Experiential Data Hackathon "ViennaDataSprint: Hacking for a Greener City"

Author: Timur Naushirvanov

Experiential Data Hackathon

"ViennaDataSprint: Hacking for a Greener City" provides an intensive month-long experience for advanced BA or MA students in Data Science. Participants tackle various sustainability challenges while collaborating with Viennese civil society organisations and local authorities. Guided by real-world data, students design innovative projects aiming for tangible societal impact.

Teams of 3 to 5 members select projects aligned with Vienna's sustainable development goals, engaging in regular consultations with clients to refine their approaches and present preliminary results. After the month, final presentations demonstrate project outcomes and proposed solutions, ranging from posters and presentations to websites and interactive dashboards.

As part of the experience, students will submit reflective essays to evaluate their teamwork, client interactions, and contributions to social good. Through this experiential learning, participants deepen their understanding of data science's practical applications and their role in effecting positive change. Therefore, the Hackathon equips students with technical proficiency, a broader perspective on social good in their work, and helps shape personal experiences based on leveraging data science for sustainable development.

Further Details

Context and Inquiry Level

The Data Hackathon is a one-month-long activity for advanced BA or MA students with at least an intermediate background in Data Science (e.g., having completed at least one university-level programming course and one university-level Foundations of Data Science course). It is designed for students who want to apply their data skills to real-world challenges. This activity is not part of a course but rather an extracurricular activity for students to practice their skills (they can do it instead of a company or research internship). It is ideally organised in cooperation with various Viennese civil society organisations and/or local authorities of the city, who can provide participants of the Hackathon with project ideas or data for further exploration and analysis.

The inquiry level of the activity is supposed to be between guided and open: ideally, students receive intriguing questions or data from civil society organisations and local authorities, and then they design their data science projects, discuss with their clients, and communicate their findings.

Practicum and Service Learning Objectives

The Hackathon serves two main objectives, each contributing to a comprehensive experiential learning experience:

1. Fostering the development of robust data science competencies by applying theoretical knowledge and learned techniques to real-world projects under the guidance of non-private clients.
2. Tackling some of society's complex challenges, including sustainability, poverty, and energy transition, thereby using data science to make a positive impact in our community.
3. Allowing students the opportunity to reflect on their experiential learning, fostering deeper insights into their growth and the impact of their work.

Team Formation and Project Ideas

Before the start of the Hackathon, students form teams consisting of 3 to 5 members. Since the partners of the Hackathon are already established, teams rank their preferences from a provided list of project ideas and associated clients. All topics relate to the sustainable development of Vienna. After reviewing the applications, clients confirm their selections. They also have the freedom to oversee more than one group if there are differences specified in the project ideas or proposed data (but no more than 3 groups).

Examples of Hackathon Projects:

- *Urban Mobility Optimisation*: How can we optimise urban mobility in Vienna to reduce congestion, carbon emissions, and travel times while improving accessibility and convenience for residents?
- *Energy Consumption Reduction*: How can we analyse energy consumption patterns in Vienna to identify opportunities for reducing energy usage, increasing energy efficiency, and promoting the adoption of renewable energy sources?
- *Waste Management and Recycling Improvement*: How can we improve waste management and recycling practices in Vienna to reduce landfill waste, increase recycling rates, and promote a circular economy?

General Guidelines for the Data Hackathon

Working for a Client

Students are expected to dedicate approximately 30 hours per week to the project. Regular consultations with the clients should be scheduled to discuss project progress, clarify requirements, and address any concerns (at least twice per week). During the consultation, students present preliminary results to the clients for feedback and validation.

Preparation of a Preliminary Presentation (After 2 Weeks)

After two weeks of project initiation, each team prepares a preliminary presentation. The presentation should last approximately 15 minutes and cover the project idea, data sources, the general workflow for the project, and the challenges faced. The purpose of this presentation is to share the project direction and receive early feedback from a larger audience.

Preparation of a Final Presentation

After four weeks of project work, each team prepares a final presentation. The presentation should last approximately 20 minutes and showcase the project results. The final product can vary and may include a poster, policy paper, app demonstration, or traditional slide presentation with the results of the analysis. The final presentation should effectively communicate the insights gained from the data analysis and any actionable recommendations derived from the findings.

Experiential Essay

Given the designation "Experiential", upon the conclusion of this Data Hackathon, students are encouraged to reflect on their project experience under the guidance of the organisation and the social impact of their work. Students are required to complete individual essays (minimum 1500 words) covering the following aspects of their participation:

- *Introduction*: Provide a brief overview of the project and the client.
- *Work as a Team*: Describe your individual contribution and that of your teammates. Reflect on the team dynamic: was it smooth? Did you feel heard and valued? Were there any challenges or areas for improvement?
- *Work for a non-private Client*: Assess the communication with the client. Evaluate the usefulness of their feedback. Share your overall satisfaction with working with them. Offer any recommendations for enhancing their workflow.
- *Work for Social Good*: Reflect on the potential positive impact of your project on society. Discuss your willingness to raise awareness within Vienna. Share your thoughts on the experience of working for a social benefit.
- *Summary and Feedback*: Summarise your experience and provide general feedback on the activity.

Assessment

Client Assessment

The first component of the assessment is conducted through Client Assessment and is based on a straightforward Rubric Assessment (1), along with any feedback the client wish to provide. The outcome of this assessment is either a Pass or Not Pass for the whole team.

Experiential Learning Assessment

The second component of the assessment refers to the individual Experiential Essay and relies on Rubric Assessment (2). The outcome of this assessment is a Pass or Resubmit for each group member separately. This component is independent of the Client Assessment and can be completed even if the team did not pass the former.

Table 1: Rubric Assessment Criteria: Client Assessment

Criterion	Pass	Not Pass
Team Impact and Innovation	The team demonstrates innovative approaches and solutions that have the potential to make a meaningful impact on the targeted social or environmental issue.	The team shows limited innovation or impact, with solutions lacking creativity or failing to address the core challenges effectively.
Collaboration and Team Dynamics	Exhibits effective collaboration and positive team dynamics, with members actively contributing to the project's success and supporting one another.	Displays difficulties in collaboration or team dynamics, with instances of conflict, disengagement, or unequal contribution.
Client Engagement and Communication	Engages effectively with the client, maintaining open communication channels, and responding promptly to feedback and inquiries.	Demonstrates challenges in engaging with the client, including communication gaps, delays in response, or misunderstandings of client expectations.
Social Impact and Ethical Considerations	Demonstrates a clear understanding of ethical considerations and prioritises the social impact of the project, ensuring that decisions align with ethical guidelines and contribute positively to society.	Shows insufficient consideration of ethical implications or social impact, with decisions or actions potentially causing harm or neglecting the broader societal context.

Table 2: Rubric Assessment Criteria: Experiential Essay

Criterion	Pass	Resubmit
Clarity of Introduction	The introduction provides a clear overview of the project and the client, setting the stage for the essay.	The introduction lacks clarity or fails to provide a comprehensive overview of the project and the client, requiring revision for improved coherence.
Reflection on Teamwork	Provides insightful reflections on individual contributions and teamwork dynamics, including challenges and areas for improvement.	The reflection on teamwork is superficial or lacks depth, requiring further elaboration or analysis of team dynamics.
Evaluation of Client Interaction	Offers a thorough evaluation of communication with the client, highlighting the usefulness of feedback and overall satisfaction with the collaboration.	The evaluation of client interaction is limited or lacks detail, necessitating a more comprehensive analysis of communication effectiveness and client satisfaction.
Reflection on Social Impact	Reflects thoughtfully on the potential positive impact of the project on society and willingness to raise awareness, providing meaningful insights into the experience of working for a social benefit.	The reflection on social impact is cursory or lacks depth, requiring further exploration of the project's societal implications and the experience of contributing to social good.