COMP1010: INTRODUCTION TO PROGRAMMING

Project: **Developing a live dashboard for COVID-19 spread analysis using Python**

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Team members:

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Abstract

COVID-19 is spreading across the world and is changing the world. The coronavirus pandemic is far from over and leaving severe challenges to many countries, including Vietnam with a population of nearly 100 million. As such, all Vietnamese people are in need of more statistics and analysis about the COVID-19 counts to get updates on the surrounding their lives.

For this project, we implement a live dashboard for the COVID-19 situation in Vietnam. Our entire product is hosted on an interactive website. The dashboard presents the daily counts of COVID-19 confirmed cases and deaths in Vietnam. For the users to get and analyze information easily, there are statistics of the total number of COVID-19 cases and vaccinated people as well as tables and charts showing the cases and deaths among days in Vietnam.

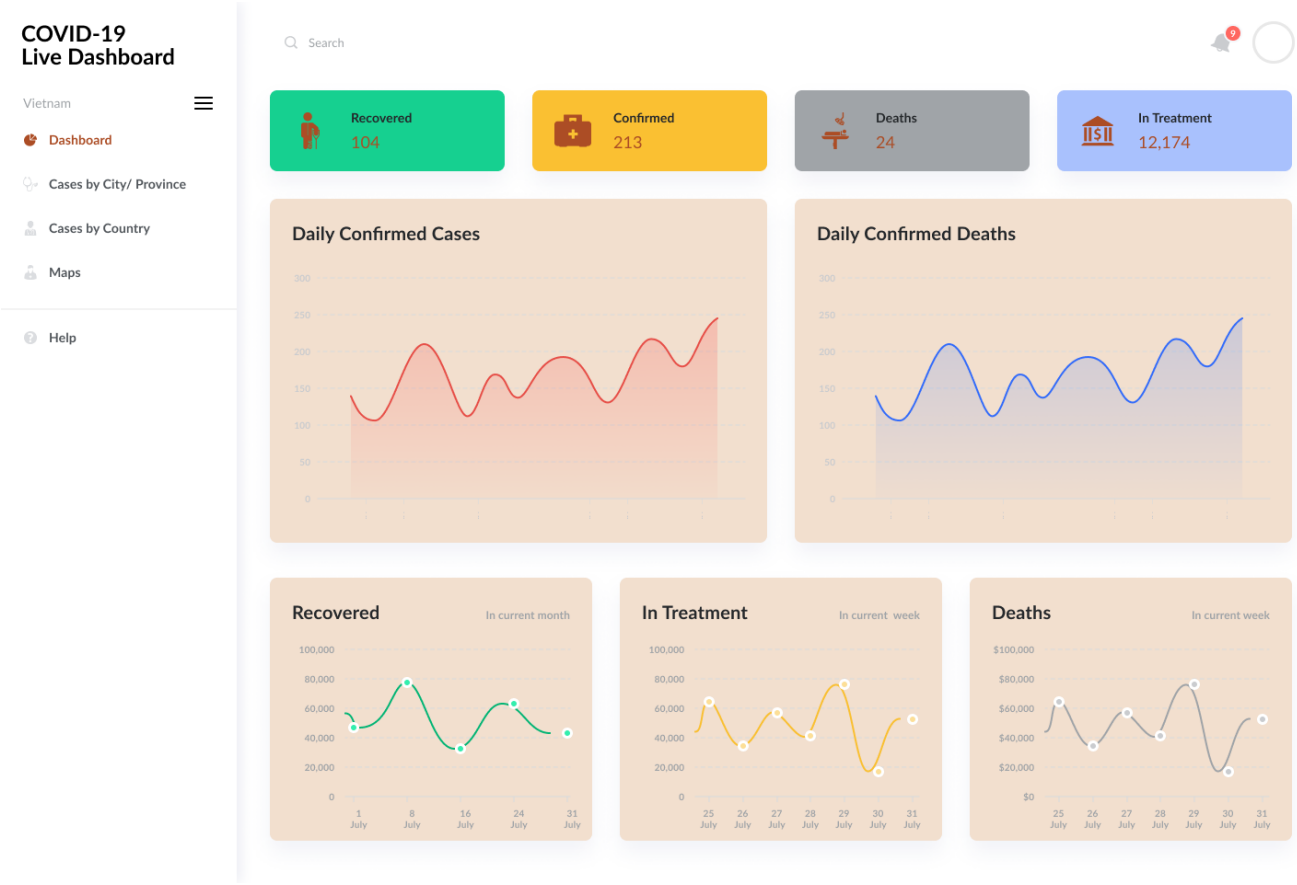
1 Project Introduction & Prototype

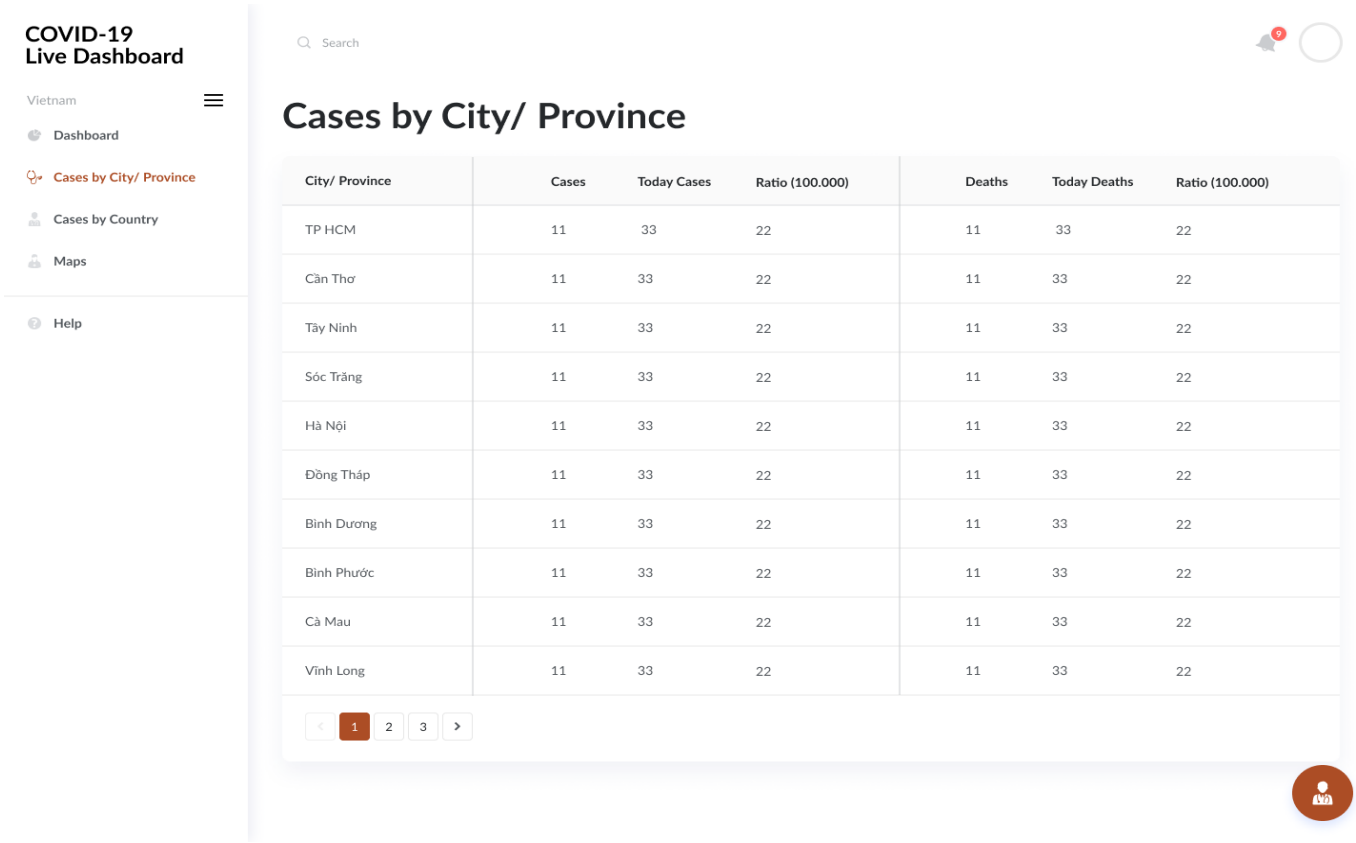
We are four students majoring in Computer Science at VinUniversity, with some experience in Python, we create a browser-based interactive data visualization about the live COVID-19 in Vietnam. With reliable sources of data, our website presents the exact numbers of total cases and deaths in Vietnam and provides the table with the nearest 15-day information of confirmed cases and deaths. The numbers are updated day by day and displayed on the line and bar charts. Coupled with those graphs, we integrate some interactive functions to welcome the

users and for the users to change between the confirmed cases and deaths variables to look at what analysis they want. In addition, there is a pie chart about the vaccination which shows the percentages of people who were not vaccinated, who got the 1st dose, and who were fully vaccinated. Finally, scrolling down to the end of our website, there are articles about the COVID-19 situations in Vietnam that link users to more informative and useful news.

Our website is developed through the use of Plotly, Pandas, and Dash libraries of Python.

- Our design prototype:





2 Preparation

- Learning:

Firstly, we watched some live dashboard implementations using Python on Youtube to define what we need to make our website. Then, we together found and searched for the available datasets of the COVID-19 in Vietnam. After that, we divided tasks for each member to learn how to read and extract the data and learn the syntax of Plotly, Pandas, and Dash syntax for the front-end and back-end coding of our browser.

- Learning sources:

- How to read csv file into Python with Pandas libraries:
https://towardsdatascience.com/how-to-read-csv-file-using-pandas-ab1f5e7e7b58
(pandas.read_csv)
https://www.analyticsvidhya.com/blog/2021/08/python-tutorial-working-with-csv-file-for-data-science/

- DataFrame:
(pandas.DataFrame): https://pandas.pydata.org/docs/reference/api/pandas.DataFrame.html
(pandas.DataFrame.iloc):
https://pandas.pydata.org/docs/reference/api/pandas.DataFrame.iloc.html

- Extract data from DataFrame:
https://www.geeksforgeeks.org/python-pandas-extracting-rows-using-loc/
- Dash-bootstrap-components:
https://dash-bootstrap-components.opensource.faculty.ai/docs/
https://dash-bootstrap-components.opensource.faculty.ai/docs/themes/
https://dash-bootstrap-components.opensource.faculty.ai/docs/components/layout/ (Layout: Container, Row, Column)
- Lambda Function:
https://viblo.asia/p/lambda-functionham-an-danh-trong-python-GrLZD0aeZk0
- Front-end:

Line charts: https://plotly.com/python/line-charts/
Generate table: https://plotly.com/python/table/
Generate Card: https://dash-bootstrap-components.opensource.faculty.ai/docs/components/card/
HTML color codes and names: https://www.computerhope.com/htmcolor.htm

3 Dataset resources

- Datasets:
  - Daily cases and deaths by date reported: https://covid19.who.int/WHO-COVID-19-global-data.csv
  - Latest reported counts of cases and deaths: https://covid19.who.int/WHO-COVID-19-global-table-data.csv
  - Vaccination data: https://covid19.who.int/who-data/vaccination-data.csv

- Accuracy & Reliability of Datasets:

Our datasets are from the WHO - World Health Organization, the specialized agency of the United Nations responsible for international public health. The WHO pages present the official daily counts of COVID-19 cases, deaths, and vaccine utilization reported by countries, territories, and areas. These data are frequently updated and therefore, our data are certainly accurate, reliable, and getting up-to-date.

4 Our Product & Result

- Half-way product (before the interim presentation):

- Our final product:

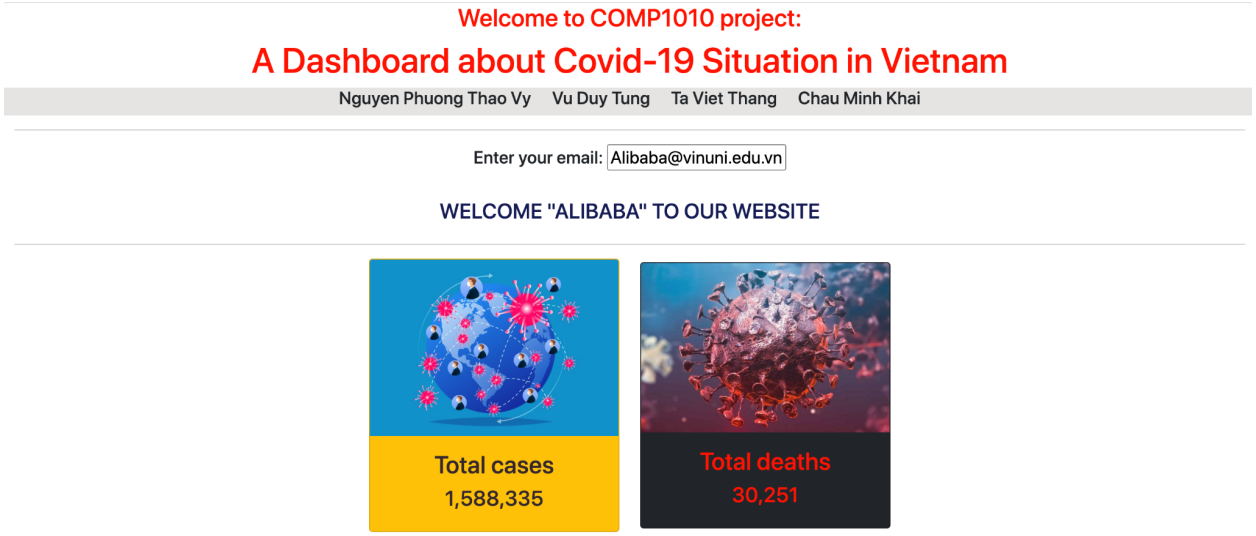
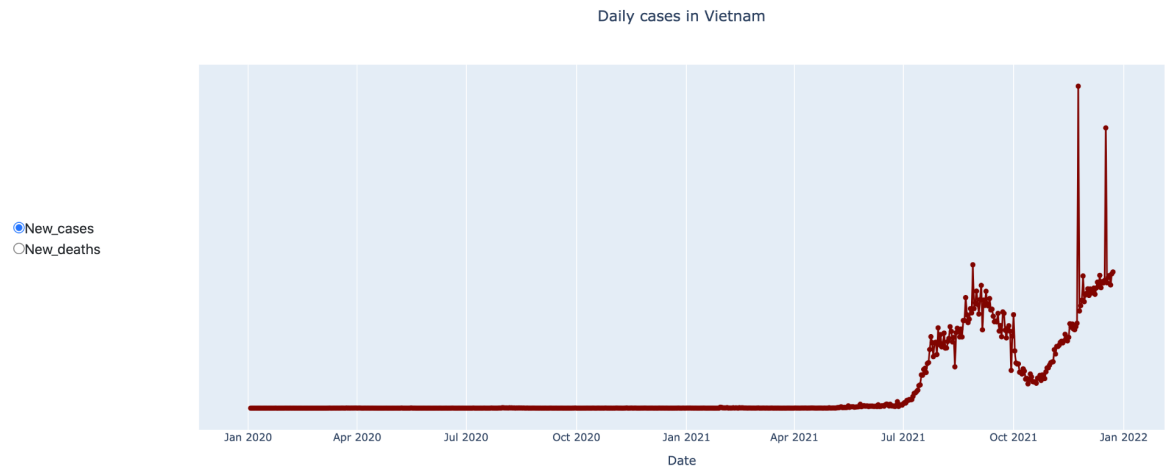
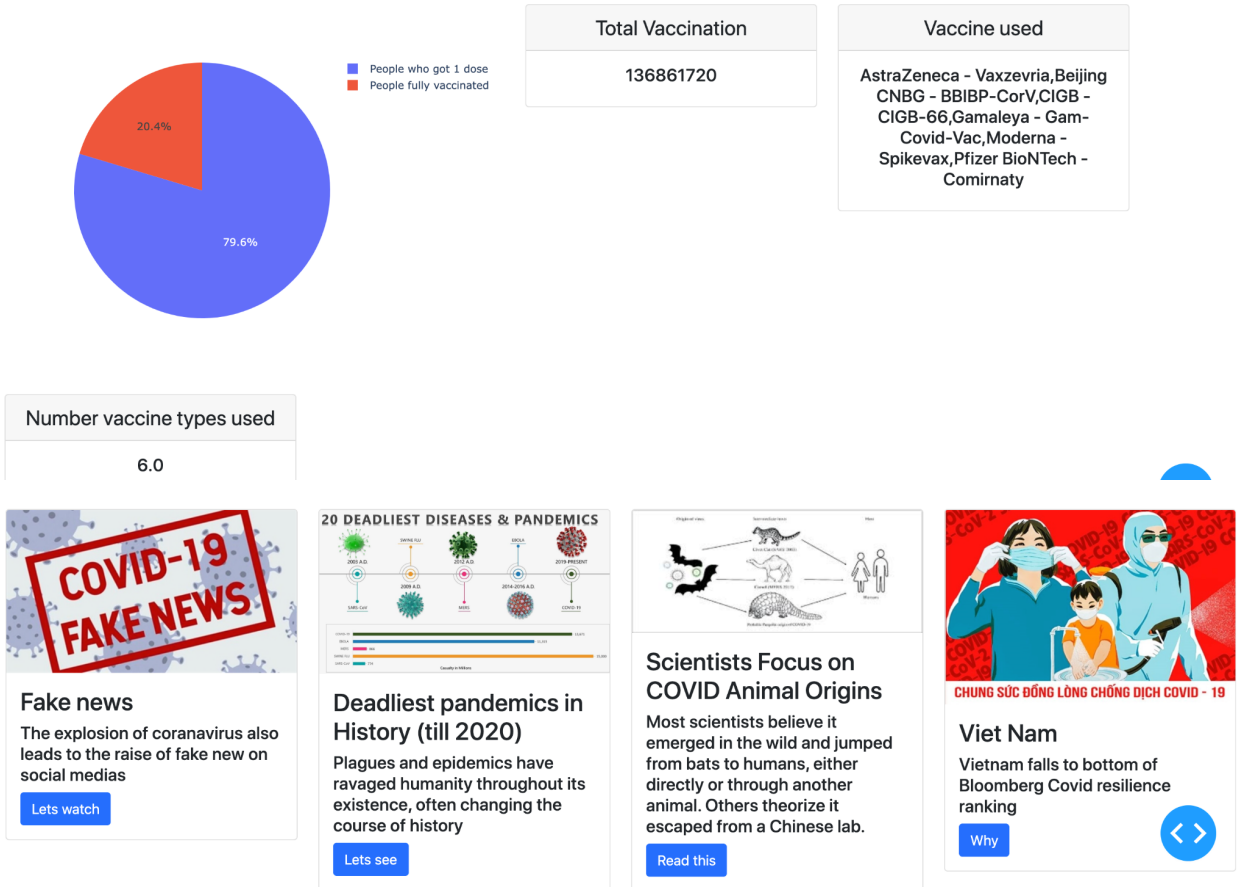


Table about the number of new cases and deaths

Date_reported	New_cases	New_deaths
2021-12-09T00:00:00	14599	230
2021-12-10T00:00:00	15311	256
2021-12-11T00:00:00	14839	216
2021-12-12T00:00:00	16141	209
2021-12-13T00:00:00	14638	228
2021-12-14T00:00:00	15377	242
2021-12-15T00:00:00	15220	252
2021-12-16T00:00:00	15527	283
2021-12-17T00:00:00	34062	241
2021-12-18T00:00:00	15236	246
2021-12-19T00:00:00	15895	248
2021-12-20T00:00:00	16110	215





5 Limitations / Difficulties

Due to the data security and confidentiality in Vietnam's official COVID-19 reported pages, it was really difficult for us to get detailed data of the COVID-19 in Vietnam. Therefore, our website has lacked information on the number of recovery and being-in-treatment cases. Also, we tried to find the statistics of the COVID-19 daily report of cases distributed in 64 cities/provinces in Vietnam. However, we did not find any accurate datasets resources; hence, we could not make the table and a COVID-19 map presenting cases by city/province.

We would definitely make the table distribution and the zoomable map if there are available datasets. Last but not least, without time limitation, we would develop our browser-based interactive data visualization with more information about the COVID-19 spread analysis not only in Vietnam but all over the world.