HSLU Hochschule Luzern

PROJECT
TITLE

Group Name: Group's name

Students: Student 1 name, matriculation number, e-mail
Student 2 name, matriculation number, e-mail
Student 3 name, matriculation number, e-mail

Examiners: First reviewer's title and name
Second reviewer's title and name
Third reviewer's title and name

GitHub: http://www.github.com
Visualization/Demo: http://www.demo.com

Luzern, September 12, 2024

CONTENTS

LIST OF TABLES

List of Figures

1 PROJECT IDEA AND USE CASE

1.1 Topic Introduction

Here you introduce the topic, give an overview of what you're going to discuss, and why the topic is important.

Examples of how to add references using BibTex are presented here: Knuth, 1984; 1986; Lamport, 1994; Lesk and Kernighan, 1977; Mittelbach *et al.*, 2004. You

1.2 Motivation

Explain why you have chosen this project.

1.3 Problem Definition and Goals

1.3.1 Business and Research Questions

Present the questions that your data lake implementation will answer.

1.3.2 Business Intelligence Questions

Present the questions that your data warehouse implementation will answer.

2 DATA LAKE

2.1 Architecture

Describe the system setup and all elements needed to answer your business questions (data lake).

2.2 Data Sources

Explain why the data sources support your use case (data lake). Describe the data sources. Analyze the data sources for potential limitations.

3 DATA INGESTION

3.1 Data Source Description

Describe the data sources, specifying whether they are dynamic or static, and include any relevant insights about the REST API service, such as API quota limitations.

3.2 ETL Process Explanation

Provide a detailed explanation of the ETL processes, ideally represented with flow diagrams that describe each step.

4   DATA STORAGE

4.1   Data Storage Services

Specify the services used for data storage and the formats employed (e.g., Parquet, CSV) in cases such as S3 Buckets.

4.2   Relational Databases

Provide a brief description of the tables, including any relationships via primary keys, and include a diagram if applicable.

4.3   NoSQL or Vector Databases

Briefly describe the type of data stored and the indexing methods used for data retrieval.

5   DATA TRANSFORMATION

Explanation of the transformations needed in the data and ideally represent them in a flow diagram to understand the sequence of steps Insights in case of data imputation techniques or cleaning and assumptions around data.

5.1   Data Quality

Any processes considered to validate the quality of the data (Data Warehouse Transformations)

6 DATA WAREHOUSE

6.1 Architecture

Describe the system setup and all elements needed to answer your business questions (data lake).

6.2 Data Preparation

Explain why the data sources support your use case (data warehouse). Describe the data sources. Describe the ETL/ELP process required.

6.3 Data Warehouse Modeling

Present the model used and implementation of your data warehouse.

7 DATA VISUALIZATION

7.1 Theoretical Model

Describe the theoretical framework for the implementation of visualizations.

7.2 Data Warehouse Visualization

Present visualizations, based on the theoretical framework, how the data warehouse answers the business intelligence questions proposed in section 1.3.2.

8   CONCLUSIONS

This section does not need to be long, but it needs to be concrete. Explain what you found, what you did not find, and what needs to be done next. No more than two pages maximum.

8.1   Discussion of the Solution

Proper discussion of the solution. Highlight the advantages, disadvantages, trade-offs in terms or technologies used etc.

8.2   Project Outcomes

Proper discussions of the project outcomes.

8.3   Future Work

Areas to improve the project. What would you do different?

Bibliography

Knuth, D. E. (1984). Literate programming. *The Computer Journal*, *27*(2), 97–111.

Knuth, D. E. (1986). *The T_EX book*. Addison-Wesley Professional.

Lamport, L. (1994). *LaTeX: A document preparation system* (2nd ed.). Addison Wesley.

Lesk, M., & Kernighan, B. (1977). Computer typesetting of technical journals on UNIX. *Proceedings of American Federation of Information Processing Societies: 1977 National Computer Conference*, 879–888.

Mittelbach, F., Gossens, M., Braams, J., Carlisle, D., & Rowley, C. (2004). *The LaTeX companion* (2nd ed.). Addison-Wesley Professional.

Appendix A - if Needed

The first appendix is here. The purpose of appendices is to keep the main part of the document clear and readable. There can be many appendices, everyone should form an integral part. The following should be considered as the candidates to build appendices:

- Multi-page tables disturbing the reading with important information which you want to include in your manuscript;
- detailed schematics for which you provided a simplified version in text (you can refer to the more complex scheme in an Appendix and only show the simplified scheme inside the main text).
- important pieces of code allowing for validation of the results. Most of the code will probably go to the git repository anyway.
- multiple figures of some properties, showing that the solution described in the manuscript is capable of calculating the properties shown in an Appendix, but the values in figures do not have the crucial significance for the research/engineering plot line of your manuscript.