Short description in 140 characters

Breathe is an app which predicts air pollution in European countries and correlates it with geography, social sciences, diseases and climate.

Short description in 3 sentences

The quality of the air we breathe affects our health and our economic condition.

The quality of the air we breathe has a huge impact on the nature that surrounds us.

If we can predict what determines the quality of the air we breathe, we can act to improve it.

Description in 1 page

Motivation

The app we develop is intended to be used as a tool to predict and understand the quality of the air that we all breathe. This can be hugely important as if we understand what causes air pollution, we know how to stop it or at least reduce it. Several studies have shown high correlation between poor air quality and the increase of lung disease, the alteration of climate and, in a more indirect way, the degradation of economical status. In other words, it is essential that we fully understand the mechanisms behind the composition of the air we breathe, so that we can take efficient measures to counteract all of the aforementioned issues and improve the sustainability of our activities without compromising the quality of our lives and the climate.

Purpose

The purpose of the app is to help local community proactively improving the quality of the air. Every place in Europe (and in the World) is different, therefore there is not a single solution valid and applicable everywhere. For this reason, by observing the characteristics of the territory (urbanisation level, presence of rivers, mountains), the climate of a specific region, the human activity, different practices can be applied for each case and Breathe can point to the most important factors to tackle air pollution.

Method

Using datasets containing the evolution in time of the most dominant air pollutants (CO2, SOx, PM10) as labels, we can build models that predict the pollutants concentration. The features used to build the predictive models span from geographical data (urbanisation degree, sea level) to social data (income level, education level). Collecting enough data in time allow us to train the data and test them, creating a basic predictive model. Integrating this model with a time-series predictor increases the accuracy of the forecast.

Description

The app will contain a dashboard where the user can view the data displayed in several fashion. A vector map of Europe is present and the feature to plot can be selected by a menu. By clicking on a nation, a plot in time of the selected feature will be available. The data will be loaded from the European Data Portal and other website, so there’s no need to build a storage system, as we rely on their servers. By reading updated datasets the predictions will be more reliable and alerts will be available when selected.

Practical applications (examples)

The mayor of a large city is pressured by the press and by the electors because the air quality is decreasing. By using Breathe, his administration will be able to decide whether to restrict traffic for a few days or for longer periods of time (if vehicles are the main cause), or incentivising thermal insulation for old buildings (if heating is the main cause instead).

The head of a regional Agriculture Council is facing tremendous struggles to liaise with farmers who experience scarcity of crops. By correlating the geographical data offered by Breathe he can make a case to present at the local authorities demanding the needed changes to improve the yield of the farmers.

A local council has got funds to build a new paediatric hospital and needs to choose the location for the site. By observing the the air quality of the territory, the can make a more data-driven decision.