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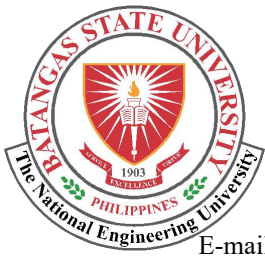
FINAL PROJECT DOCUMENTATION

CS121: ADVANCED COMPUTER PROGRAMMING

Submitted By:

ACLAN, BRENT DRANIEL R.

IT – 2102



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I. PROJECT OVERVIEW

The purpose of the system, “*Path-Finder: Community-Driven Emergency Road/Path Alert*”, is to optimize and quicken the delivery and dissemination of information in regards to damaged/destroyed roads, bridges and paths during times of natural disasters such as typhoons and earthquakes.

- The system’s developmental scope are as follows:

- **Included Features:**

The system includes several key features for managing a Path-Finder account. First, there is a basic account registration process with error handling to address incomplete inputs. Second, it offers a log-in feature that incorporates error handling for incorrect credentials by referencing the appropriate database, as well as for missing inputs. Third, the "Path Information Tab" serves as a centralized hub where users can view submitted information such as Path ID, Location, Status, Photo, and Date Submitted; users can also click on a row to open a tab displaying the path’s photo. Fourth, the "Path Status Submission" page allows users to report road information by submitting details like the location, status, and a photo of the road. Finally, the system includes an admin tab that enables administrators to delete accounts and path information. This tab is accessible only from the log-in window using specific credentials.

- **Excluded Features:**

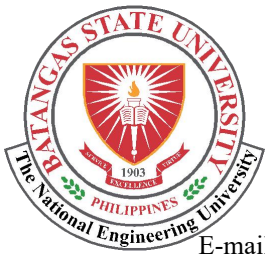
Some out of scope features for the program are, an automatic verification and deletion management system that checks for repeating data or troll submissions, admin editing for submitted data and user accounts in case for need of recovery, as solved path submissions are deleted from the database entirely. The direct linking and referencing between accounts and submissions, a geolocation map of the submitted path info, and lastly, a search and filter feature for path information in regards to the given columns.

- **Target Users**

The target users of *Path-Finder* would have to be in a contained and focused area as to avoid scope creep from its users and the submissions given, hence, the program is only limited towards the local citizens of Ibaan, Batangas as well as its established Local Government Unit/s to ensure a controlled and precise information flow that can be used by both parties. The usage of the program is also available to all ages that are legal to use a internet device, as *Path-Finder* gives a simple and delicate user experience that can be used by all ages alike.

- **Developmental Goals (SMART)**

- **SPECIFIC:** *To be able to produce an application that can store and display data about broken paths for citizen’s safety and contingency plans.*
- **MEASURABLE:** *To provide data such as the location, status, photo of the given road/path, and the date it was submitted for registered users.*



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- **ATTAINBALE:** *To develop an application made possible using Python for backend programming, Tkinter for GUI programming, and MySQL for database and data handling.*
- **RELEVANT:** *To provide local citizens an outlet of information about road/path status in an area such as the Philippines and specifically, Ibaan, Batangas, where natural calamities are prevalent*
- **TIME-BOUND:** *To produce the program, GUI, and database management within three weeks.*

II. PYTHON CONCEPTS AND LIBRARIES

○ Python and Tkinter

```
1 from tkinter import *
```

- “from tkinter import *” accesses the *tkinter* library, Python’s tool for producing Graphical User Interfaces. In *Path-Finder*’s code, labels, buttons, messageboxes and others are from the *tkinter* module and its submodules.

```
2 from tkinter import messagebox
```

- “from tkinter import messagebox” imports the *messagebox* submodule from *tkinter*. For *Path-Finder*, it is used for the pop-ups about successful processes and errors when inputting in entry boxes.

```
3 from tkinter import ttk
```

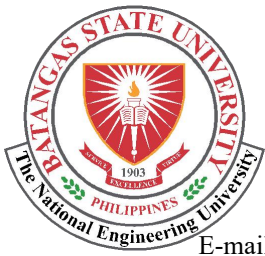
- “from tkinter import ttk” gives access to the Tk themed widget set. TTK being “Themed Tkinter Widgets”, it is mostly used for treeviews in the project’s code, responsible for the tables in the PIT page and Admin page.

```
4 from tkinter import filedialog
```

- “from tkinter import filedialog” imports the *filedialog* module, used for opening file selection, used on the part where users need to chose a photo in the Submission page.

```
5 from PIL import Image, ImageTk
```

- “from PIL import Image, ImageTk” gives access to the *Pillow* library, which works around photos. The *Image* class functions to process and save photos to be manipulated in the code, resizing and repositioning. Whilst *ImageTk* makes it so that the *Pillow* module used in photos can be used in the *tkinter* workflow. It is used for the logo for *Path-Finder* as well as handling the submitted photos in the Submission and PIT page.



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```
6 import hashlib
```

- “import hashlib” is a Python library used for hashing or hiding information, which in the case for *Path-Finder*, is the passwords for its users. It is mainly used for the encryption of users’ password accounts in *Path-Finder* for privacy

```
7 import re
```

- “import re” or “regular expressions”, is a module made, in the case for *Path-Finder*’s code, scanning the validity of emails in the entry boxes for the Sign-in and Sign-up Page. It works in tandem with the aforementioned messageboxes when inputting invalid emails scanning for the lack of the character “@” and “.com” in the entry box.

○ **MySQL**

```
8 import mysql.connector
```

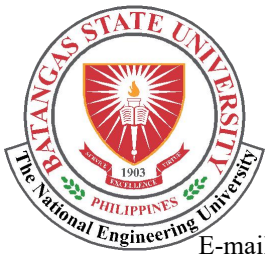
-“import mysql.connector” is a bridge between the *Python* and *MySQL* workspaces. MySQL is a database management system, which for *Path-Finder*, handles the storage of data such as the account credentials of users in the “users” table and the submitted path information about roads in “path_info” table.

III.SUSTAINABLE DEVELOPMENT GOALS

With the ongoing circumstances of the Philippines this year against typhoons, the given project, “*Path-Finder*”, serves to accommodate the Sustainable Development Goals (SDG) 9 and 11, namely “Industry, Innovation and Infrastructure” and “Sustainable Cities and Communities”. *Path-Finder*’s goal of disseminating information about broken roads, bridges and paths assists the given SDG’s.

In the context of SDG 9: Industry, Innovation and Infrastructure, the Philippines, being a victim of constant arrivals of typhoons, suffer from heavy infrastructural damage, most impactful being roads, whether it is a treefall or the breakage of the road material, it hinders community and rescue mobility for the citizens. By usage of *Path-Finder*, citizens and most importantly, LGU’s and disaster response teams can reference the information for their operations and change their routes for the safest and quickest way towards their destinations.

And for SDG 11: Sustainable Cities and Communities, *Path-Finder* serves the goal as it assists in the safety and longevity of roads through information tabs that the LGU’s can use for repair operations, as well as the community’s safety by providing quick and precise data that can be used for contingency / evacuation plans, thus minimizing the risks to the community.



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IV. PROGRAM/SYSTEM INSTRUCTIONS

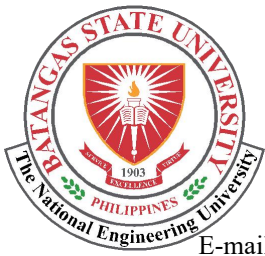
○ **Project Overview**

“*Path-Finder*” offers a basic structure towards account registration, page navigation, and data submission for *Path Info* (information about the focal problem to solve of the project, broken roads).

I. Home Page

The Home Page hosts the basic login frame for *Path-Finder*, with some flavor text to add to its content, as well as a button to navigate the Sign-up Page for new users utilizing the program.

Registered users can input their account credentials such as their email and password and click the “SIGN-IN” button. It also boasts a messagebox for inputted credentials that are either incorrect or not in the “users” database. To opt-out of the program on all pages directly, simply click the “X” symbol on the top right to terminate the program.



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II. Sign-up Page

Sign-up Page

Path-Finder

Already got an account?

SIGN-IN

Create an Account

Use your valid email account

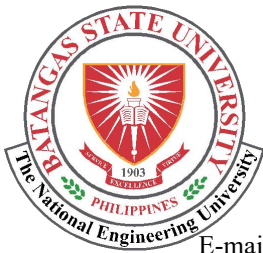
Name

Email

Password

REGISTER

The Sign-up Page has the account creation frame that is connected to the “users” table of “Path-Finder”. New users can put in their name, valid email that is also checked if it is valid and has a messagebox if checked otherwise, and their password which is visually encrypted and hashed in the “users” table for privacy. Once users have put in their new account credentials they can click the “REGISTER” button that also checks the availability and validity of the credentials given and displays a messagebox for the outcome whether it is successful or not. Users can also go back to the Home page using the “SIGN-IN” button on the left.



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III. Path Information Tab (PIT) Page

Path Information Tab

Path-Finder

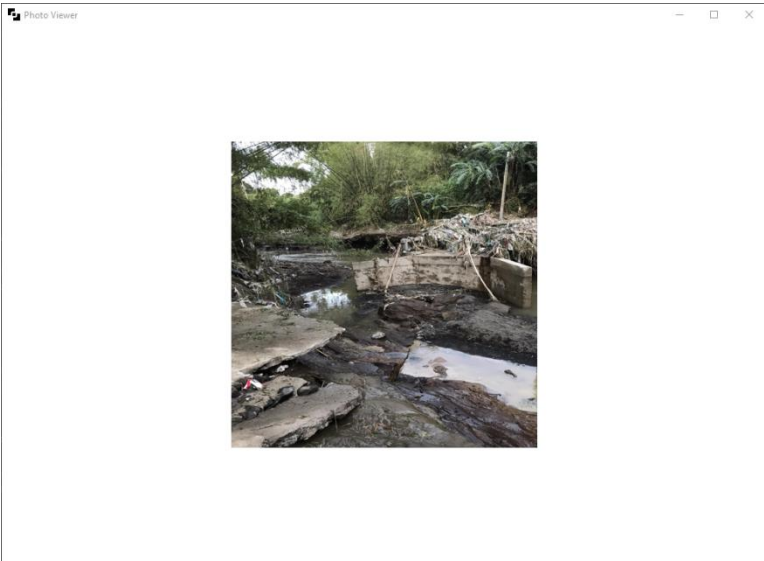
Path Information Tab

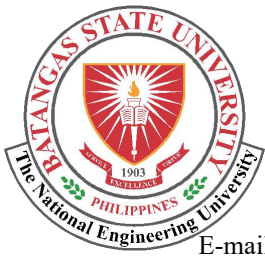
Post ID	Location	Status	Date Updated	Photo
1	Coliat, Ibaan, Batangas	Closed	2024-11-29 20:54:26	D:/Pictures/449345174_25968442
4	Quilo, Ibaan, Batangas	Closed	2024-12-01 18:56:15	D:/Pictures/449345174_25968442
5	Bago, Ibaan, Batangas	Closed	2024-12-01 18:56:24	D:/Pictures/432488592_93688121
6	Sabang, Ibaan, Batangas	Under Maintenance	2024-12-01 18:56:55	D:/Pictures/459532485_10611056
7	Poblacion, Ibaan, Batangas	Closed	2024-12-01 18:57:25	D:/Pictures/462577451_10322892
8	Talaibon, Ibaan, Batangas	Closed	2024-12-01 18:58:16	D:/Pictures/Wallpaper/1i918gwz
9	Coliat 2, Ibaan, Batangas	Damaged	2024-12-01 18:59:13	D:/Pictures/Wallpaper/i3x7tnc8rr
10	Lapu-Lapu, Ibaan, Batangas	Damaged	2024-12-01 19:00:51	D:/Pictures/462559831_15850085

LOG OUT

SUBMIT PATH INFO

The Path Information Tab (PIT) is the heart of *Path-Finder*. It has the table of inputted path info by other users, it has the Post ID that is the main identifier of the data row, the location of the path, the status of the path whether it is Closed, Under Maintenance or damaged. Fixed paths are then removed from the table to reduce visual data load for faster sifting of the rows by users. It also has the Date Updated column for data about when the path info was submitted, and lastly the Photo column which can be accessed by clicking on the row as shown below. All data displayed here and taken from the Submission Page are stored in the “path_info” table in *Path-Finder*’s database





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Users in the PIT Page can opt to log-out of the account by clicking the “LOG-OUT” button on the bottom left or proceed to the Submission Page by clicking the “SUBMIT PATH INFO” button on the bottom right.

IV. Submission Page

Submission Page

Path-Finder

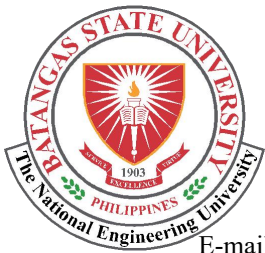
Path Status Submission

Path / Location

Status

Photo

The Submission Page houses the main inputting panels for the path info data to be stored and later displayed in the PIT Page for users to see. The user can write the Location of the road in question, the Status of the road, and submit a Photo for visual reference, by clicking the “CHOOSE FILE” button on the right to select a photo file to upload, this is to see how severe the status of the road is. After all fields have been satisfied, users can click the “SUBMIT” button to submit the data that would also checked whether there is a field missing, displaying a messagebox when triggered. Users can also go to the previous PIT Page by clicking the “GO BACK” button on the bottom left.



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V. Admin Page

Admin Page

Users Table

ID	Name	Email	Password
1	Brent Daniel Aclan	brentaclan@gmail.com	c39e52d3a2ed84ddcedec6c24a9ba8904c2af747e6fea0b8c094794
3	John Pathfinder	pathfinder@yahoo.com	a0af9f865bf637e6736817f4ce552e4cdf7b8c36ea75bc254c1d1f0i
4	Example Testing	example@gmail.com	50d858e0985ecc7f60418aaf0cc5ab587f42c2570a884095a9e8cca
5	Christian Josh Javier	cjj@gmail.com	af7961f5d4f758b0626a1ec1cf934ac09880e37c76488297b62acaff
6	Jiro Dino Carag	dinonuggets@gmail.com	8fbefc95205d5645b24823f75d1935b607af6fd3ff792b14d74db92

Path Info Table

ID	User ID	Location	Status	Date Uploaded	Photo
1	None	Coliat, Ibaan, Batangas	Closed	D:/Pictures/449345174_259684	2024-11-29 20:54:26
4	None	Quilo, Ibaan, Batangas	Closed	D:/Pictures/449345174_259684	2024-12-01 18:56:15
5	None	Bago, Ibaan, Batangas	Closed	D:/Pictures/432488592_936881	2024-12-01 18:56:24
6	None	Sabang, Ibaan, Batangas	Under Maintenance	D:/Pictures/459532485_10611C	2024-12-01 18:56:55
7	None	Poblacion, Ibaan, Batangas	Closed	D:/Pictures/462577451_10322E	2024-12-01 18:57:25
8	None	Talaibon, Ibaan, Batangas	Closed	D:/Pictures/Wallpaper/i9i18g	2024-12-01 18:58:16
9	None	Coliat 2, Ibaan, Batangas	Damaged	D:/Pictures/Wallpaper/i3x7tn	2024-12-01 18:59:13
10	None	Lapu-Lapu, Ibaan, Batangas	Damaged	D:/Pictures/462559831_15850C	2024-12-01 19:00:51

Unselect All

Delete Selected Rows

Logout

The Admin Page is accessible via the Home Page with a specific account. It shows the tables “users” and “path_info” in *Path-Finder’s* database. Here the admin can view and manage the users and the data by clicking on the row and clicking either “Unselect All” or “Delete Selected Rows”. The admin can also opt to log-out of the page by clicking the “Logout” button.