PROJECT HEAL

SnooCODERED

PROJECT HEAL

RATING/CLASSIFICATION HOSPITAL

PREPARED FOR

Prof. Dr. Sandra Batista

PREPARED BY

Mansi Prajapati

PROJECT TITLE	Project Heal – Rating/Classification Hospital		
SUBMITTED BY	Mansi Prajapati	**PROJECT TYPE**	Health-Care
PHONE / EMAIL	Mansi.prajapati99@gmail.com	**PROJECTED COMPLETION DATE**	12/17/2021
PROJECT START DATE	09/02/2021	**PREPARED FOR**	Prof. Dr. Sandra Batista

INTRODUCTION

Scientific knowledge and new technologies are crucial to all aspects of society, sectors, and markets, and can have the potential to transform healthcare systems into accessible and sustainable ones.

In most parts of Africa, people usually spend a considerable amount of time citing landmarks and descriptions like

"*take the third rough road after the big mango tree*"

to direct the Ambulance and other services to them. Imagine, when your house does not have a number and your street does not have a name? How about an Amazon delivery or when opening a bank account or giving your address for a contact tracing program?

SnooCode Solved this problem with the offline digital addressing system. My task is to *Rating / Classifying Hospitals* accordingly to their capacity and resources so that system can appropriately rate their acceptability for different kinds of emergencies. Also, all details like the name of the health facility, SnooCODE address, district/municipality/metropolis, region, and level of a hospital are automatically stored in GoogleDrive.

Work on two modules named *Obstetrics/Gynecology* and *Trauma/Surgical/EM*. The person from the hospital needs to fill the answers in a web form questionnaire. After submitting the form, the system will process and come up with the final level of that specific hospital.

This result will helpful for identifying which hospital is suitable for the patient. For example, we don't send a pregnant woman to a clinic without Gynecologist equipment. This Rating/Classification shows the level of the selected hospital. Therefore, each patient can go to the correct hospital and save time. Additionally, a hospital can identify their level of specialization in related modules. These details are also used by emergency care service providers, care centers, healthcare assistants, and the local public on which facility provides which level of care

1.1 Experts Data File

Seven/Eleven Health care professionals prepared a document by analyzing the specific hospital. They add different levels based upon each service at the hospital. For example, there are more than 100+ services on the list so that experts give opinions for each service based upon the availability of resources and services. This data help to find the final level of the hospital.

- ***Obstetrics/Gynecology expert data file :***

These data files contain 7 experts' opinions for 101 questions with a given date and time.

Submission Date	Delphi Expert	Presence of Obstetrics and Gynaecology Services in the hospital	Designated Head of Obstetrics and Gynaecology (registered Obstetrician/Gynaecologist)	Designated Residents pursuing training in Obstetrics and Gynaecology	ANTENATAL CLINICS
2021/04/19 17:04:58	Expert 1	Level 1; Level 2; Level 3; Level 4	Level 1; Level 2; Level 3	Level 1; Level 2; Level 3	Level 1; Level 2; Level 3; Level 4
2021/04/13 20:58:40	Expert 2	Level 4	Level 2	Level 1	Level 1; Level 2; Level 3; Level 4
2021/04/07 20:03:01	Expert 3	Level 1; Level 2; Level 3	Level 1; Level 2	Level 1; Level 2	Level 1; Level 2; Level 3
2021/04/05 05:17:41	Expert 4	Level 1; Level 2; Level 3; Level 4	Level 1; Level 2	Level 1; Level 2	Level 1; Level 2; Level 3; Level 4
2021/03/24 15:04:22	Expert 5	Level 1; Level 2	Level 1; Level 2	Level 1	Level 1; Level 2; Level 3; Level 4
2021/03/23 19:22:01	Expert 6	Level 1; Level 2; Level 3; Level 4	Level 1; Level 2	Level 1; Level 2	Level 1; Level 2; Level 3; Level 4
2021/03/04 19:49:43	Expert 7	Level 1; Level 2; Level 3; Level 4	Level 3; Level 4	Level 3; Level 4	Level 1; Level 2; Level 3; Level 4

- ***Trauma/Surgical/EM expert data file :***

These data files contain 11 experts' opinions for 151 questions with a given date and time.

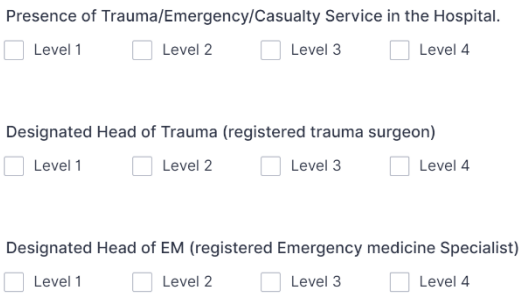
Submission Date	Delphi Expert	Presence of Trauma/Emergency/Casualty Service in the Hospital.	Designated Head of Trauma (registered trauma surgeon)	Designated Head of EM (registered Emergency medicine Specialist)	Designated medical officers in emergency medicine/Casualty
2021/03/27 15:51:54	Expert 1	Level 1; Level 2; Level 3	Level 1	Level 1; Level 2	Level 1; Level 2; Level 3
2021/03/21 12:05:25	Expert 2	Level 1	Level 1; Level 2	Level 1; Level 2; Level 3	Level 1; Level 2; Level 3
2021/03/17 03:24:44	Expert 3	Level 1; Level 2; Level 3	Level 1; Level 2	Level 1; Level 2	Level 1; Level 2; Level 3
2021/03/16 09:43:34	Expert 4	Level 1; Level 2; Level 3; Level 4	Level 1; Level 2	Level 1; Level 2	Level 1; Level 2; Level 3; Level 4
2021/03/15 17:20:49	Expert 5	Level 1; Level 2; Level 3	Level 1; Level 2	Level 1; Level 2	Level 1; Level 2; Level 3
2021/03/13 22:38:33	Expert 6	Level 1	Level 1; Level 2; Level 3	Level 1; Level 2; Level 3	Level 1; Level 2; Level 3; Level 4
2021/03/11 22:18:31	Expert 7	Level 1; Level 2	Level 1	Level 1; Level 2	Level 1; Level 2; Level 3
2021/03/04 06:39:33	Expert 8	Level 1; Level 2	Level 1	Level 1; Level 2; Level 3	Level 1; Level 2; Level 3
2021/03/02 09:55:05	Expert 9	Level 1; Level 2; Level 3; Level 4	Level 1; Level 2	Level 1; Level 2	Level 1; Level 2; Level 3; Level 4
2021/02/27 18:44:33	Expert 10	Level 1; Level 2; Level 3; Level 4	Level 1; Level 2	Level 1; Level 2; Level 3	Level 1; Level 2; Level 3; Level 4
2021/02/25 17:28:00	Expert 11	Level 1	Level 1	Level 1	Level 1

1.2 List of questions

- ***Obstetrics/Gynecology web form questionnaire:***

Snoocode provides web form questions related to obstetrics/Gynecology. Used those questions for making an HTML web form. These questions are divided into different sections like routine care questions, personal questions, comprehensive emergency care questions, and so on. Total 101 questions provided to determine the resources of a hospital.

- ***Trauma/Surgical/EM web form questionnaire :***



Snoocode provides web form questions related to Trauma/Surgical/EM. Used those questions for making an HTML web form. These questions are divided into different sections like on-call availability, a resource for head injuries, a resource for chest injuries, and so on. Total 151 questions provided to determine the resources of a hospital.

LITERATURE AND CONTRIBUTION OR RELATED WORKS

Sesinam Dagadu, the founder of SnooCode, designs a revolutionary navigation app. For the first time, 8.7 million people in Ghana have access to ambulance services, even without an internet connection. SnooCode allows Ghanaians to navigate using GPS pinpointing without needing a traditional address system. Sesinam Dagadu won the British Council entrepreneurial award in 2017 for this incredible work. SnooCode allows Ghanaians to access essential services and find their way around - without needing a traditional address system.

It is difficult to repair in certain parts of Ghana and the cities and villages. Numerous streets are nameless, houses are not numbered and the inhabitants use areas such as trees, churches, or banks to orient the people. This become a problem when an ambulance was

referred to as the “blue kiosk on the corner of the street, but the kiosk was in danger” Dagadu explained. The ambulance must then carry out follow-up calls to retrieve it. It wastes huge time and something delay to reach patient.

SnooCode generates a unique alphanumeric code for each property in Ghana and uses GPS to pinpoint the property’s exact location. When an address code has been created, the user enters it into the app, and its navigation system calculates the best route to the property. As well as the emergency services, taxi drivers, couriers, food delivery drivers, and garbage collection can also use the app – and the code can even be used in place of an address to open a bank account.

He comments, “*Designing the app has required a lot of observation of the things that frustrate and limit people due to a lack of an adequate address system. We see our job as being to make all these problems go away*.”

SnooCode has been identified by World Health Organisation (WHO)’s African Network for Drugs and Diagnostics Innovation as a key technology in providing timely emergency care across Africa and in the battle against infectious and vector-borne diseases like malaria, cholera, and Ebola, by allowing healthcare professionals to identify the centers of disease and other outbreaks.

PROBLEM DESCRIPTION

The use of an expert excel file and web form answers lead to getting a final level of the hospital. This task has the following problems

The first challenge is to make web form attractive and user-friendly. For that use the latest web design language to make web form more creative. This web form takes much important information from the hospital staff so it should more accurate and interactive.

To add, experts give opinions for each service in the hospital(see an image from the 1.1 section). All opinions are different so now the challenge is how we can consider one level from the given multiple opinion level.

For example, How is service for Physiotherapists at the hospital. Seven Experts give different Levels(level-1, level-2, level-3, level-4). My task is to find the method which gives the final level by using the expert's opinion excel file.

The next challenge is, the user needs to fill the web form that consists of 100+ questions and click on submit button. It will redirect to another page and show the final

Level. The problem is how can I use all answers from the web page and come up with the final level.

All hospital data is crucial so now the task is to store all the data at Google Drive in excel format automatically every time. Whenever users submit the form by filling in answers then details like SnooCode address, facility, district, region, and level of the hospital store in Google Drive. My task is to find a way that automatically stores all information in one folder at Google Drive.

PROPOSED SOLUTION

The summary of the solution is to use questions from a web form, compare it to a new analysis file and come up with final results.

Let's see the whole workflow for getting the final level

Experts opinion excel file has many answers for one question. For getting level from the experts excel file, apply the following technique by using Python language and libraries like Flask, JSON, xlrd. The below images are from the expert's opinion file and every question has multiple levels.

Delphi Expert	Presence of Obstetrics and Gynaecology Services in the hospital	Designated Head of Obstetrics and Gynaecology (registered Obstetrician/Gynaecologist)	Designated Residents pursuing training in Obstetrics and Gynaecology	ANTENATAL CLINICS	POST NATAL CLINICS	ASSISTED REPRODUCTION (IVF)	OBSTETRIC EMERGENCY UNIT
Expert 1	Level 1; Level 2; Level 3; Level 4	Level 1; Level 2; Level 3	Level 1; Level 2; Level 3	Level 1; Level 2; Level 3; Level 4	Level 1; Level 2; Level 3; Level 4	Level 1; Level 2	Level 1; Level 2; Level 3; Level 4
Expert 2	Level 4	Level 2	Level 1	Level 1; Level 2; Level 3; Level 4	Level 1; Level 2; Level 3; Level 4	Level 1; Level 2	Level 1; Level 2; Level 3
Expert 3	Level 1; Level 2; Level 3	Level 1; Level 2	Level 1; Level 2	Level 1; Level 2; Level 3	Level 1; Level 2; Level 3	Level 1	Level 1; Level 2
Expert 4	Level 1; Level 2; Level 3; Level 4	Level 1; Level 2	Level 1; Level 2	Level 1; Level 2; Level 3; Level 4	Level 1; Level 2; Level 3; Level 4	Level 1	Level 1; Level 2; Level 3; Level 4
Expert 5	Level 1; Level 2	Level 1; Level 2	Level 1	Level 1; Level 2; Level 3; Level 4	Level 1; Level 2; Level 3; Level 4	Level 1	Level 1; Level 2; Level 3
Expert 6	Level 1; Level 2; Level 3; Level 4	Level 1; Level 2	Level 1; Level 2	Level 1; Level 2; Level 3; Level 4	Level 1; Level 2; Level 3; Level 4	Level 1; Level 2	Level 1; Level 2; Level 3
Expert 7	Level 1; Level 2; Level 3; Level 4	Level 3; Level 4	Level 3; Level 4	Level 1; Level 2; Level 3; Level 4	Level 1; Level 2; Level 3; Level 4	Level 3; Level 4	Level 2; Level 3; Level 4

Firstly, check which level is common in each question. For instance,

Question 1 : Presence of Obstetrics and Gynecology Services in the hospital ?

It has Level 1 = 6 times, Level 2 = 6 times, Level 3 = 5 times, Level 4 = 5 times. Now, Level 1 and Level 2 have the same number so consider these levels as the highest.

So, the **final answer for question 1 is LEVEL 1 and LEVEL – 2**

Question 2 : Designated Head of Obstetrics and Gynecology (registered Obstetrician/Gynecologist)?

It has Level 1 = 5 times, Level 2 = 6 times, Level 3 = 2 times, Level 4 = 1 time. So here, level 2 has the highest number so **final answer for question 2 is LEVEL – 2**

Question 3 : Designated Residents pursuing training in Obstetrics and Gynecology?

It has Level 1 = 6 times, Level 2 = 4 times, Level 3 = 2 times, Level 4 = 1 time. To compute that Level 1 has the highest number so **final answer for question number 3 is LEVEL – 1**

Do the same with all the questions and store data into a new gynecology analysis excel file and the same excel file data will use in the Python file for fetching the level of each question. The below images is showing how data is stored in a new analysis excel file.

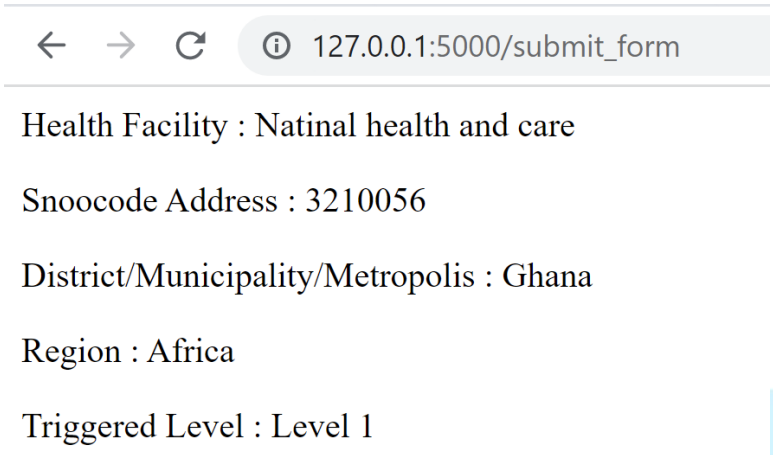
1		
2	Presence of Obstetrics and Gynaecology Services in the hospital	Level 1, Level 2
3	Designated Head of Obstetrics and Gynaecology (registered Obstetrician/Gynaecologist)	Level 2
4	Designated Residents pursuing training in Obstetrics and Gynaecology	Level 1
5	ANTENATAL CLINICS	Level 1, Level 2, Level 3
6	POST NATAL CLINICS	Level 1, Level 2, Level 3
7	ASSISTED REPRODUCTION (IVF)	Level 1
8	OBSTETRIC EMERGENCY UNIT	Level 2
9	GYNAECOLOGY EMERGENCY UNIT	Level 1, Level 2

Now, the user opens the HTML web form that contains a questionnaire regarding obstetrics and Gynecology. Users give answers for whatever services or equipment they have in the hospital. For example, the user gives the first 5 answers YES (see first 5 questions in the above image) and click on submit button. Firstly, the system goes to the gynecology analysis excel file and check the level for the first 5 questions. Fetch all answers and apply a loop.

```
For each in level:
        if each.strip() == “Level 1”:
                levelOneCount += 1
        elif each.strip() == “Level 2”:
                levelTwoCount += 1
        eilf each.strip() == “Level 3”:
                levelThreeCount += 1
        elif each.strip() == “Level 4”:
                levelFourCount += 1
```

So now all answers from the gynecology analysis excel file, go to this loop, and after implement maximum methods to identify which level appears maximum. The level which counts the maximum that is our final level of the hospital.

Collect data like name of facility, address, district, region, maximum level store in variables, and at the end, pass all the information as final output.



This is our final output after clicking on submit button. Users can see the Health Facility name, Snoocode address, District, Region, and final Triggered level of the hospital.

Working with Google Drive

Our project used Google Drive as data storage instead of any other database because any authenticated person can see data any time by entering Gmail credentials. There is no need to go to DB and set up the database.

Storing data at GoogleDrive is automatic, whenever users submit the form. This will require getting authentication files from Google Service API. For this, create one new Gmail account for the project that contains all result files in excel format.

Install library *pip install pydrive* for accessing **google-api-python-client** that help to do Google Drive API tasks.

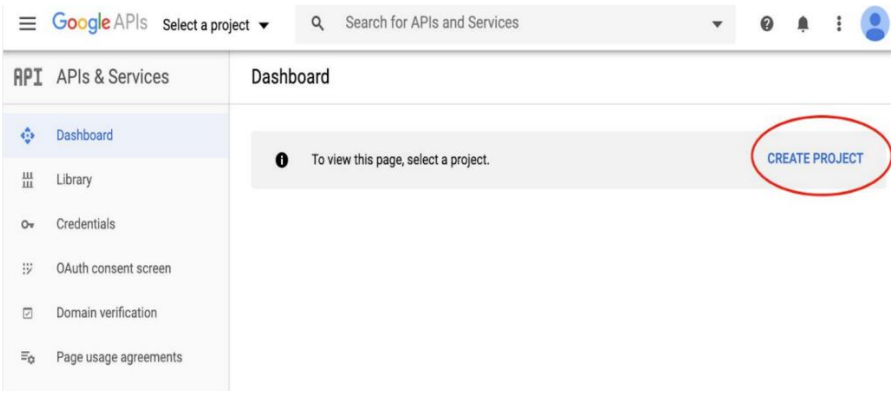
Import more libraries in a Python file,

```
from pydrive.auth import GoogleAuth

from pydrive.drive import GoogleDrive
```

Now, follow the steps to Get Authentication for Google Service API.

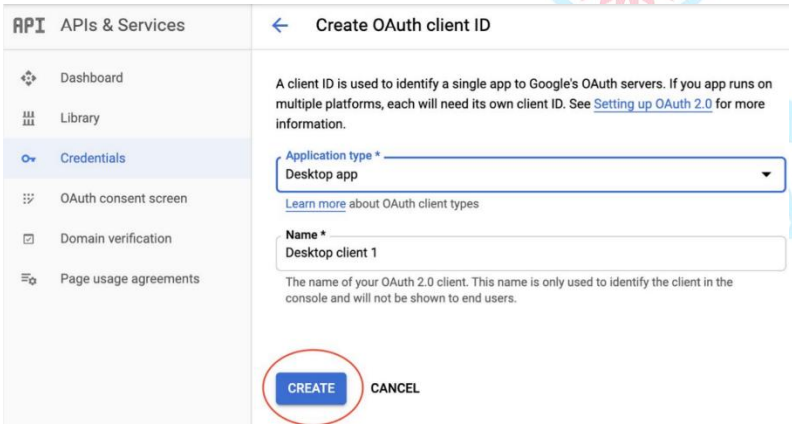
- Create a new project in Google Developer Console by clicking “CREATE PROJECT” > https://console.cloud.google.com/apis/dashboard and give project name.



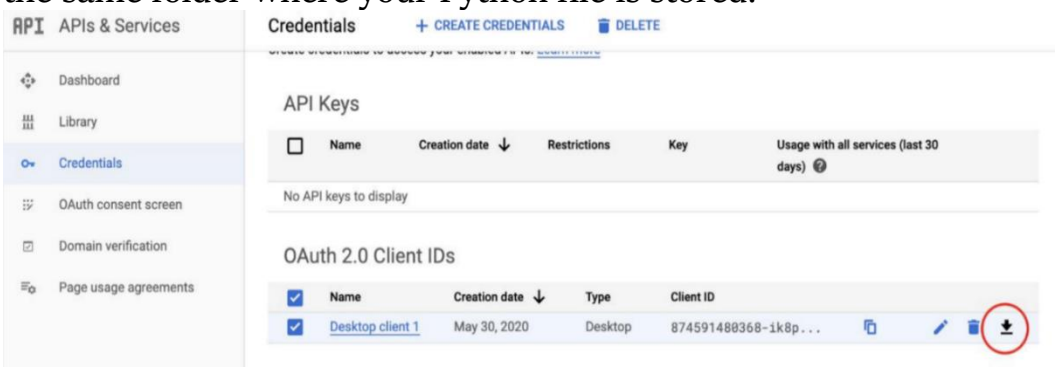
- Enable APIs and Services by clicking the “ENABLE APIS AND SERVICES”. This will bring you all the API libraries. Now Search “Google Drive” in the API library search box.

- Click the “Google Drive API” icon and “ENABLE” it, which will enable your Google Drive API service.

- Create credentials by clicking the “CREATE CREDENTIALS” icon and click “client ID” as that’s the Python program needs. Then click “CREATE”.



- Now, check the credentials section and you will see a new JSON file. It has all details about APIs like access token, client id, client secret, and so on. Download it and store it in the same folder where your Python file is stored.



- The JSON file looks like this (Note: This is the example of the client_secret.JSON file that was used from the internet).

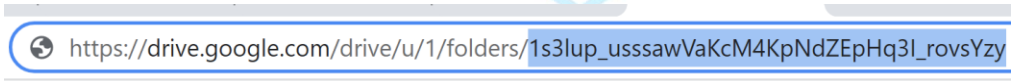
```
{
    "installed": {
      "client_id": "837647042410-75ifg...usercontent.com",
      "client_secret":"asdlkfjaskd",
      "redirect_uris": ["http://localhost", "urn:ietf:wg:oauth:2.0:oob"],
      "auth_uri": "https://accounts.google.com/o/oauth2/auth",
      "token_uri": "https://accounts.google.com/o/oauth2/token"
    }
  }
```

- The next step is to write code in a Python file that will automatically connect with Google Drive and upload files with information.

`gauth = GoogleAuth()` This library provides the ability to authenticate to Google APIs using various methods.

`drive = GoogleDrive(gauth)` Pass gauth to GoogleDrive and store in to drive variable.

Create a new folder in Google Drive and copy its ID from the weblink.



Write below code to create a new file every time in the created folder.

file1 = drive.CreateFile({'parents': [{'id': 'Paste ID here'}],'title': 'Crimson-Project-Data.xlxs'})

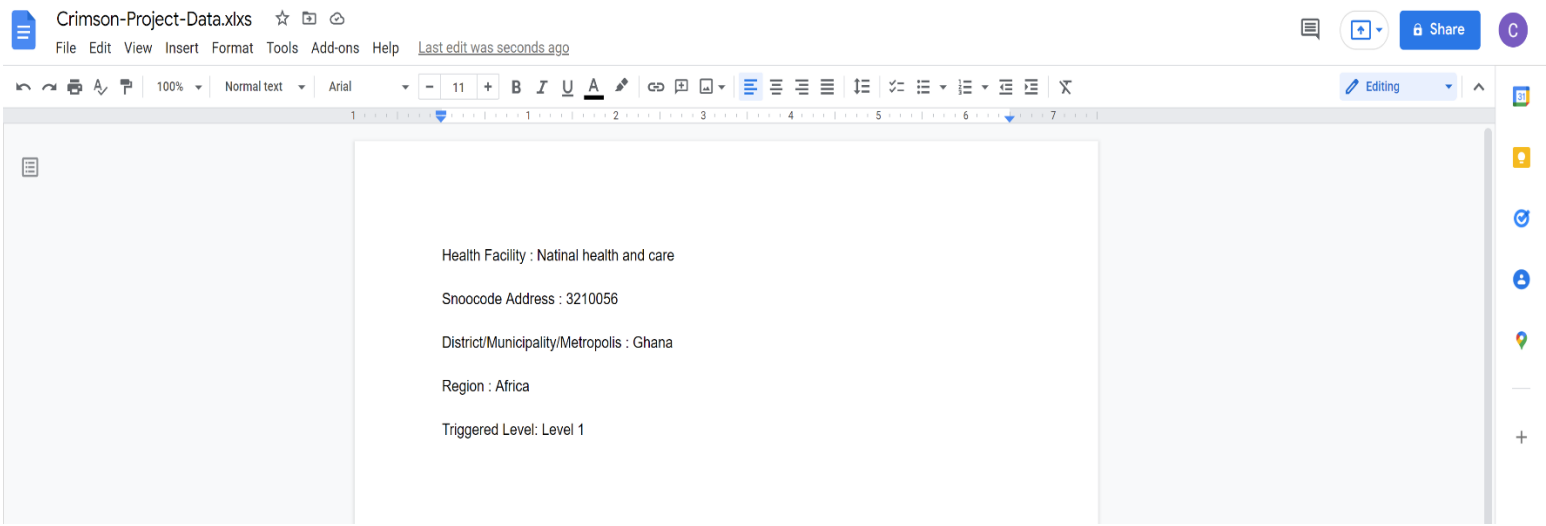
All the information like the name of the facility, address, district, region, and level of the hospital and store it at Drive in excel format automatically. All excel files are stored in the same folder at GoogleDrive.

file1.SetContentString('Health Facility : ' + request.form.get('facility') + '\n\nSnoocode Address : ' + request.form.get('add') + '\n\nDistrict/Municipality/Metropolis : ' + request.form.get('dis') + '\n\nRegion : ' + request.form.get('region') + '\n\nTriggered Level : ' + levelString + '')

Write file upload code for uploading all the results in Google Drive.

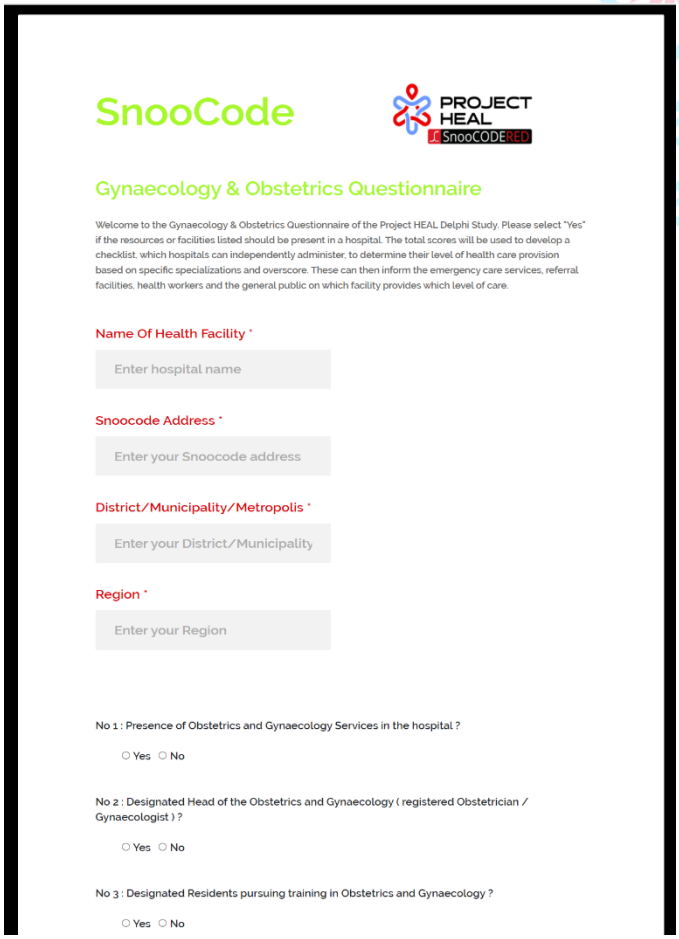
file1.Upload({'convert': True})

- Here is the final output from Google Drive with all the information about the hospital



Working with Front Design

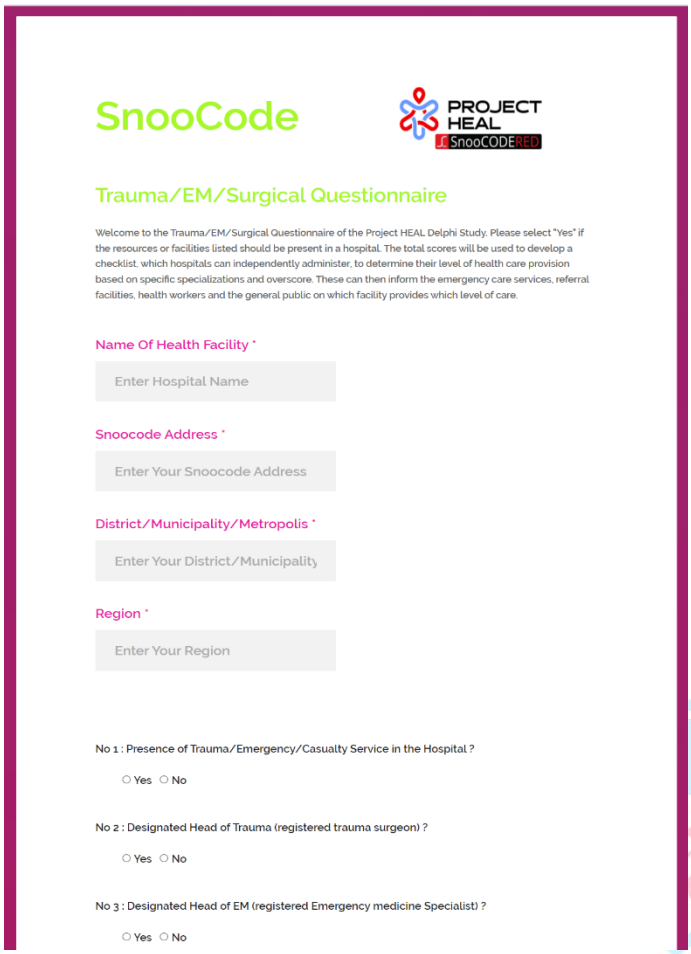
Webform consists of more than 100+ questions and is a long process for the user. Making a page attractive and easy to read is important. So that, Implement some more CSS and JavaScript ideas that look beautiful and meaningful. Additionally, add validation for inputs so users write all the information about the hospital



This is an example of a Gynaecology and Obstetrics web form that consists of 101 questions. The first four questions are mandatory like name of health care, address, district, and region. If the user clicks on submit button without answering those fields, it will give an error.

Users can click on the radio button for an answer Yes or No. In the end, users can find customer care contact details of SnooCode and the logo of Snoocode that redirect to its official website. Users can learn more about SnooCode from its official website.

.



This is an example of a Trauma/EM/Surgical web form that consists of 151 questions. The first four questions are mandatory like name of health care, address, district, and region. If the user clicks on submit button without answering those fields, it will give an error.

Users can click on the radio button for an answer Yes or No. In the end, users can find customer care contact details of SnooCode and the logo of Snoocode that redirect to its official website. Users can learn more about SnooCode from its official website.

HOW TO RUN THIS PROJECT

- Open cmd (Command Prompt).
- Go to your project folder .
  Example : cd C:\MANSI\SUBJECTS\fall 2021\project\final\modules\Gynec
- Write Python app.py and click enter.
- You will see the development server information.
  Note: currently we are using a local server to run this application.
  Copy server link > http://127.0.0.1:5000/ and paste it on your favorite browser.
- You will see the HTML form the same as we see in the Solution section.
- Fill in all information and click submit button.
- Whenever you interact with the first time. It will ask you for Google Authentication. You need to click allow button for successful authentication.
- You can see the final result in the browser with all the detailed information.
- Now go to the Crimson project email account and open Google Drive. You can see new file will automatically add the same information.

METHODS

There are many languages and tools used to implement this project.

For the web forms, use HTML, JavaScript, CSS. For the backend implement code by using Python language. Use xlrd library to work with excel files and flask library for installing flask web application framework.

Install pydrive by using pip install pydrive. For working with Google Drive, configure with console.cloud.google and create credentials in QAuth client. Also, use the same credentials JSON file to access the drive from the account.

CONCLUSION

Technology is powerful and it can change people's lives completely. A mobile application developed in Ghana will allow reducing the time of patients by providing accurate and precious information about hospitals without internet help.

On the hospital side, the Admin/staff will fill the form according to resources and services. By using those details of answers, the system will generate the level of the hospital. This level will give a big impact on the time of emergencies or “where to go” question. The patient can easily identify which is the near hospitals they have, what level of services and availability of equipment expected at the hospital.

The total scores will be used to develop a checklist, which hospitals can independently administer, to determine their level of health care provision based on specific specializations and overscore. These can then inform the emergency care services, referral facilities, health workers and the general public on which facility provides which level of care.

Due to unmanaged health systems and not knowing which hospital is related to what type of patient, There are huge numbers of mortality rates in Africa. This feature will be especially crucial for a child, pregnant women, and elder people to solve their illness by using the levels of each hospital.

With this purpose in mind, If the situation taught us something last two years, it's that health system and its importance. This project will create a markable impact on people's lives in Africa.

Pioneering app gives millions of Ghanaians access to ambulances. *By Luke Walton, International Press Officer*. https://warwick.ac.uk/newsandevents/pressreleases/pioneering_app_gives/

Finding your way in a country without street addresses. *By Chris Matthews, Accra, Ghana*. https://www.bbc.com/news/world-africa-35385636

Learn Web Development Basics – HTML, CSS, and JavaScript Explined for Beginners. *By Kingsley Ubah*. https://www.freecodecamp.org/news/html-css-and-javascript-explained-for-beginners/

Google Drive API in Python | Upload Files. *By Jie Jenn*. https://www.youtube.com/watch?v=cCKPjW5JwKo&ab_channel=JieJenn

Build a web app fast : Python, HTML & JavaScript resources. *By Andrew Montalenti – Parse.ly Founder*. https://amontalenti.com/2012/06/14/web-app

16 Young digital health, healthcare innovators in Africa who are changing the face of healthcare in the sub-Saharan region. *By SCIENCE SERVICE : Dr Hempel Digital Network*. https://www.dr-hempel-network.com/digital_health_contact_lists/16-young-digital-health-healthcare-innovators-in-africa/

SnooCODE RED : Improving access to emergency health care irrespective of socioeconomic stat. https://www.f6s.com/snoocodered

How To Upload Files Automatically To Drive With Python. *By Annis Souames*. https://medium.com/@annissouames99/how-to-upload-files-automatically-to-drive-with-python-ee19bb13dda

Learn Python programming language.https://www.tutorialspoint.com/python/python_functions.htm

#2 | Build a Website w/ Python & Flask – HTML & CSS. *By ProfessorPitch*. https://www.youtube.com/watch?v=1PvNrKCZOu0&ab_channel=ProfessorPitch

How to create interactive tags in HTML file?. https://stackoverflow.com/questions/6150716/how-to-create-interactive-tags-in-html-file

Tutorial teacher – Python -functions. https://www.tutorialsteacher.com/python/python-user-defined-function

SnooCODE : A solution to the lack of formal addresses in Ghana and beyond. *By Kate Douglas*. https://www.howwemadeitinafrica.com/snoocode-a-solution-to-the-lack-of-formal-addresses-in-ghana-and-beyond/51075/

Google Drive help. https://support.google.com/drive/answer/2424368?hl=en&co=GENIE.Platform%3DDesktop

Creating an interactive HTML page. https://www2.microstrategy.com/producthelp/Current/DataConnectorSDK/Content/topics/Creating_an_interactive_html_page.htm