

Python API for visualization of sets

Outline Document

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1) Analysis

The project involves creating a Python API/ library to be used by students or academic professionals with the aim of visualising sets, using InteractiVenn's approach to Set Visualisation, to allow a greater understanding of given sets, and their unions and intersections. The Python tool developed should allow users to input up to six sets of data to be visualised as an interactive Venn Diagram with functionality that:

- 1) Allow users to visualise the union and intersections of the given complex input sets.
- 2) Allow users to hover over set unions and present the elements of a given set.

The developed Python tool should take into account that the users may have little or no technical skills, this should direct the design towards being as easy as possible to use for the target audience. The documentation of the tool must have clear and concise information on the functionality of the tool along with concrete examples displaying to the user the operations that can be performed.

The project includes running and evaluating the developed Python tool by itself as well as against an established tool, *UpSet – Visualizing Intersecting Sets*, to highlight the benefits and disadvantages of each tool given a number of examples.

2) Broad plan of steps

The project should commence with research into which technologies should be used. Which are the best tools for outputting interactive models to the user through Python. The design of the Python tool should have consideration for users coming from any OS, with minimal importing of dependencies needed allowing for users of any technical skill level to operate. Technologies that need to be decided on:

- Which technology for displaying interactive outputs through Python.
- How the documentation of the Python tool will be presented to the user.
- Which file types the user will be inputting and relevant error handling measures.

Once the technologies have been chosen, the implementation may begin. This will involve the development of the Python tool using the chosen technologies from the initial definition phase of the project. The implementation involves:

- 1) Creating a directory to store the Python library
- 2) Creating a virtual environment for the directory

- 3) Creating the content of the Python library
- 4) Building the Python library.

Development of the documentation, to allow the users to understand the functionality of the tool, may commence. Once the implementation and documentation have been completed to a satisfactory level, the final stage of the project may begin.

The final stage of the project will involve testing the Python tool extensively, to discard unforeseen errors or missing functionality. The Python tool will be evaluated by itself to assure it satisfies the requirements of the project. The Python tool will also be evaluated against the existing Upset Visualisation tool to compare the two projects. The documentation will be finalised and completed. With the project closure involving public and peer testing of the developed Python tool by the target audience.