

VISUALIZATION OF GEOGRAPHIC DATA USING GOOGLE CLOUD PLATFORM

Diploma thesis

Introduction

Advances in GIS cloud computing paradigms have opened up possibilities for the visualization and communication of spatial data at Scale. Google Cloud Platforms via its products like google data studio have created a unique opportunity for spatial data exploration, analysis, synthesis and presentation which are key for effective geovisualization.

The aim of the diploma thesis therefore is to:

- Analyze, describe and evaluate spatial and geographic aspects of Google Cloud Platform. Focus is on integration with supported tools by Google Cloud Platform (e.g. Google Data Studio), Data Import, Connection and Integration.

The main emphasis is on visualization purposes - both general and cartographical methods, parameters, datasets, implementations.

Methods Used

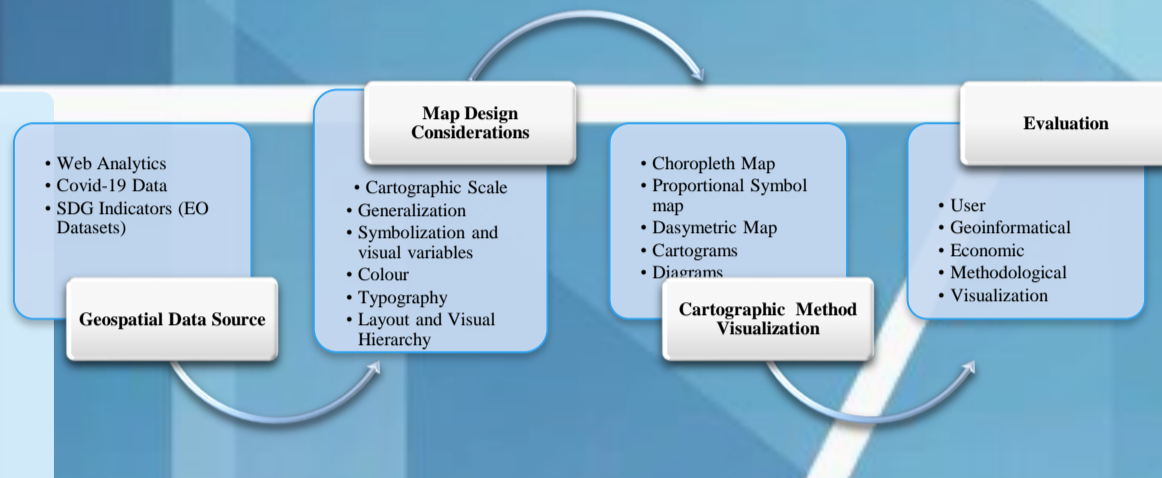
The study adopted a mix methodological approach to address the various objectives. This includes literature review, case study and heuristic evaluation. Multiple data sources including;

- Covid-19 data
- Google Analytics data,
- Global population data and
- Air pollution data

were explored in varied case studies to ascertain the spatial and cartographic dimensions. The results of the case studies were corroborated with Aspect and Heuristic analysis.

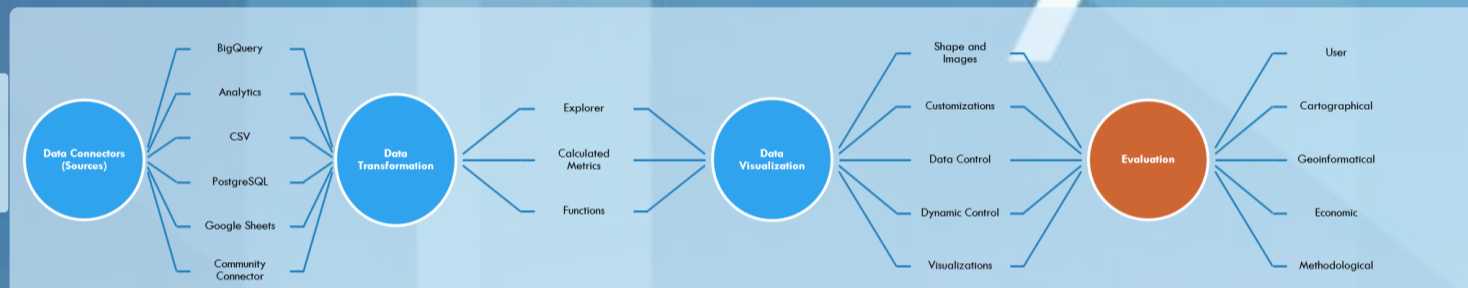
Design Framework

A design framework was developed to detail the basic considerations when building a visualization product from google cloud platform. This is to serve as a guide and involves four broad stages. The approach was adapted to steer the case studies in the in addressing the relevant objectives. The framework is termed **GMCE** which stands for Geospatial data source, Map design considerations, Cartographic Method visualization and Evaluation

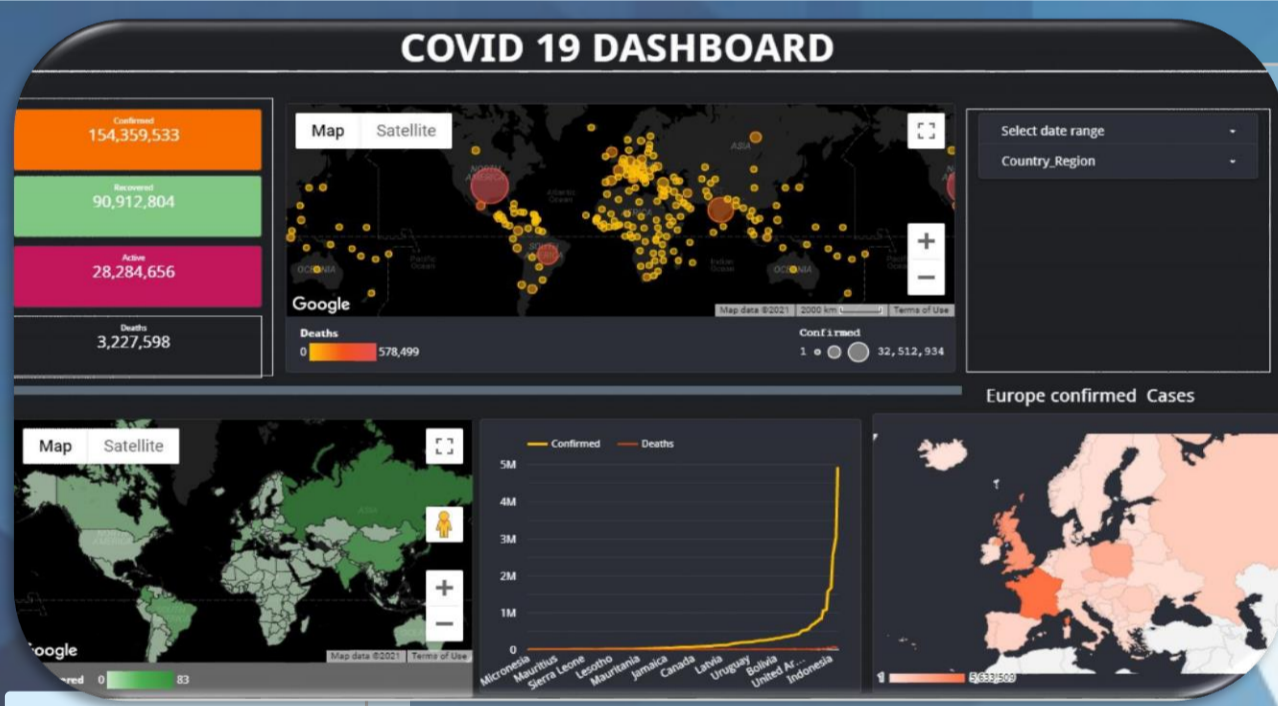


Workflow

The case study workflow was based on the GMCE design framework and involves spatial data connection, data transformation, data visualization and evaluation.

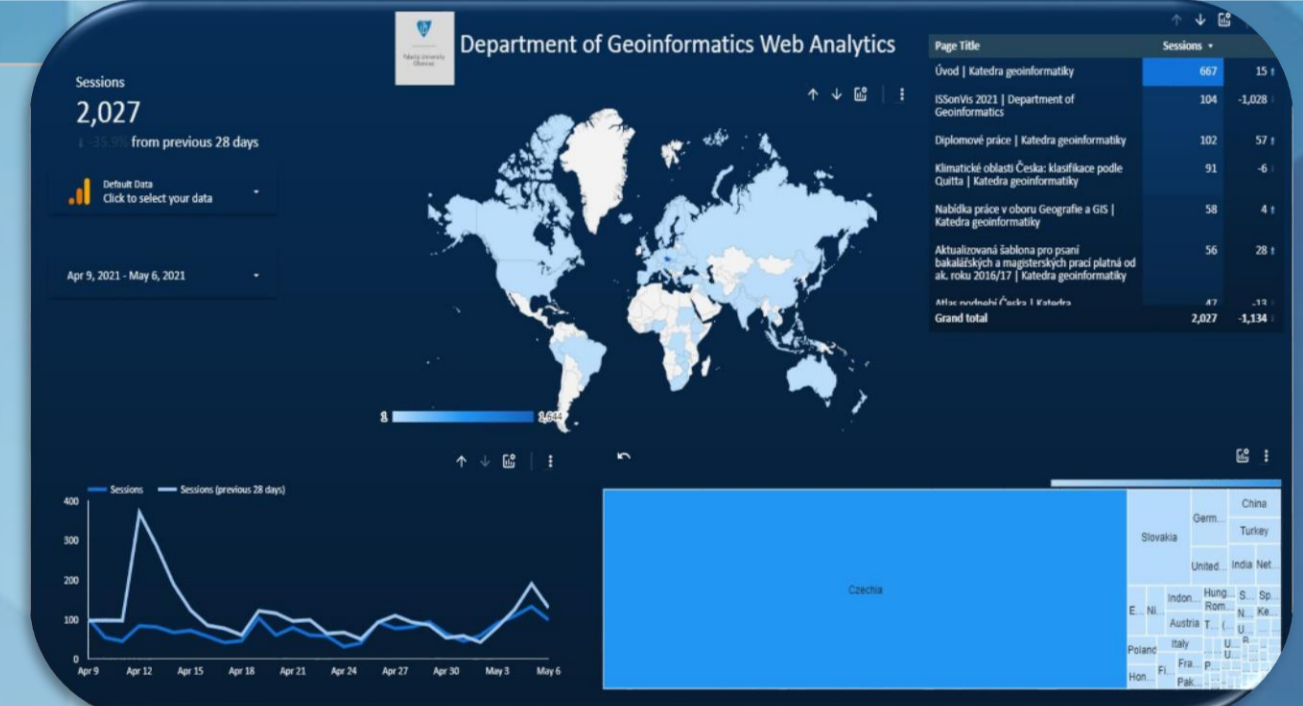


Case Study-1: Covid-19 Visualization Dashboard



Case Study-1
Link to Dashboard

Case Study-2: UPOL Department of Geoinformatics Web Analytics



Case Study-2
Link to Dashboard

Case Study-3: World Population and Air Pollution Dashboard



Case Study-3
Link to Dashboard

Evaluation

Aspect

- Cartographic Aspect
- Geoinformatics Aspect
- Economic Aspect
- Methodological Aspect
- User Aspect

Heuristics

Aspects	Points	Questions	Answers	Answered	Score
General	6	10	8	80%	88%
GIS	2	10	10	100%	60%
Carto	7	11	11	100%	82%
UX	3	6	4	67%	88%
Content	7	9	9	100%	89%
Graphics	5	5	5	100%	100%
Total	30	51	47	92%	82%

Conclusion

Google Cloud Platform via Google Data Studio supports multi spatial data integration via in-build or community connectors. Google Cloud Platform supports spatial data visualization when approached with the GMCE design framework and workflows.

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