

# Development of a Web Application for a Real-Time Traffic Monitoring System

Amado, Timothy M., Arciaga, Raynilin Aira G., Bomitivo, Ryan A., Perez, Rose Anne G., Roño, Isaiah M., Villapando, Raven Lyzette S., Pascion, Cherry G., Valenzuela, Ira C., Jorda, Romeo Jr. L., Madrigal, Gilfred Allen M.

*Electronics Engineering Department, Technological University of the Philippines – Manila*

**Abstract--** One of the most significant problem in our country is traffic congestion. As a result, people started to utilize the latest technologies to act on this problem. In this study, Internet of Things (IoT) was used to create a solution about traffic congestion. With the use of a secured website, it aims to display the gathered traffic information from different lampposts of Project IPOSTE and disseminate the real-time traffic status in the area to the users. The website consists of multiple pages such as; Home, Traffic and Weather Updates, About Us, Log in, and the Health and Status. The Home page, the introductory page of the website. The webpage for Traffic and Weather Updates, consisting the information gathered from the San Marcelino Post that contains actual photos and traffic situations received from the device. Log in section, it is a set of security used to authenticate if the user is an admin or not. The Health and Status Webpage, which acts as an admin page, periodically monitors the devices of Project iPOSTE for status and health data that includes the information about the RPI temperature, the packetduino, DH322, float switch and the camera. The website was built using the Python web development framework, Flask, in conjunction with a text editor, Sublime Text, along with the HTML, CSS, and Python programming languages and using a freely available open source RDMS, MySQL. After launching the website to the internet, the iPoste Website is accessible to the public for their real-time traffic updates.

**Keywords-** web application, IOT, website, traffic

## I. INTRODUCTION

[1] Smart City has no precise definition but is defined as Urban Intelligence, instead. It gives comfort and safety to the people in all respects. [2] A hallmark of an intelligent city is a collection of infrastructures that are built to assist the economic development.

Web design is a broad term for the research involved in creating an Internet website or a private network. Web development can range from creating the simplest single-page static plain text to the most complex web-based internet applications, electronic companies, and social networking services.

[3] The emergence of the Internet made the introduction of new ways of ideas and information for dissemination in electronic environments possible. The Web design process uses techniques to properly organize information, using appropriate resources to serve on web pages, in such a way that the user can easily and pleasantly achieve his target. [4] Object-oriented method can create very powerful web applications that can be achieved in less time. Because it makes use of modern technologies, this can help both developers and customers. There are so many scripting languages and new technologies available to build these types of applications so the developer doesn't need to stick to one.

[5] With the three parameters of the researchers; extensibility, reusability and documentation that are analyzed and found to support the assumption that the use of UML for the creation of Web applications has resulted in good maintenance design. [6] Findings presented a series of interviews in a dynamic and rush-to-market environment with companies developing web applications, it suggests that communication intensive is emerging in such an environment.

[7] Linux, CVS, and Tomcat, as well as MySQL, can provide the means to develop and deploy a Web application in a free-of-charge environment while providing high reliability, usability and security. Design using Open Source software is certainly more difficult than with its commercial counterparts.

## II. METHODOLOGY

### Planning the user interface:

The website consists of multiple pages such as Home, Traffic and Weather Updates, About Us, Log in, and the Health and Status. The Home page, the introductory page of the website. The webpage for Traffic and Weather Updates, consisting the information gathered from the San Marcelino Post that contains actual photos and traffic situations received from the device. Log in section, it is a set of security used to authenticate if the user is an admin or not. The Health and Status Webpage, which acts as an admin page, periodically monitors the devices of Project iPOSTE for status and health data that includes the information about the RPI temperature, the packetduino, DH322, float switch and the camera.

### Creating the Database:

SQLite Database is used to store the traffic information received from the post and devices' health condition inside the post. The database is connected to the webpage to automatically update the data in the website whenever the central computer received and processed a new set of data from the posts.

There were two databases used: one for the updated traffic situation in the area, and another for the health status of the devices present in the post.

	id	Traffic	EstimateTravel	Flood	Humidity
	Filter	Filter	Filter	Filter	Filter
1	1	Heavy Traffic	120 seconds	1 ft mark. cat...	Humidity is 74...

**Figure 1.** Database for Traffic Updates

Figure 1 shows the processed information collected and from the post and stored into the database and then directly uploads the stored data from the database to the website. These data will be overwritten by the new set of data when received.

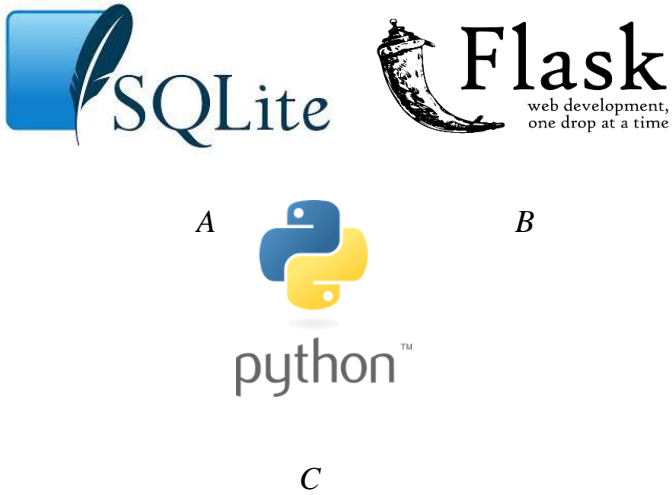
	Post	RPITemp	Packetduino	DH322	Float	Camera
	Filter	Filter	Filter	Filter	Filter	Filter
1	1	Healthy	Healthy	Healthy	Healthy	Healthy

**Figure 2.** Database for the Status of the sensors

Figure 2 shows the health status data coming from the devices from the post including the RPI Temperature, Packetduino, DH322, Float Switch, and the Camera, in order to update and inform the researchers about the current health status of the said devices.

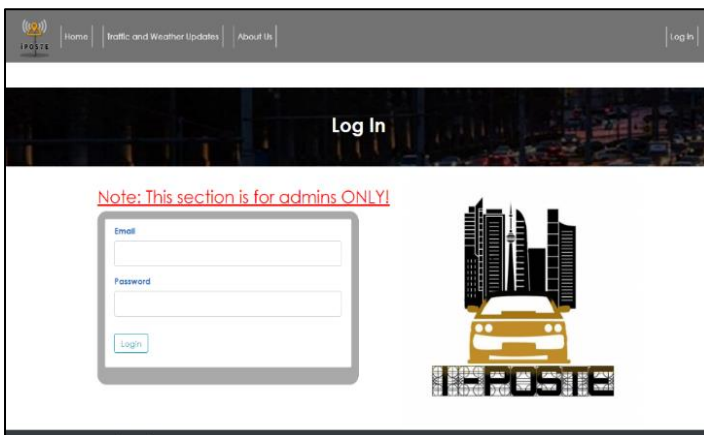
### Creating the website:

In order to use many of the proposed website's services, which the proponents planned, the website was constructed using the well-documented and flexible Python web development framework, Flask, in conjunction with the sophisticated text editor, Sublime Text, along with the standard HTML, CSS, and Python programming languages and using a freely available open source Relational Database Management System, SQLite.



**Figure 3. A-C:** Languages used in developing the website

The admin page will only be available to the researchers to be kept posted of the health of the sensors and devices used on the post. This webpage can be accessed by logging in to authenticate if the user is authorized to check the information.

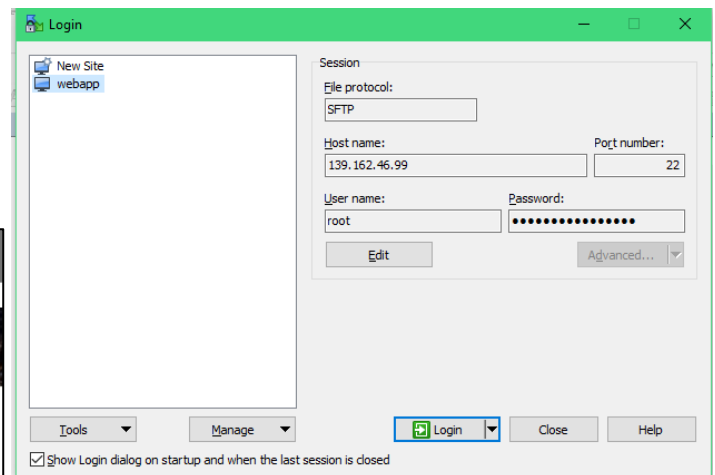


**Figure 4.** The Log-in page for the researchers

The admin page consists of the temperature reading of the Raspberry Pi, packetDUINO, DH322, float switch and the camera used. These devices are programmed to periodically updates its status which is then uploaded to the website.

Uploading the data:

The website is uploaded to a Linux server using WINSCP application to transfer all the web application files. In accessing the web application files, WINSCP requires a user authentication with a hostname and password requirements. By configuring the central computer, the researchers can access and modify the files remotely via the application. The temperature and humidity gathered from packetduino will be sent directly to the central computer. And the images and other parameters gathered from cameras and sensors respectively will be sent to a receiving end (Box in the lamp post with Raspberry Pi) before being sent to the base station (desktop computer) through SSH means.



**Figure 5.** User Authentication in WINSCP

All these data are stored to a local drive in the central computer. Uploading those data are done using AutoFTPManager where the latest data transferred is detected by the application and automatically transmit it to the web server.

From there, the codes in the web application will detect this and replace the current photos and other traffic data. The same images that was uploaded will undergo data analysis to assess if there is a light, moderate or heavy traffic on the road, flood detection, and humidity level. These analyzed data will be uploaded to the website

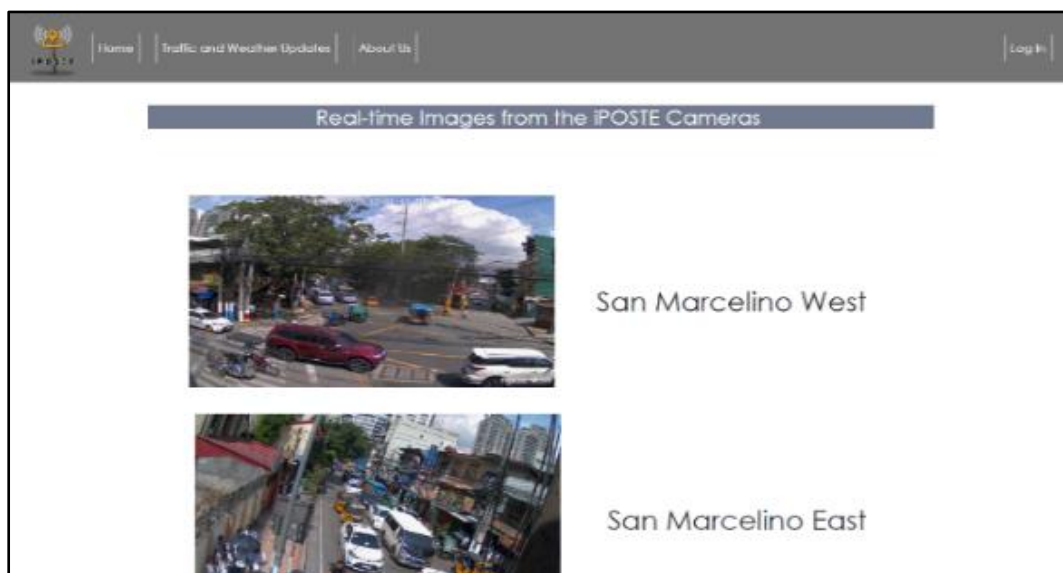


**Figure 6.** Traffic and Weather Updates page

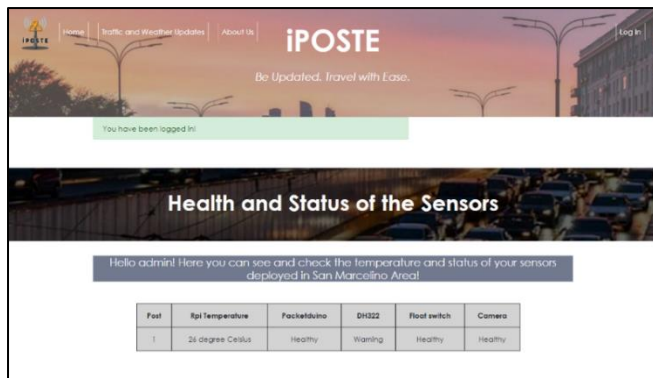
The Traffic and Weather Updates page will be updated every 60 seconds to display the most recent data from the post. It features the real-time photos of the area, humidity reports, and flood-level. The calculated travel time along the area if the user decided to take that road and can also broadcast a forewarning of a flood that is taking place and what kind of vehicle only can pass through.

Figure 6 shows the latest traffic information in San Marcelino street. The data saved from the database is displayed in paragraph form in the website to make it looks like talking to the user.

Figure 7 shows the actual photos captured by the iPOSTE cameras in different angles.



**Figure 7.** Traffic and Weather Updates webpages



**Figure 8.** Health and Status of the Sensors webpage for the admins

### III. CONCLUSION

iPOSTE web application is developed to serve as a platform to disseminate traffic situations and weather conditions to the public. It exhibits images of the area from different angles, along with its analyzed data like travel time, humidity report and flood-level. It also gives data information about which type of car will not be able to pass through if a flood is occurring.

The web application is user-friendly and doesn't require signing up to view traffic updates. However, the health of the sensor will only be accessible by the admins of the website.

### IV. RECOMMENDATION

In improving the project's overall results, the researchers recommend:

- To come up with another type of application to distribute the real-time traffic situations to the users that is more convenient to use.
- To make it possible to have access to the services of Project iPOSTE without using internet connection, so anyone can have the latest traffic update of the area including the ones without Internet access while travelling.
- When another application was created and used to disseminate the traffic updates of the

Project iPoste, come up with another method that can upload the processed information from the database to the server without using an internet connection.

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**Raynilin Aira G. Arciaga** finished her studies in highschool at Muntinlupa Science High School. She was able to pursue a bachelor's degree in Electronics Engineering major in Information and Communications Technology at Technological University of the Philippines, Manila, and graduated last 2020. She's also one of the examinees who passed the Electronics Technician Board Exam last 2018.



**Ryan A. Bomitivo** finished his studies at Las Piñas National High School. He was able to pursue a bachelor's degree in Electronics Engineering major in Information and Communications Technology at Technological University of the Philippines, Manila, and graduated last 2020. He also graduated as a receipient of R.A. 7687 DOST Scholarship



**Rose Anne G. Perez** finished her elementary and highschool in Divine Light Academy- Las Piñas. She was able to pursue a bachelor's degree in Electronics Engineering major in Communications at Technological University of the Philippines last 2021.



**Isaiah M. Roño** finished the degree of Electronics and Communication Engineering major in Information and Communications Technology at Technological University of Philippines last 2020. He passed the 2018 licensure exam of Electronics Technician.



**Raven Lyzette S. Villapando** finished her studies in highschool at Colegio De San Pedro. She was able to pursue a bachelor's degree in Electronics Engineering major in Information and Communications Technology at Technological University of the Philippines, Manila, and graduated last 2020.