

# Implementation of Data Visualization in Open Digital Twin Platform

Chenyu Zuo<sup>1</sup>, Milos Balac<sup>1</sup>, Stefan Ivanovic<sup>1</sup>, Sabine Maennel<sup>2</sup>, Jascha Grübel<sup>1</sup>, Carlos Vivar Rios<sup>2</sup>  
<sup>1</sup>ETH Zurich; <sup>2</sup>Swiss Data Science Center (SDSC)

## 1 Introduction

Data visualization have the potential in supporting users to understand large amount of data and better understand the real world. With the aim of improving the efficiency in performing mobility simulations, we integrate visualizations into the Open Digital Twin Platform (ODTP). Designing visualizations for ODTP and ensuring its usefulness must take multiple factors in consideration, as shown in Figure 1. The process employs a sequential process starting with data acquisition and preprocessing, followed by exploratory data analysis using diverse visualizations. Advanced analytics techniques such as machine learning and statistical modeling are then applied to extract deeper insights. The results are communicated through interactive visualizations and reports, facilitating informed decision-making. Iterative refinement ensures the accuracy and relevance of the analysis.

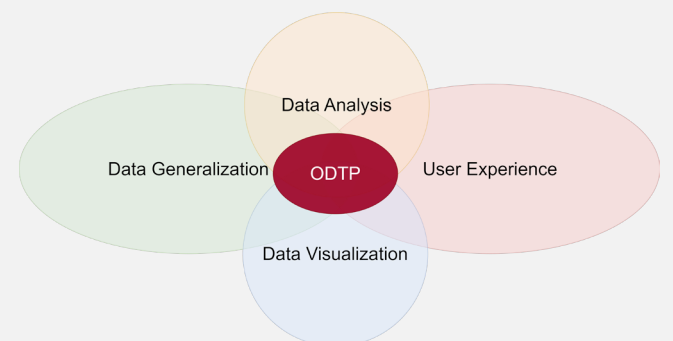


Figure 1. Data visualization in ODTP.

## 2 A Show Case of a Dashboard for Trip Data Visualization

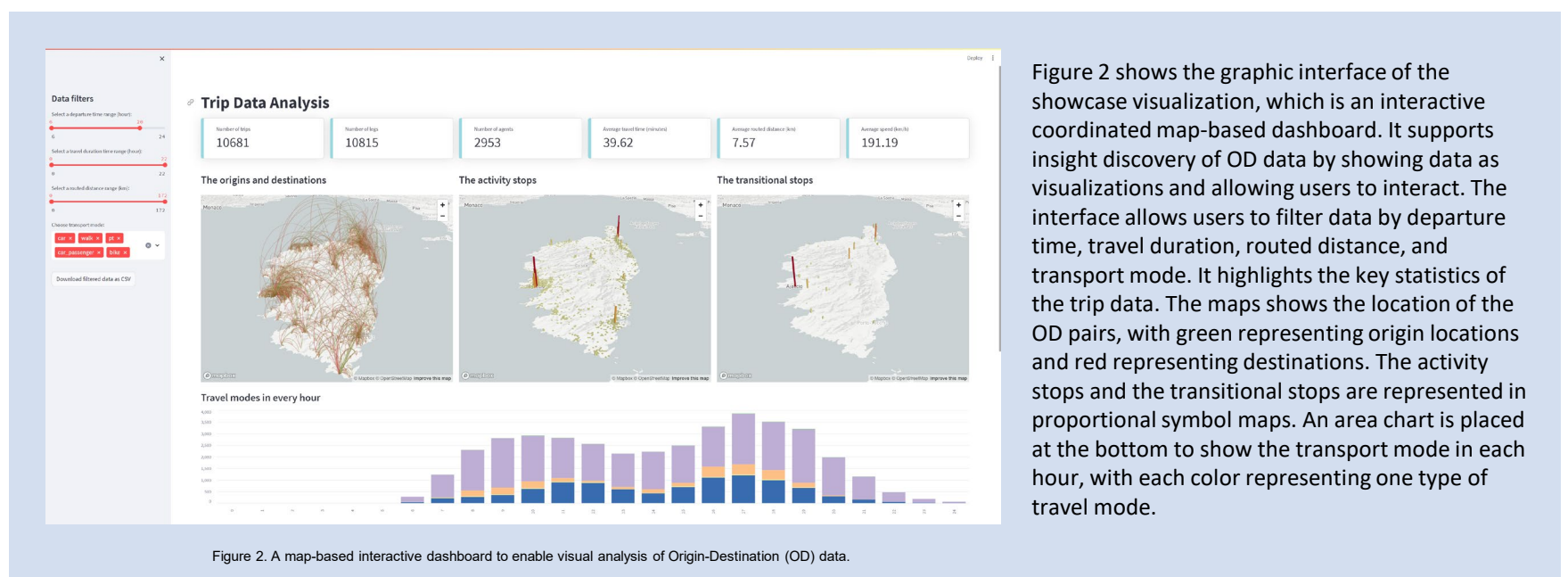


Figure 2. A map-based interactive dashboard to enable visual analysis of Origin-Destination (OD) data.

Figure 2 shows the graphic interface of the showcase visualization, which is an interactive coordinated map-based dashboard. It supports insight discovery of OD data by showing data as visualizations and allowing users to interact. The interface allows users to filter data by departure time, travel duration, routed distance, and transport mode. It highlights the key statistics of the trip data. The maps show the location of the OD pairs, with green representing origin locations and red representing destinations. The activity stops and the transitional stops are represented in proportional symbol maps. An area chart is placed at the bottom to show the transport mode in each hour, with each color representing one type of travel mode.

## 3 Trip Data Interpretation

The hidden patterns of OD data can be found by viewing OD-Vis. The maps show that more trips took place in Ajaccio and Bastia than in Porto-Vecchio. The trips in Ajaccio and Bastia are closer to the harbors than in Porto-Vecchio. Moreover, cars are the dominant travel mode in the test data and walking is the second most adopted travel mode. Most of the stops are made in these three aforementioned cities. The maps confirmed that transitional stops are much fewer than stops for activities. In addition, the most popular travel time is from 17:00 to 18:00.

## 4 Summary

- The data visualization interface is designed as a self-explanatory visual interface to discover spatial and temporal patterns.
- The usability will be tested with real users. The feedback of users will be used to improve the design.

## References

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