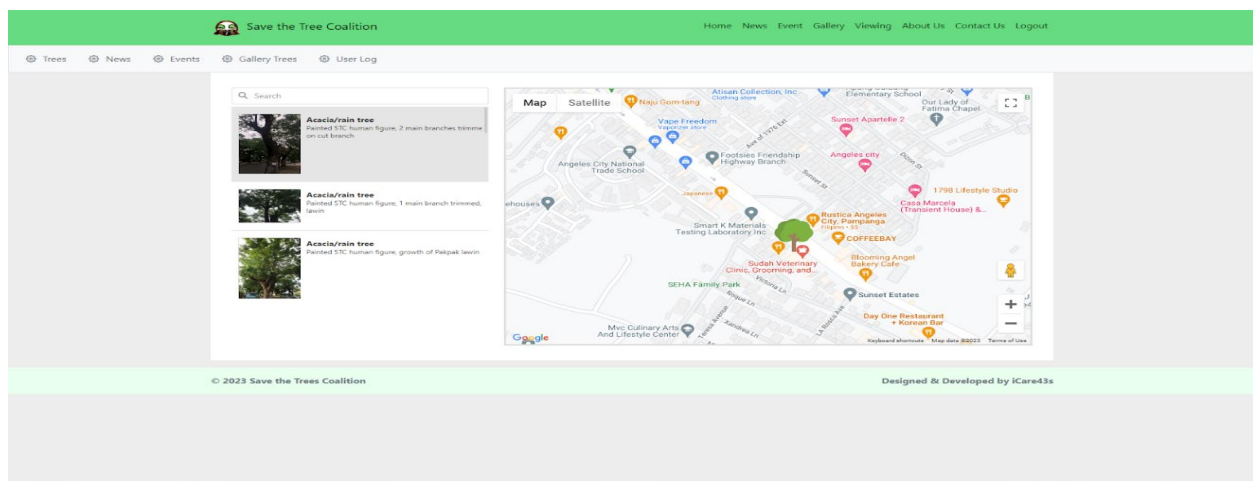Overall, the data that an administrator can access is managing the system's data.

Figure 2. Administrator Page

Use of Member side of the system

Based on the information provided, it appears that users who register as members of this website have limited access to the system's functionality. Members would be able to browse the website and view its content, but would not have access to the management tools and data that an administrator has. In addition to browsing the website, members would also be able to leave comments to communicate with other users. This suggests that there may be some social or community aspect to the website, where users can interact and engage with each other. To register as a member, users would need to provide certain personal information
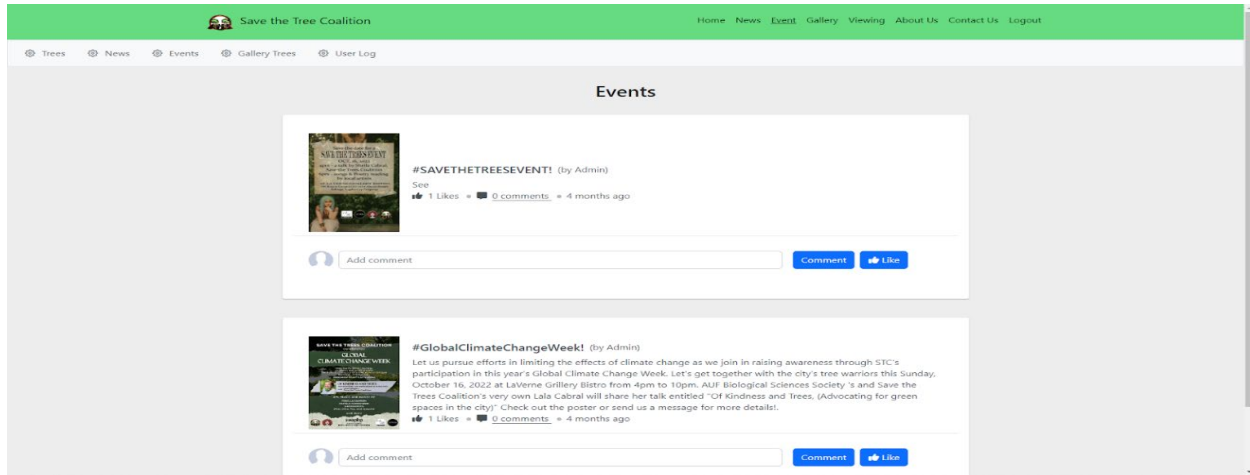

Figure 3. Member Page

Use of NonMember side of the system

Based on the information provided, it appears that users who are not registered members of the website would have very limited access to the system's functionality. Non-members would only be able to view the website's content and would not have access to any interactive features, such as leaving comments or accessing management tools.
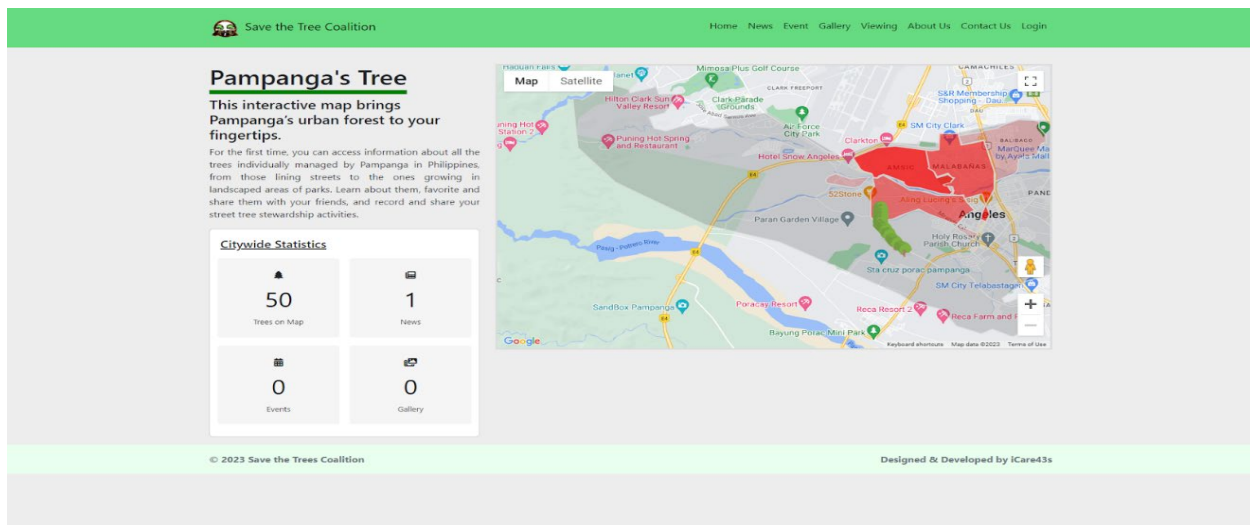

Figure 4. Nonmember Page

Statistical Evaluation

The researchers conducted and delivered questionnaires to nonmembers, members, and the Save the Trees Coalition's administrator to determine their personal experience with the system. After using the system, respondents were given time to complete the survey form. The researchers utilized a pie chart because it depicts the relative proportions of multiple data categories, visually summarizes a big data set, and requires no explanation. The outcomes of the examination and survey are provided below.
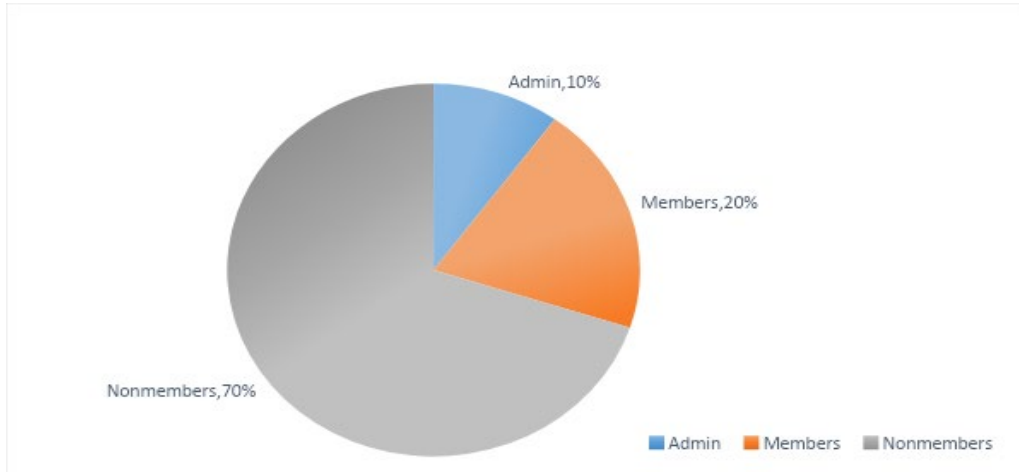

Figure 5. Statistical Evaluation

Admin Function

Table 1. Admin Function

Functions	Was the user able to do the function?
The admin was able to log in	YES
The admin can add to the system	YES
The admin can edit the system	YES
The admin can delete from the system	YES
The admin can manage the comments on the system.	YES

Member Function

Table 2. Member Function

Functions	Was the user able to do the function?
The user can create an account to be a member	YES
The member can leave a comment in news and event tab	YES
The member can browse the website	YES

NonMember Function

Table 3. NonMember Function

Functions	Was the user able to do the function?
The user was able to browse the system	YES

5. Conclusion

During the early stages of gathering information, it was observed that the Save the Trees Coalition is using a manual method of inputting the Information that they have gathered around Angeles City. With this, the researchers established a web-based Tree coalition management system to help the organization improve the process of inputting data and other information about the trees that they are maintaining.

The web-based Tree coalition management system was implemented for the Save the Trees Coalition to make the organization's management system better. The developed web-based Tree coalition management system can serve the organization as an efficient and more organized management system. Also, the developed system is more suitable than the client's previously used management system, it lessens the client's work for inputting the information that has been gathered. The users and clients will be able to monitor the trees around Angeles's city because of the web-based Tree coalition management system.

There are several recommendations that the researchers are able to provide to the current version of the system. The following are suggestions that future researchers can take into consideration to improve the current system:

- To implement additional functions and UI design in order to attract a larger number of individuals/clients
- To have a 3D feature of the map like in google map
- A high quality of images in the Viewing Section
- A data detector for duplicated data
- To have a filter in the comments to prevent offensive language
- To have an account retrieval for the users
- To have a better design for the database

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