SE4G Project Assignment A.Y. 2021-2022

This year we propose two different high level objectives for the projects. They result in the same kind of work, but focus on different types of datasets:

- **Increasing the value of a citizen science projects**: nowadays citizens can collect data using their own devices and share it with others through proper platforms. Also, they can launch data collection campaigns and involve other citizens in it. The point is that collected datasets are useful when they are elaborated and visualized in an effective way. The purpose of this project consists exactly in visualizing and elaborating a dataset of your interest among those available on the Epicollect5 platform (https://five.epicollect.net). Data collected on Epicollect5 includes geographic coordinates, a series of quantitative and/or qualitative attributes, and possibly digital media information (e.g. pictures) for each entry. Raw data is openly distributed by means of a REST API. For our project you should create or identify and reuse an Epicollect5 public project (https://five.epicollect.net/projects) including at least 50 entries having geographical coordinates and 2+ attributes.
- **Contributing to sustainability by monitoring data from environmental sensors**: many public administrations and other organizations collect sensor data in real-time and store them in a digital archive. Of course, there is a need for presenting and analyzing this valuable information in order to support decision making. The purpose of this project is to identify and reuse an open REST API providing environmental measurements from sensors (e.g., air quality sensors https://aqicn.org or https://openaq.org) in a specific geographical area (e.g., a country or a region), provided that such measurements have geographical coordinates within the records and possibly include other metadata (e.g., sensor type, etc.). Any service that full-fill the above requirements can be considered. Services that dispatch both real-time and historical data should be preferred.

Project goals:
In any of the two cases described above, you are asked to develop a web application that supports users in querying and visualizing data that is retrieved from the web through a well-defined REST API. Different types of visualizations should be foreseen, maps, dynamic graphs, etc.

Your Tasks:

A. Create or identify and reuse the dataset of your preference, provided that it is available through an open REST API as described above.
B. Develop a Web app that offers the following features:
    - Retrieving the data using the identified REST API(s).
    - Processing and exposing on the Web the data through the use of some original manipulation strategy, by leveraging both the geographic content (map-based views) as well as attributes (interactive exploratory graphs).
    - Allowing users to extract custom views of the data and, possibly, leave comments.

    As part of the web app development, you will:

- Define the requirements for your software (what the software should offer to its users and how it interacts with the external environment) in a Requirement Analysis and Specification Document (RASD) - (deadline 20th of April 2022)
- Define the structure of your software and a plan to verify it in a Design and Test Plan Document (DTPD) - (deadline 25th of May 2022)
- Release your app together with an accompanying Software Release Document (SRD) that describes the procedure for installing and running your software as well as any known limitation your software may show - (deadline for releasing your app and the SRD 7th of June 2022).

Suggested software tools (these will be presented during the lectures by Daniele):
Epicollect5 REST API, Python-Flask, Python-Bokeh, Python data analysis and plotting libraries (of your choice)