

Creating With Data Report

Vu Doan

Digital Media course

Student ID: 18043856

University of the West of England

Vu2.Doan@live.uwe.ac.uk

Air pollution has always been one of the top human health-related concerns. It is also listed as one of the eight death causes in the world (WHO, 2014) and with the world population is on the increase, in later years, the increase in death due to air pollution will grow exponentially. By all means, everybody needs to be self-aware and take part in making a better world with as least amount of pollutants as possible.

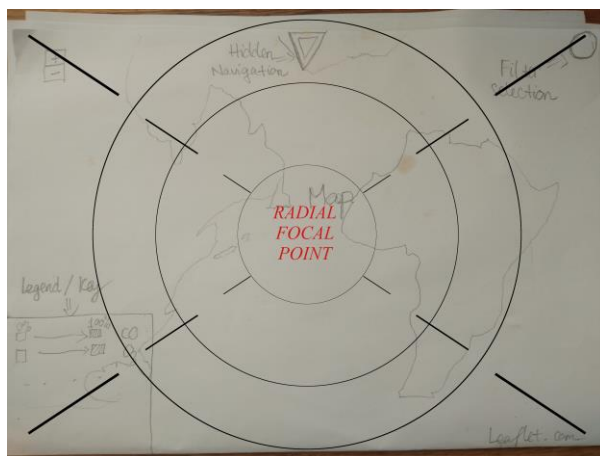
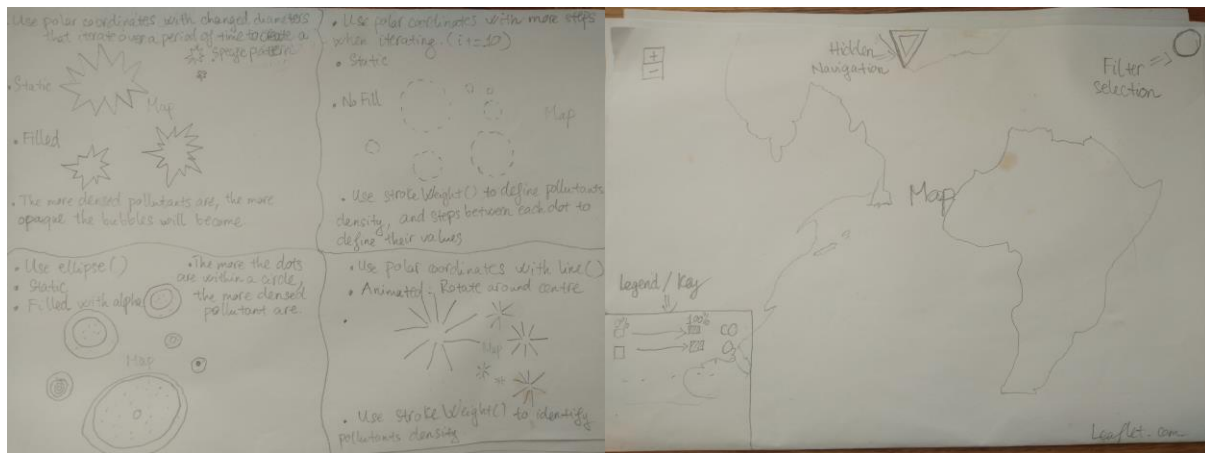
There has been quite a few organisations currently contributing to this idea such as: Air Visual (<https://www.airvisual.com/>) or the American governmental National Weather Service (<https://www.weather.gov/>) and many other, however big or small, organisations working so hard in spreading words throughout social media, websites, mobile apps, holding campaigns, or creating useful tools for purifying the air...to help us see the sun of tomorrow.

My aim for this project is to visualise six common types of air pollutants that have reigned in some countries over the past few years: Carbon Dioxide (CO), Ozone (O3), Nitrogen Dioxide (NO2), Sulfur Dioxide (SO2), and two main types of particulate matter (PM10) and (PM2.5) which are differentiated by the size. This project is not about “we are organisations that help clean the air”, it is more about “what type of pollutants do you think you can help reduce”. It also targets the huge gaps in how different the amount of each type of pollutant was/is “possessed” by each country, and from there, not to let us have a laugh about it, but, to come up with solutions that some developed countries can help and support other developing ones and/or collaboratively work on some innovative ideas which might be the answer to one of the world’s most headachy questions.

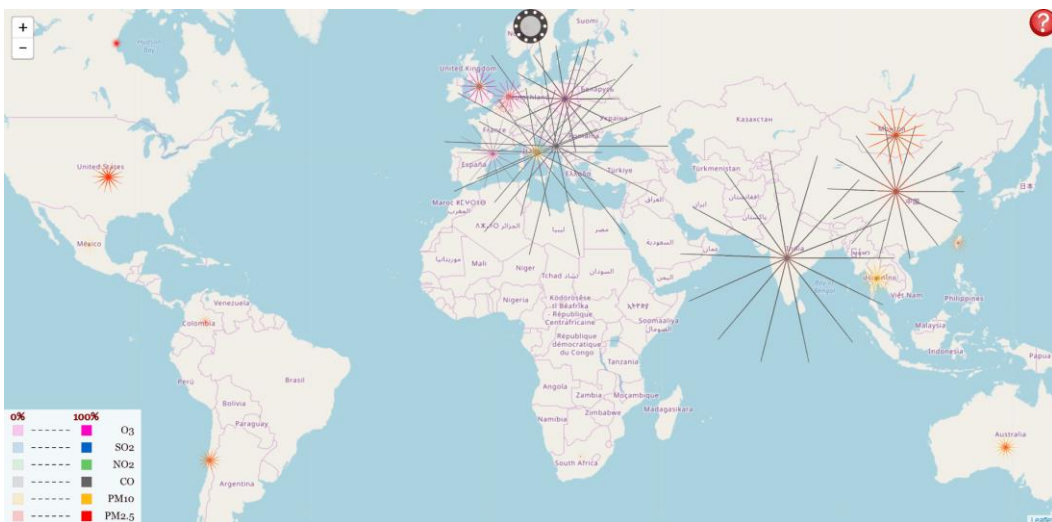
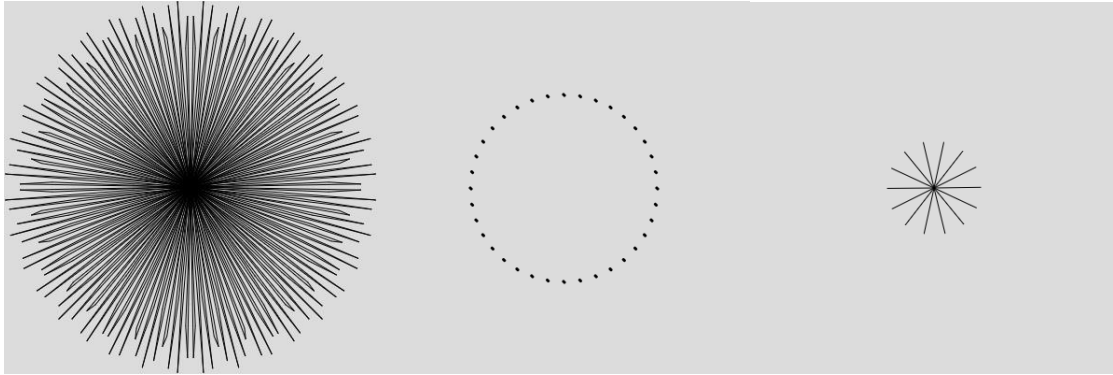
My initial plan for this particular project was to have a 3D-interactive map on a 3D earth model and plot all the pollution data on top of it. However, I decided to create a 2D-interactive map for its quick and easy manner of usage, because of the fact that the majority of map users uses Google Map for directions and hence, my 2D map visualisation will bring somewhat, familiar experiences to my users. The source map used for the project was from the Open Street Map that was provided by Leaflet.js. Nevertheless, there seemed to be an issue with canvas layers as I needed to visualise the data using another javascript library called p5.js. And mappa.js, which was originally designed for p5.js, has the feature for overlaying canvas on top of an interactive tile map. Moreover, it provides accessibility to all the base map libraries including Leaflet.js itself, which makes it become a powerful tool in visualising data while interacting with a mobile-friendly map.

Moving onto the technical part, Open Air Quality (<https://openaq.org/#/?k=h640hp>), is a very common data source for AQI (Air Quality Index) due to the fact that it is “the world’s first open, real-time and historical air quality platform”. Therefore, it is free and easy to use. It has been gathering lots of air inequality data from every place in the world including those “at the end of an alley”, with a purpose of allowing easy access to data in the most polluted area which are “often greatly under-studied”. However, despite the fact that OpenAQ aggregates all the data by gathering in real-time data from government agencies, “no guarantees can be made for their accuracy” as the real data sources are, in fact, government-level, organisations. As a result, different nations have different formulas for defining their AQI and it is difficult to easily know what the physical levels of pollution are at a specific location and compare them with other neighbouring countries/states. Their solution to this issue is to keep the data “raw” and not “back-calculate” it.

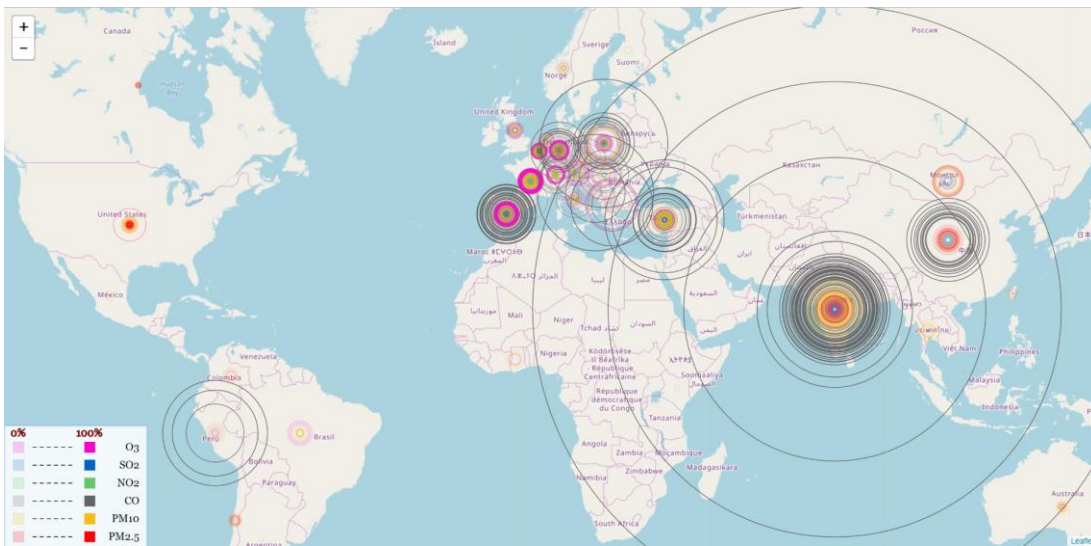
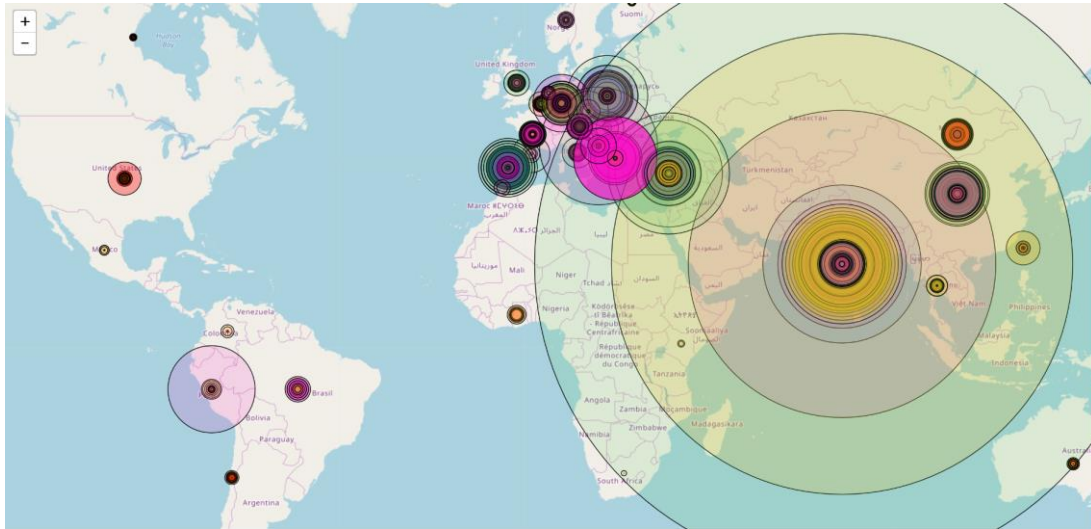
After all the data having been carefully analysed, I shifted my focus to a more aesthetic, fun part where I would decide how the data should be displayed on the map. Here are some of the sketches for ideation



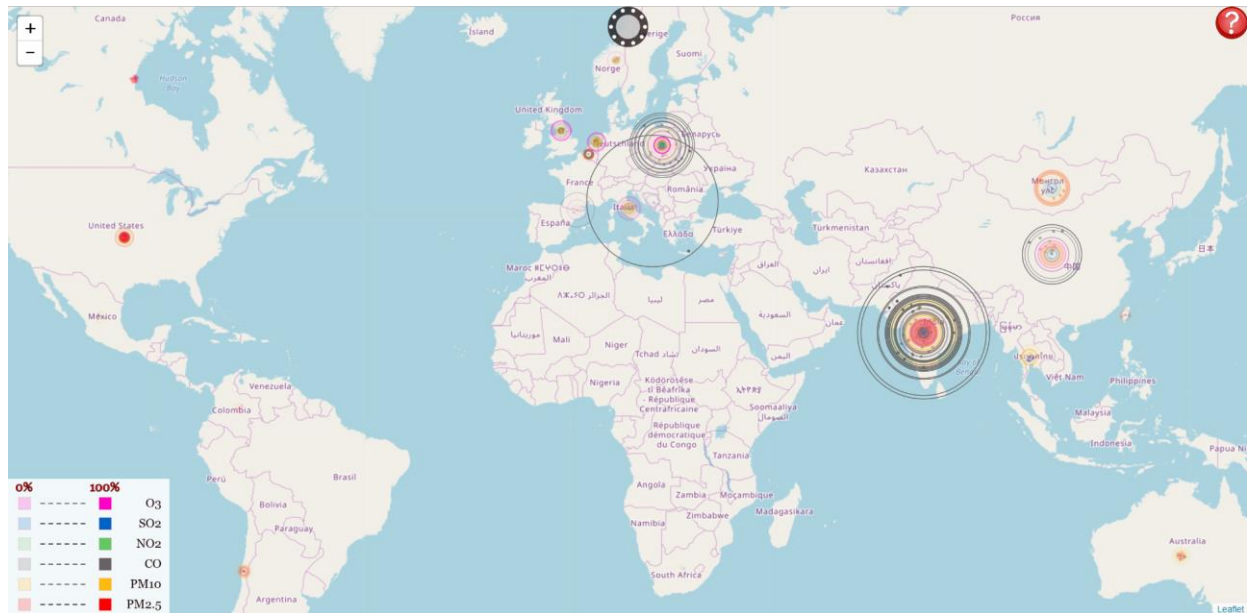
These are some variations for designing the data. They all look appealing and perfectly symbolise a sense of danger when it comes to air toxics. However, as they need to form into a certain pattern/shape, the code craves for more intensive CPU speed, thus, leads to slow performance and might result in having a negative impact on user experience.



Because of that, I then, made a decision on using the old-school ellipse function

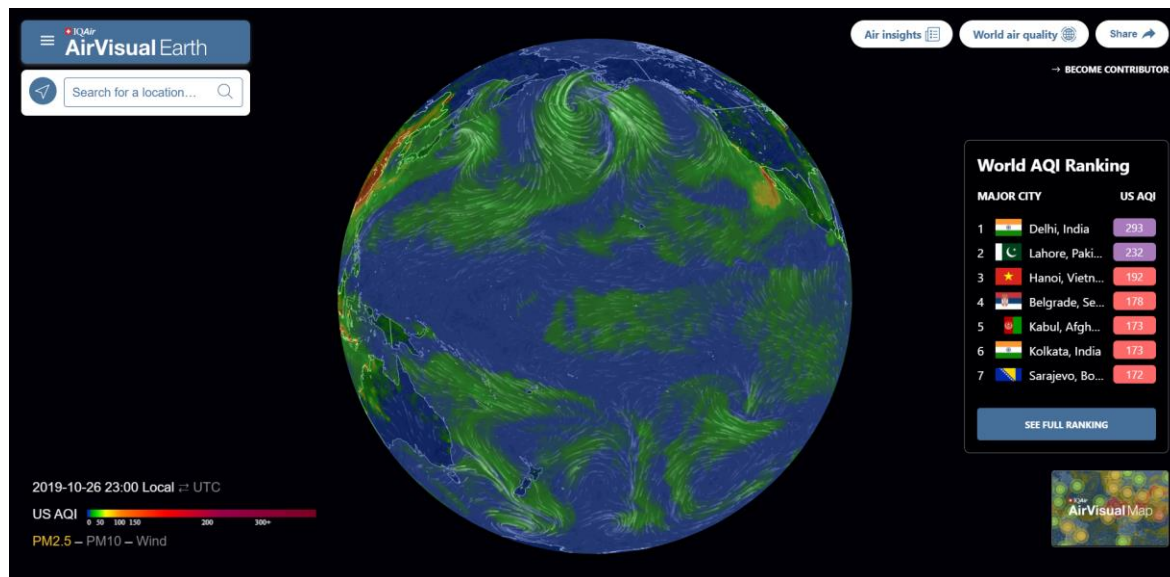


And since the static circle-visualisation was not as fancy as it used to be, it came to my mind that these bubbles needed some animation to preserve the sense of danger that previous data visualisation had created. And this is my final iteration.

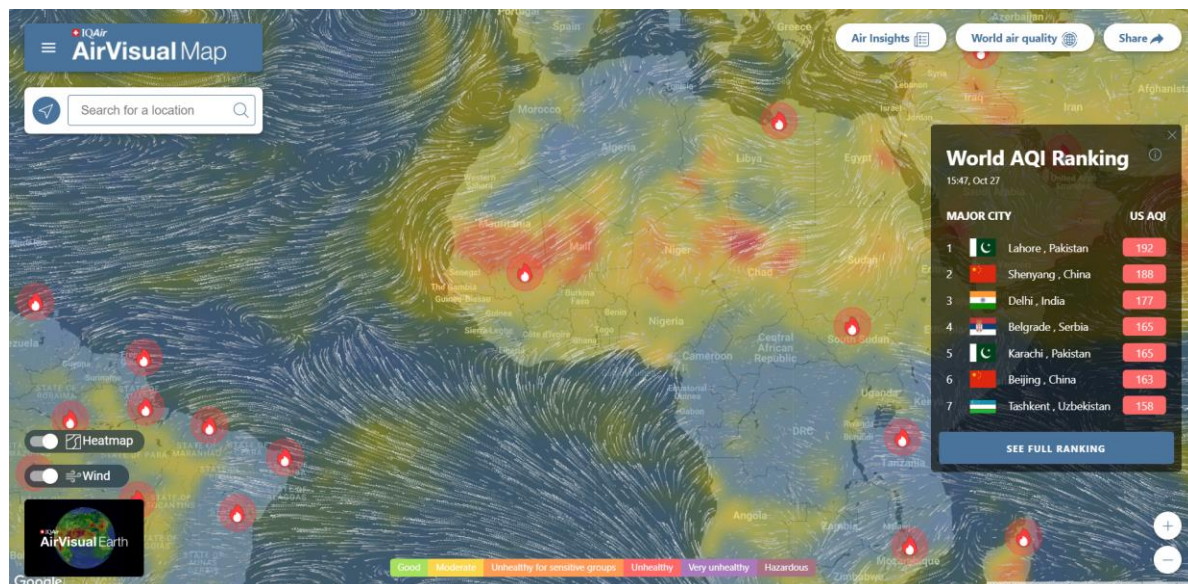


As for the logging part, users can get their current positions in a quick manner to explore air pollutants in a certain country where they are and other neighbouring areas. Data will be logged, saved to database and display on screen. Also, they can choose which types of pollutants they think they can help reduce in order to improve air quality (the response is for illustration purpose, and not based on real calculation. Even so, it clicks their minds that if everyone is working on resolving air pollution, we will get to breathe fresh air very soon).

As for inspiration, Air Visual was the one that gave me the thought of making a 3D-interactive map (<https://www.airvisual.com/earth?nav>) but it also quickly put out my little spark of idea.



This site has done a great job in visualising every polluted area in the world, which is the thing that I'm keen on learning how to without potentially crashing my website. It also has a visual link to a 2D interactive map that brings you to another page, which, in my opinion, would give me a better experience if it redrew the canvas and had some fly-zoom effect transition before a whole new canvas was redrawn. By doing this, there would be a 2D – 3D fly-zoom transition that might create some new user experience.



None of any element on the page is redundant. They show great detail (AQI ranking in country level, pollution density, heatmap, search engine,...) and one of my favourite visualisation styles: wind animation, is also contributing to this aesthetic art.