1. Provide a high-level summary of your project

While real-time data is most desired, sometimes local sources do not provide up-to-date statistics. However, information derived from models and simulations are ever-becoming more reliable the more historical data is gathered. Our project aims to develop a COVID-19 hotspot prediction system using environmental variables such as air quality, meteorological variables, and human population. Based on our research, the air quality and the weather had a positive correlation with spread of the virus. Users will be able to see which city is safe during pandemic.

1. Describe how your project addresses this challenge

Project AD answers the question, **“Is it safe to go to this area?”**. By using our proposed website, citizens will be guided on what cities will be considered “safe” on a given day, especially for employees who commute daily into and out of Metro Manila cities. More importantly, by predicting COVID-19 incidence, local government officials can then make evidence-based decisions before restricting or allowing access to a city. Furthermore, the national government and policymakers are then able to predict which cities to deliver more healthcare resources.

We developed a website that predicts how much a chosen city on a day will pose a risk of COVID-19 exposure on the individual. Because there is a growing body of research showing that COVID-19 transmission is affected by the air temperature and humidity, and that air pollution worsens the severity of disease. Together with population data and the incidence of COVID-19 on a certain time period, we can then compute for the predicted incidence of COVID-19 of a city for a given day, this number we shall call “Hotspot percentage”.

In the future, we propose to have a small-scale air quality monitoring system so that this system can be precise. For example, inside malls and other indoor leisure activities space. This can give warnings to the locals if it is safe in the said area. We would also need help from tech enthusiasts to further develop our real time satellite data gathering to input in our prediction model. As of now we can only give number of cases prediction, but in the future, we want to have a more straightforward answer like “It’s bad to go to this city”.

Our project combines satellite data and local epidemiologic data regarding COVID-19 in order to provide information that can then be used by private and public entities which will serve as a guide in terms of transportation and logistics. Because of these websites, we concluded that there is a correlation between the virus and the environmental factors. Our reference page in our website gives the studies where we got our project idea.

1. Describe how you developed your project. (What inspired your team to choose this challenge? What was your approach to developing this project? How did you use space agency data in your project? What tools, coding languages, hardware, software did you use to develop your project? What problems and achievements did your team have?)

There are two factors that inspired us to do this project, the first one is that the fact that we cannot see where COVID-19 would spread next. This project was motivated by the fact that our country, the Philippines, has high population density in urban areas, particularly Metro Manila, where the number of COVID-19 cases is still rising. In order to limit the spread of this disease, widespread quarantine was imposed. “Silent” carriers or the ones that are not tested but has the virus can just show up anywhere without him knowing that he is contagious. Therefore, economic activity suffered greatly.

The second one is that our team is a former environmental research group that specializes air quality in a university at Manila, Philippines. Analyzing these environmental factors is one of our strengths, that is why we are confident that we can use this advantage to help people around the globe.

We used satellite data to grab out some pictures or map out data if some environmental factors are present in our sample time and location. We also got raw data from various government agencies like NOAA and DOH.

The tools used in this project are as follows:

Python programming

* Data Analysis [Pandas, Seaborn, Numpy, Matplotlib, Sklearn, Joblib]
* Flask and HTML for our web design
* Azure for Cloud Services
* Porkbun for Domain Management

Our expertise is around research and data analysis, but due to some time and monetary constraints our project has a weak point in UX, web design, web-scrapping real time data and the architecture of the website.