Short description in 140 characters

Breathe estimates the impact of air pollution on population health and uses geographical and socio-economic data to predict air pollution.

Short description in 3 sentences

1. The pollution present in the air we breathe affects our health.

2. The pollution is affected by both unchangeable factors, such as the geography of a territory, and controllable factors caused by human activities.

3. If we predict the impact of the elements determining the pollution in the air we breathe, we can act to reduce 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 how poor air quality correlates with the increase of lung disease and the alteration of climate, therefore it is crucial to address it.

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) differs in geography and human activity. For these reasons there is not a unique solution valid and applicable everywhere. Therefore, by using the characteristics of the territory (urbanisation level, presence of rivers, mountains), climate, human activity of specific regions, different actions can be taken for each case. Breathe can point to the most important factors to tackle air pollution.

Method

Using datasets containing the different time point measurements of the principal air pollutants (CO2, SOx, PM10 among others), we can develop models that predict the pollutants concentration. The features used to train the predictive models span from geographical data (urbanisation degree, sea level) to social data (income level, education level). Collecting different data points in time allow us to train and test a model, creating a predictive framework. Integrating this model with a time-series predictor increases the accuracy of the forecast.

Description

The app will consist of a dashboard where the user can view the data displayed in several fashions. A vector map of Europe is present and the feature to plot (for example concentration of CO2 in the air or average train passengers) can be selected by a menu. By clicking on a nation, a plot in time of the selected feature will be shown. 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 live updated datasets the predictions will be more accurate and alerts will be available when selected.

Practical applications (examples)

In this section we provide three potential examples of the application of the app we are developing.

1. The mayor of a large city is urged by the press and by the electors because the air quality is worsening. By using Breathe, the administration will be able to decide whether to restrict vehicles traffic (if vehicles are the main cause), or incentivising thermal insulation for old buildings (if house heating is the main cause instead).

2. The Minister of Transports needs to submit a proposal for obtaining funds to further develop the rail network. Breathe can help making a data-driven decision to identify the most suitable regions where to build the network. Looking at the type and level of air pollutants, population density and use of existing infrastructures, the Minister has more elements to make the best decision.

3. A local council has got funds to build a new paediatric hospital and needs to choose the location for the site. By monitoring the the air quality of the territory together with lung related diseases incidence they can identify most and least suitable areas.