Universität Zürich[UZH]

Master's Project Market · Fall 2025

Nathan Labhart, Academic Coordinator

Projects and presentations by: Pascal Andermatt, Selene Baez Santamaria, Jürgen Bernard, Dominik Frauchiger, Aman Kumar, Martin Lacayo-Emery, Noah Mamié, Nasim Nezhedsistani, Dohyun Park, Marinja Principe, Pooja Rani, Malaiappan Srinivasan, Dario Stähelin, Xiao Tan, Piotr Wojtaszewski.

Picture generated with Copilot

Important to know: The Master's Project…

… is a **group project** of 2 to 5 members.
If you are a group of two and one person has to cancel, the whole project has to be canceled.

… must be done **with an IfI professor**.
You may be required to have passed certain modules. External co-supervision may be possible.

… is carried out with **scientific methods**, requires **final report**.
And usually a presentation or demonstration of the solution.

… yields 15 ECTS Credits.

… is ideally carried out during the summer break; **max. 1 year** to complete.
Usually 6 months (part-time), 3 months (full-time). Start date depends on context and supervisors.

Read the Fact Sheets:
ifi.uzh.ch/studies > MSc: While studying

Master's Project: Procedure

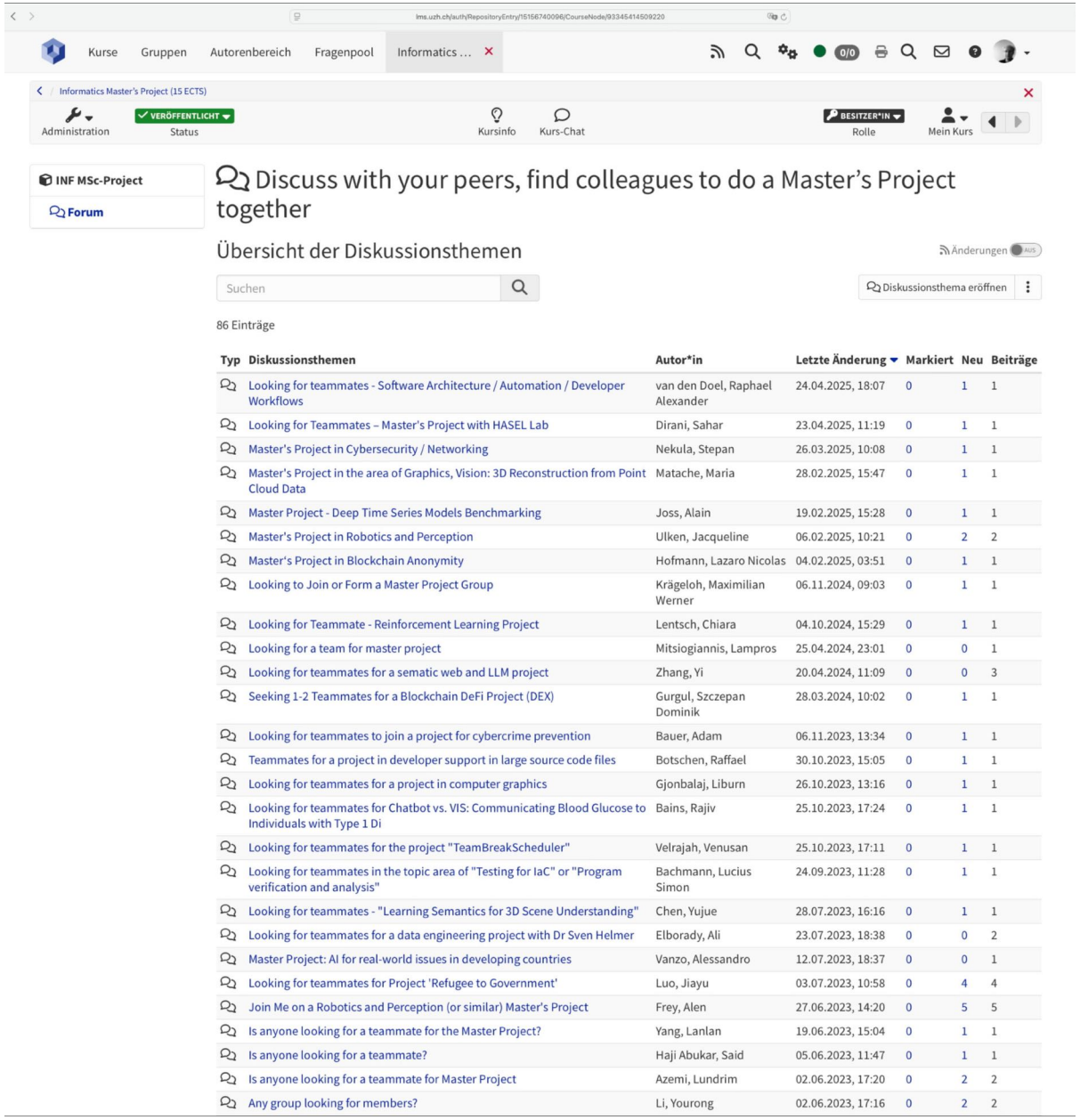
1. Find a project: Here at the Master's Project Market, on the individual group pages at IfI, or in OLAT http://t.uzh.ch/yi

2. Build groups (find peers here, in OLAT, …)

3. Meet with supervisor and submit the registration form.

4. Start.

Read the Fact Sheets:
ifi.uzh.ch/studies > MSc: While studying



Typ	Diskussionsthemen	Autor*in	Letzte Änderung	Markiert	Neu	Beiträge
	Looking for teammates - Software Architecture / Automation / Developer Workflows	van den Doel, Raphael Alexander	24.04.2025, 18:07	0	1	1
	Looking for Teammates – Master's Project with HASEL Lab	Dirani, Sahar	23.04.2025, 11:19	0	1	1
	Master's Project in Cybersecurity / Networking	Nekula, Stepan	26.03.2025, 10:08	0	1	1
	Master's Project in the area of Graphics, Vision: 3D Reconstruction from Point Cloud Data	Matache, Maria	28.02.2025, 15:47	0	1	1
	Master Project - Deep Time Series Models Benchmarking	Joss, Alain	19.02.2025, 15:28	0	1	1
	Master's Project in Robotics and Perception	Ulken, Jacqueline	06.02.2025, 10:21	0	2	2
	Master's Project in Blockchain Anonymity	Hofmann, Lazaro Nicolas	04.02.2025, 03:51	0	1	1
	Looking to Join or Form a Master Project Group	Krägeloh, Maximilian Werner	06.11.2024, 09:03	0	1	1
	Looking for Teammate - Reinforcement Learning Project	Lentsch, Chiara	04.10.2024, 15:29	0	1	1
	Looking for a team for master project	Mitsiogiannis, Lampros	25.04.2024, 23:01	0	0	1
	Looking for teammates for a sematic web and LLM project	Zhang, Yi	20.04.2024, 11:09	0	0	3
	Seeking 1-2 Teammates for a Blockchain DeFi Project (DEX)	Gurgul, Szczepan Dominik	28.03.2024, 10:02	0	1	1
	Looking for teammates to join a project for cybercrime prevention	Bauer, Adam	06.11.2023, 13:34	0	1	1
	Teammates for a project in developer support in large source code files	Botschen, Raffael	30.10.2023, 15:05	0	1	1
	Looking for teammates for a project in computer graphics	Gjonbalaj, Liburn	26.10.2023, 13:16	0	1	1
	Looking for teammates for Chatbot vs. VIS: Communicating Blood Glucose to Individuals with Type 1 Di	Bains, Rajiv	25.10.2023, 17:24	0	1	1
	Looking for teammates for the project "TeamBreakScheduler"	Velrajah, Venusan	25.10.2023, 17:11	0	1	1
	Looking for teammates in the topic area of "Testing for IaC" or "Program verification and analysis"	Bachmann, Lucius Simon	24.09.2023, 11:28	0	1	1
	Looking for teammates - "Learning Semantics for 3D Scene Understanding"	Chen, Yujue	28.07.2023, 16:16	0	1	1
	Looking for teammates for a data engineering project with Dr Sven Helmer	Elborady, Ali	23.07.2023, 18:38	0	0	2
	Master Project: AI for real-world issues in developing countries	Vanzo, Alessandro	12.07.2023, 18:37	0	0	1
	Looking for teammates for Project 'Refugee to Government'	Luo, Jiayu	03.07.2023, 10:58	0	4	4
	Join Me on a Robotics and Perception (or similar) Master's Project	Frey, Alen	27.06.2023, 14:20	0	5	5
	Is anyone looking for a teammate for the Master Project?	Yang, Lanlan	19.06.2023, 15:04	0	1	1
	Is anyone looking for a teammate?	Haji Abukar, Said	05.06.2023, 11:47	0	1	1
	Is anyone looking for a teammate for Master Project	Azemi, Lundrim	02.06.2023, 17:20	0	2	2
	Any group looking for members?	Li, Yourong	02.06.2023, 17:16	0	2	2

Master’s Project presentations
1 minute each, 15 seconds in-between

The slides will be uploaded later this afternoon.

http://t.uzh.ch/yi

Ready… set…

Aman Kumar, Jürgen Bernard:
Personalized Ranking: Human Preference Elicitation for Multi-Criteria Decision Making

Personalized Ranking: Human Preference Elicitation for Multi-Criteria Decision Making

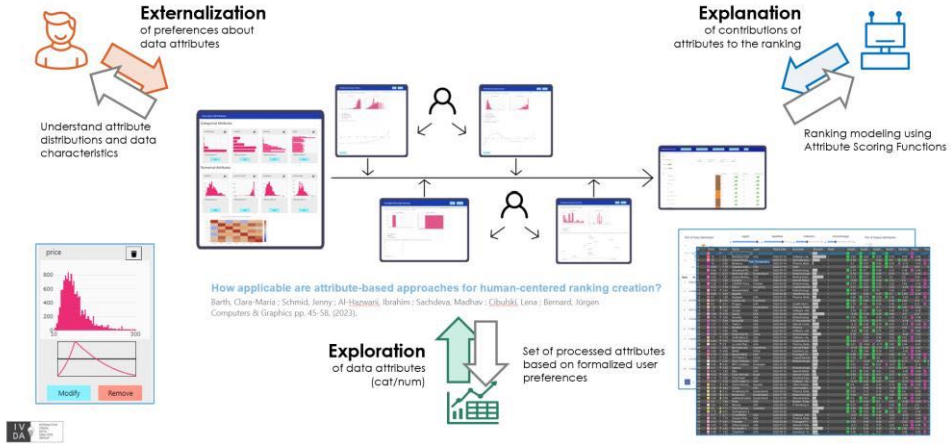
Master Project | (Master's Thesis)

Motivation: Ranking is everywhere!

1. Everyday decisions require ranking thousands of items by multiple, conflicting criteria.
2. **Item-based:** People give feedback on item preferences
3. **Attribute based:** People give feedback on multiple criteria.

Approach

1. Build visual interface that combines **item** and **attribute** feedbacks.
2. Develop a **visual interface** with coordinated views, ranking algorithm/ML or AI algorithms, instant rank updates, explanations and conflict highlights for all feedback.
3. Modelling: learning from items → attributes; and attributes → items.
4. Evaluate the tool with a user study.



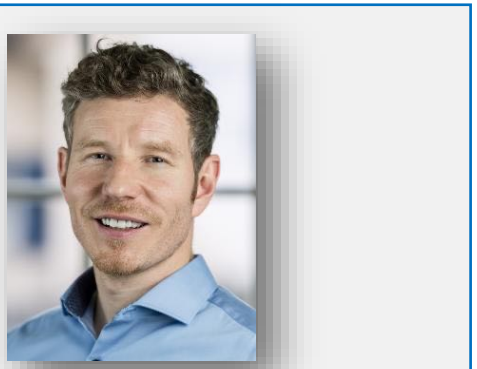
Source: Schmid, J., Cibulski, L., al Hazwani, I., & Bernard, J. (2022). RankASco: A Visual Analytics Approach to Leverage Attribute-Based User Preferences for Item Rankings. International Workshop on Visual Analytics, 2022-June, 7–11. https://doi.org/10.2312/eurova.20221072

Apply at aman.kumar@uzh.ch and juergen.bernard@uzh.ch

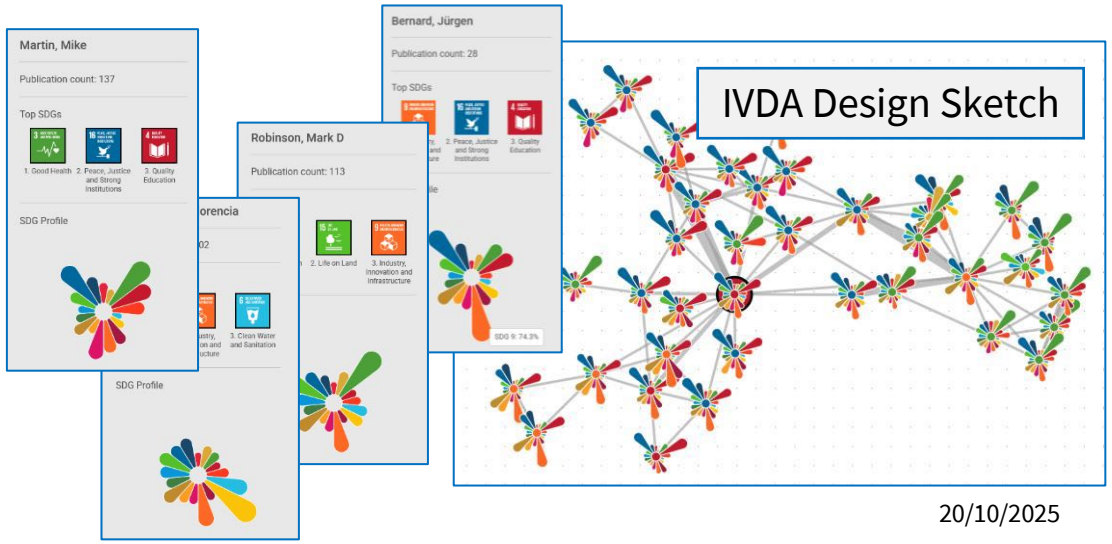
Jürgen Bernard:
Sustainability Impact of UZH Research

Sustainability Impact of UZH Research

- **Motivation**
  - The 17 UN SDGs are a prominent taxonomoy for sustainability development and impact
  - The 17 SDGs are also used „metrification“ and „classification“
  - How does our university impact sustainability?
- **Goal of the Project: „SDG Author Scout“**
  - *Explore* co-author networks
  - *Find* peers with similar SDG impact/interest
  - *Identify* experts with different SDG competencies for interdisciplinary collaboration
- **Data**
  - 200000 UZH publications
  - AI-Based SDG scoring



Jürgen Bernard
juergen.bernard@uzh.ch



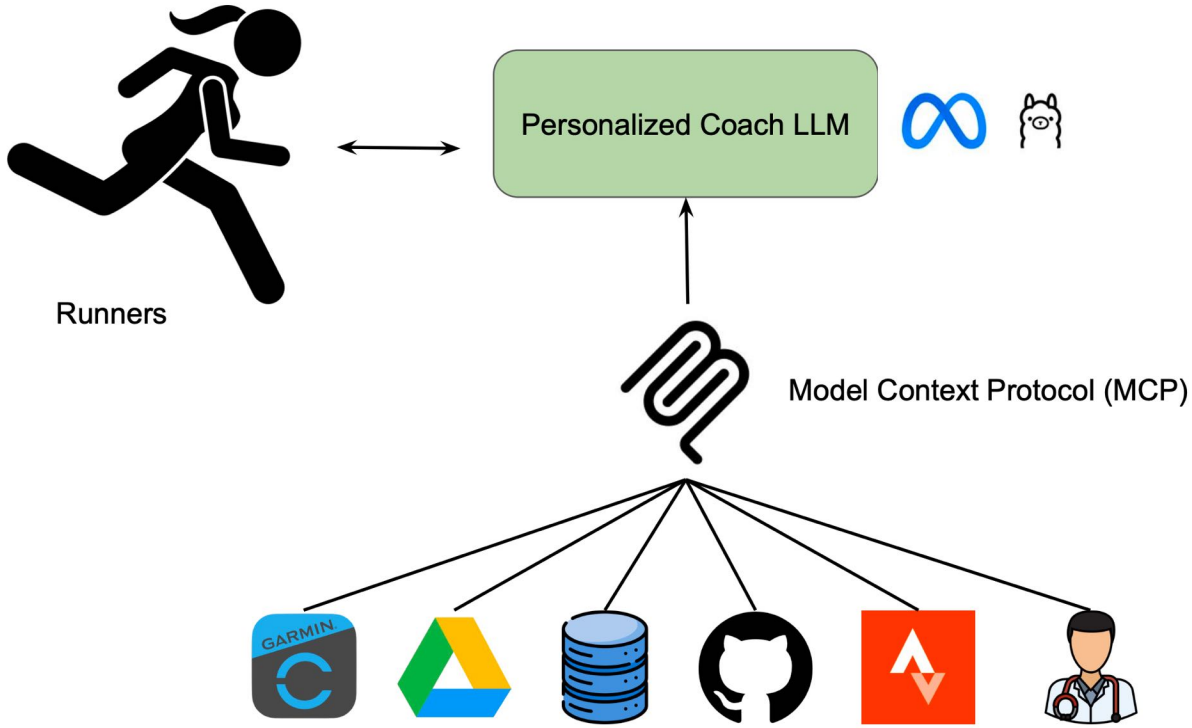
Dohyun Park, Piotr Wojtaszewski: Personalized AI coaching system for runners

Personalized AI coaching system for runners

- **Motivation**
  - AI-based digital coach for runners
  - Personalized, conversational, context-aware
- **Tasks**
  - Frontend/backend system with **interactive dashboard**

    ➔ visualize running data
  - Context-aware coaching model (**MCP-based LLM**)

    ➔ Python-based, wearable sensor data
- **Contact**
  - Dohyun Park, dohyun.park@uzh.ch
  - Piotr Wojtaszewski, piotrmaciej.wojtaszewski@uzh.ch
  - Supervised by Prof. Bernard



IVDA INTERACTIVE VISUAL DATA ANALYSIS

Martin Lacayo-Emery:
A Scalable Interactive Visual Data Analysis for Semantic Corpora

A Scalable Interactive Visual Data Analysis for Semantic Corpora

Motivation:
- **Added value** from digital scholarly editions (DE) data
- **Unification** of 60 DE in a web framework

Problem:
- **Integration** of heterogenous corpora non-trivial
- **Magnitude** of scaling significant

Tasks:
- **Assess** capabilities of prototype
- **Identify requirements** for scaling
- **Design and develop** new features
- **Validate** prototype in a user study

Martin Lacayo & Gregor Bachmann

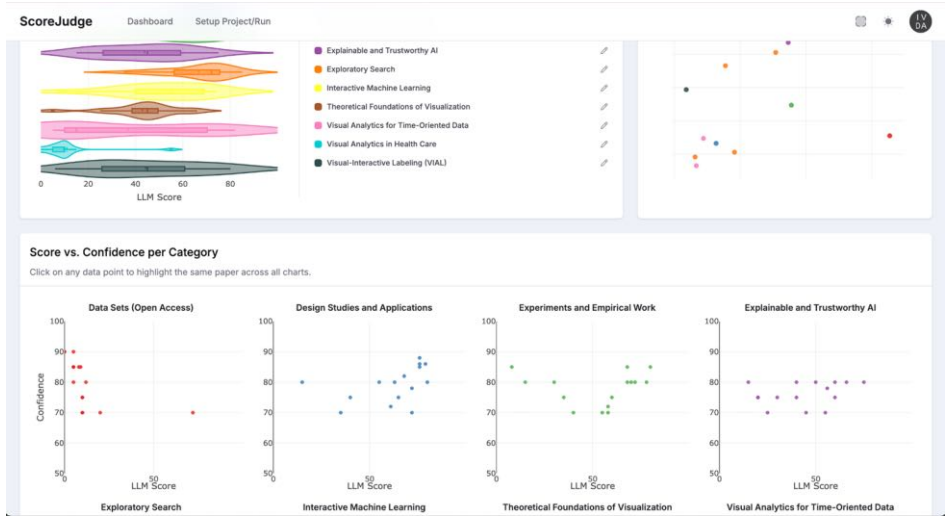
Interactive Visual Data Analysis Group

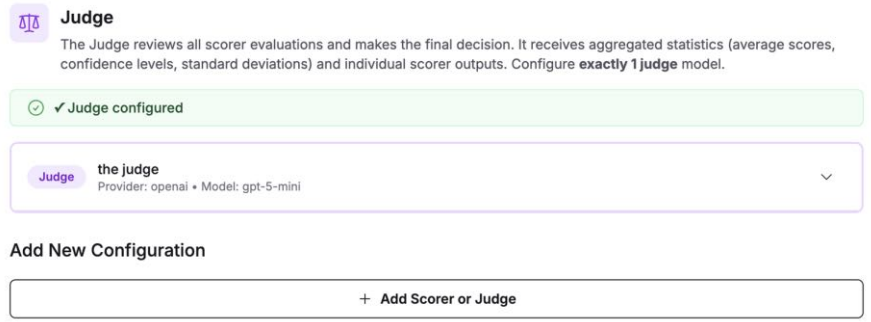
mlacayo@ifi.uzh.ch

Jürgen Bernard, Yves Rutishauser:
Iterative Human-In-The-Loop LLM-based Data Generation and Validation

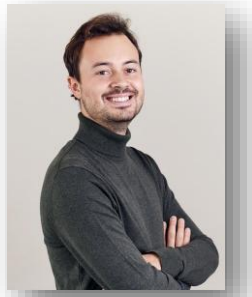
Iterative Human-In-The-Loop LLM-based Data Generation and Validation

- **Motivation**
  - LLMs can generate data attributes, like scores and ratings
  - Outputs vary across prompts, models, and runs
  - Manual validation is urgently needed but expensive
  - Need for a systematic way to compare and validate LLM ratings
- **Goal of the Project: „ScoreJudge“**
  - *Develop* an iterative LLM validation framework
  - *Compare* runs across models, prompts, and datasets
  - *Integrate* human-in-the-loop checks for sample-based validation
  - *Apply* the framework for interesting cases (sustainability scoring etc.)






Jürgen Bernard
juergen.bernard@uzh.ch


Yves Rutishauser
rutishauseryves@gmail.com

Malaiappan Srinivasan, Nasim Nezhadsistani: Wireless Intrusion Detection Semantic Process Tracing

Wireless Intrusion Detection
Semantic Process Tracing

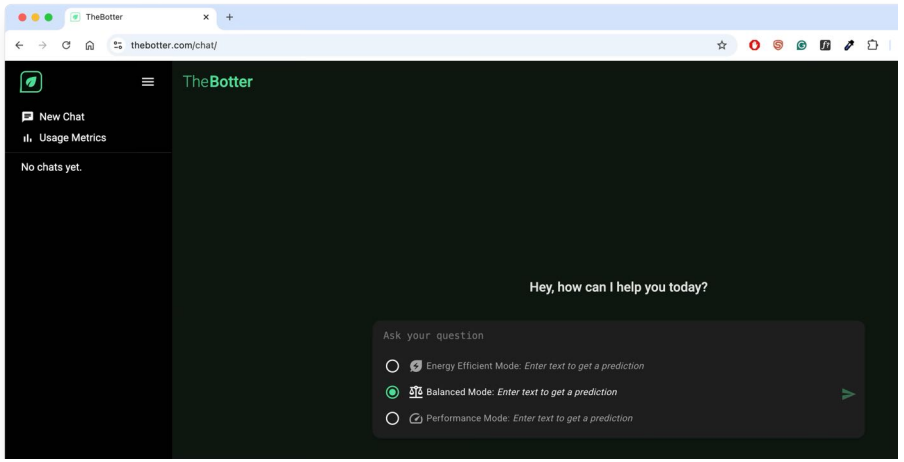
- Trace intrusion decisions in Wireless Sensor Networks (WSNs) with semantic clarity and explainable reasoning
- Problem
  - Lack of transparent and explainable reasoning behind alerts
  - Increasing attack complexity and multi-stage scenarios
  - Difficulty tracing how and why detection decisions are made
  - Reduced trust, auditability, and operational response.
- Approach
  - Design a semantic Petri net engine to model attack progression
  - Build a domain-specific knowledge graph encoding sensor behavior and threat patterns
  - Integrate a query engine to evaluate semantic conditions
  - Simulate WSN attack scenarios and generate explainable traces
  - Evaluate detection accuracy and reasoning clarity against baselines
- *Toward transparent, trustworthy, and auditable intrusion detection for security-critical WSN environments*

Contact: **Nasim Nezhadsistani** | Communication Systems Group (CSG), University of Zurich
Email: **Nezhadsistani@ifi.uzh.ch**

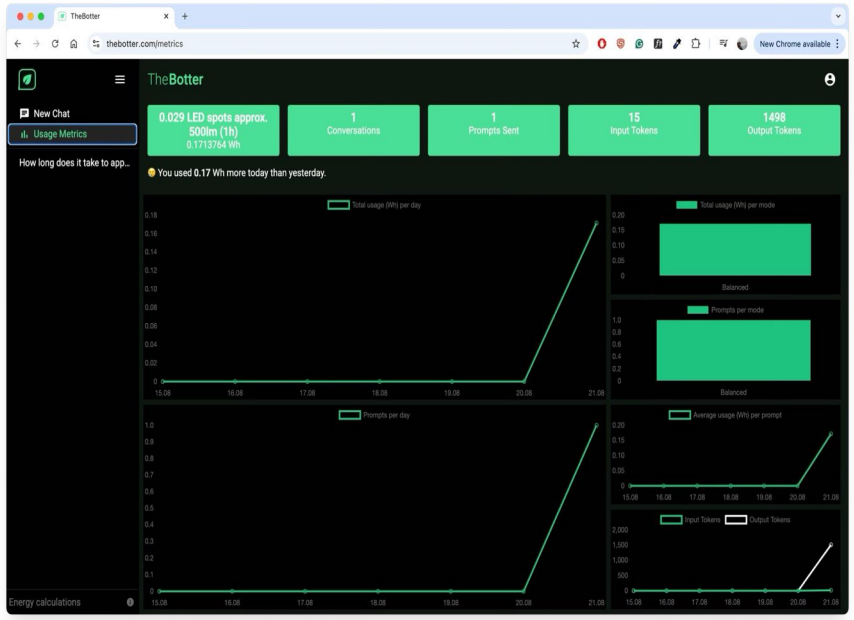
Pooja Rani:
Green Software Engineering: Sustainability-aware AI chatbot

Green Software Engineering: Sustainability-aware AI chatbot

About: As the use of AI chatbots like ChatGpt are increasing, so the concerns related to their energy consumption. We want to explore ways to increase user awareness and reduce their energy consumption



- **Task**:
  - Introduce effective prompt strategies to reduce energy consumption
  - Improve sustainability-oriented features like the dashboard to reduce the number of conversations
  - Identify more features to raise the awareness of the users regarding chatbot sustainability



- **Technical Requirements:** Angular, Python, LLM API integration, visualization-related libraries
- **Related Work:** DynamoLLM, GreenPT
- **More details:** https://www.ifi.uzh.ch/en/seal/teaching/master/projects/Sustainability-aware-AI-Chatbot.html

Dominik Frauchiger, Dario Stähelin: Co-Pilot in long-term Care

Co-Pilot in long-term Care

About the project

The Co-Pilot in long-term care is a digital support system for nursing staff that accompanies the entire nursing process.
The goal is to optimize and professionalize nursing documentation and processes, thereby freeing up resources and enhancing care quality.

Available Masters Project

- Create a first *functional* prototype of an **AI-supported diagnosis tool**, which helps nurses to assess the health of their patients using nursing reports.
- (**Context-aware Retrieval-Augmented Generation** for nursing knowledge.)*

Who We Are Looking For

- A highly motivated development and research team, capable of working autonomously.
- Knowledge of web technologies is required.
- Python and React.js knowledge is preferred.
- Capability to work closely with nurses to elicit and evaluate the requirements for the chosen project.

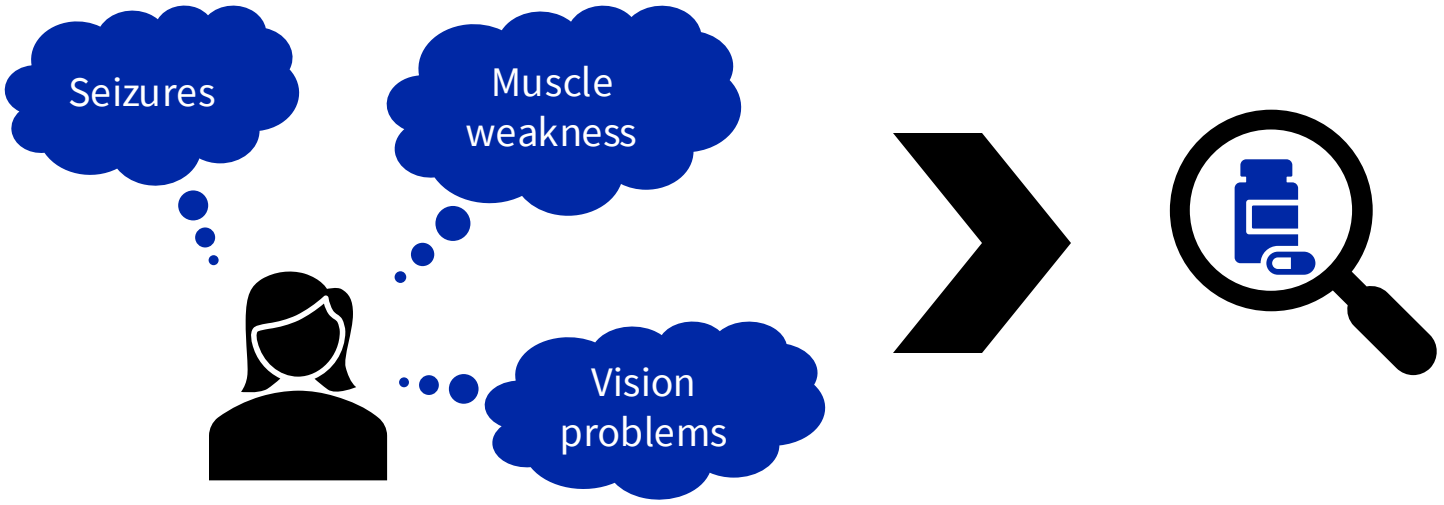
Contact us

Dario Stähelin (darioluca.staehelin@uzh.ch)
Dominik Frauchiger (dominik.frauchiger@uzh.ch)

*availability not guaranteed yet

Pascal Andermatt:
RareSim: Diagnosing Patients with Rare Diseases

RareSim: Diagnosing Patients with Rare Diseases



Goal: Compute similarity between patient and disease profiles

- Create, train, and benchmark existing methods
- Develop your own method using rare disease ontologies
- Build an ensemble of similarity measures
- Visualize symptoms in the ontology

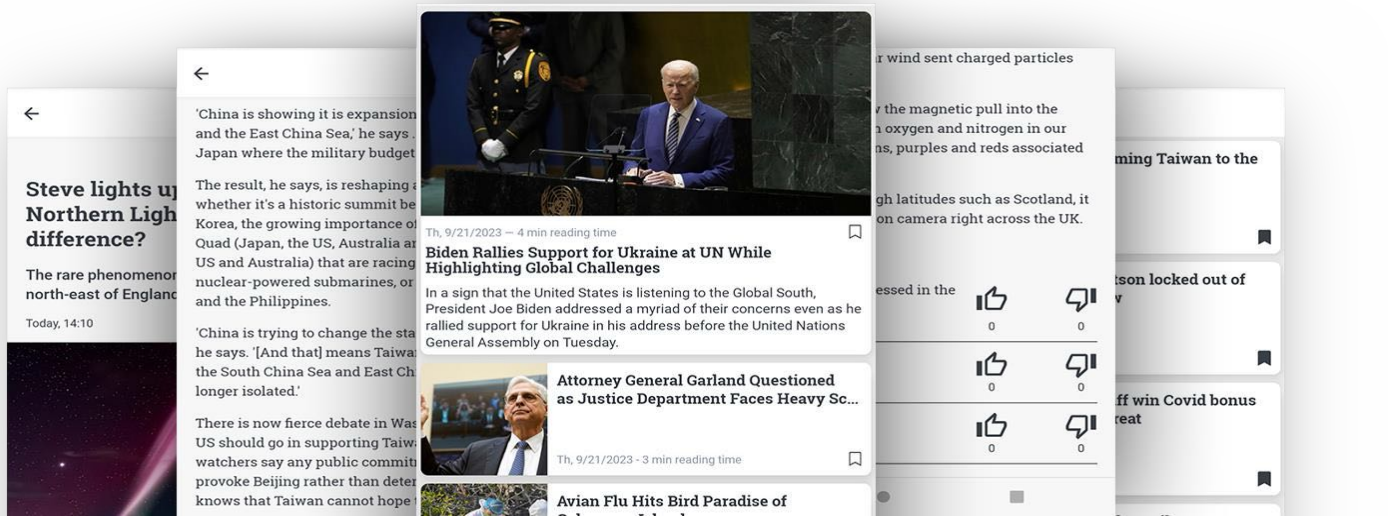
Requirements: Strong Python skills
Major in AI, SoSys
3-4 students

Start: Mid February

Contact: Pascal Andermatt
pandermatt@ifi.uzh.ch

Noah Mamié:
Designing Multi-Modal and Interactive News Experiences

Designing Multi-Modal and Interactive News Experiences



Goal: Multi-modal news recommender platform development

— Build on the existing Informfully.ch news recommendation platform
— Develop interactive features for enhanced user engagement
— Explore different news presentation modes (e.g., text, images, audio)
— Deploy generative AI models on a real-world platform

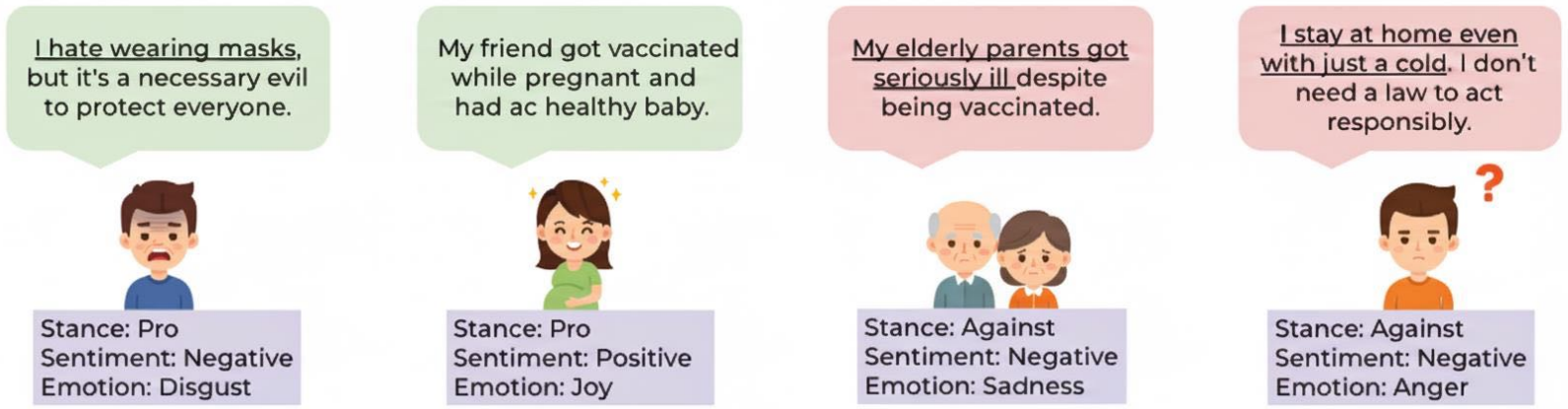
Requirements: Strong full stack skills
Major in SoSys, AI
3-4 students

Start: Mid February

Contact: Noah Mamié
nmamie@ifi.uzh.ch

Selene Baez Santamaria:
Extracting Emotions and Narratives in Political Dialogue

Extracting Emotions and Narratives in Political Dialogue



Goal: To elicit (rather than control) emotional attitudes and personal narratives related to political stances

— Implement and compare emotion recognition, sentiment classification, and narrative extraction models
— Benchmark pre-trained LLMs performance to elicit explanations for political stances
— Design adaptive prompting strategies that adjust to the emotional dialogue history

Requirements: Strong Python skills
Major in AI, SoSys
3-4 students

Start: Mid February

Contact: Selene Baez Santamaria
selene.baezsantamaria@uzh.ch

Marinja Principe:
A Life Course Approach for Menstrual Health Technology

A Life Course Approach for Menstrual Health Technology

Women's Health Gap → Low menstrual health literacy and awareness, and how cycle phases and physical, mental, and social well-being interact

Opportunities:

… Menstrual Health Technology usage **by minors** and how to improve menstrual health literacy at a young age

… Menstrual Health Literacy and Awareness **at the workplace** (e.g., organizations, universities)

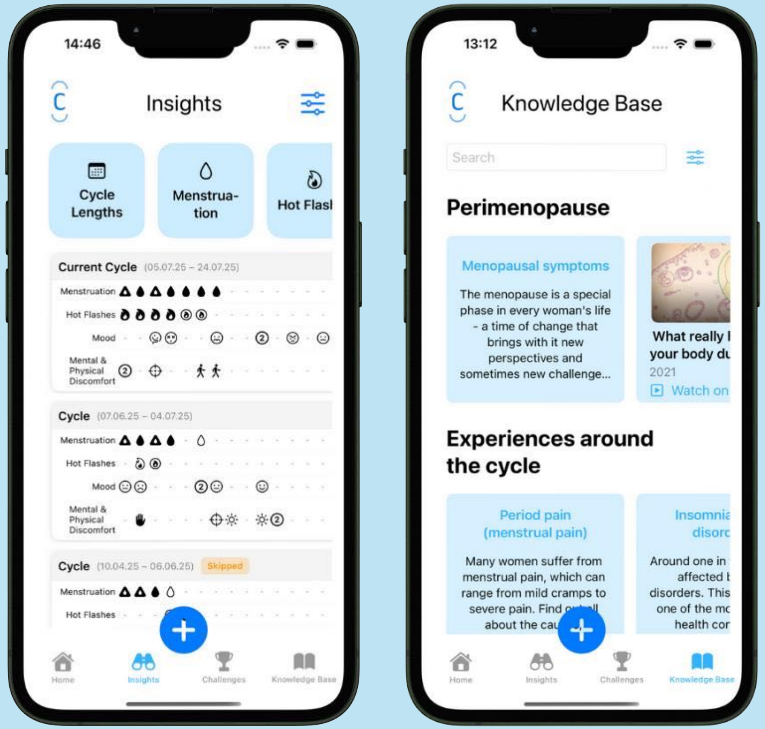
… Pitch your **own ideas**!

Contact us: marinja.principe@uzh.ch

CyMe [si:][mi:]:
A Life Course Approach in Menstrual Health Technology

Project description

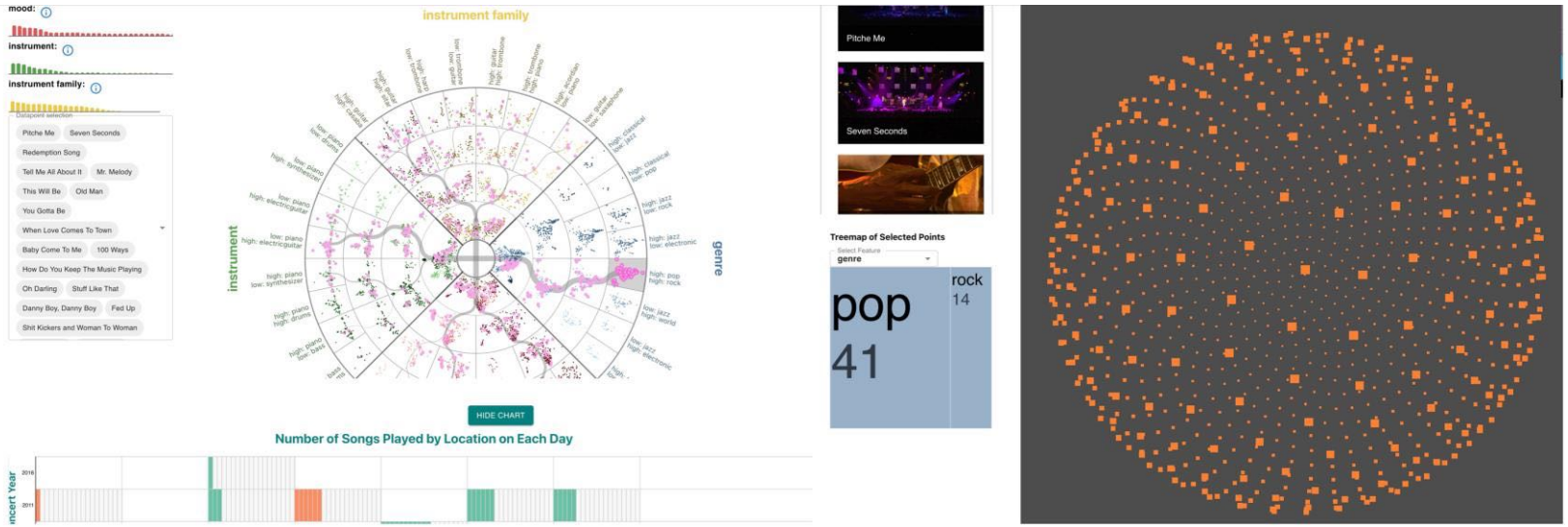
Project code



Xiao Tan:
SnakeTrees WebGPU/WebGL Implementation

SnakeTrees WebGPU/WebGL Implementation

- The existing system is built using JavaScript and Python
- Re-implement the visualization layer, with WebGPU or WebGL and D3.
- Experience in programming with C++ and JavaScript/TypeScript.



Email: xtan@ifi.uzh.ch

Xiao Tan:
Interactive 3D Exploration of Large Video Dataset

Interactive 3D Exploration of Large Video Dataset

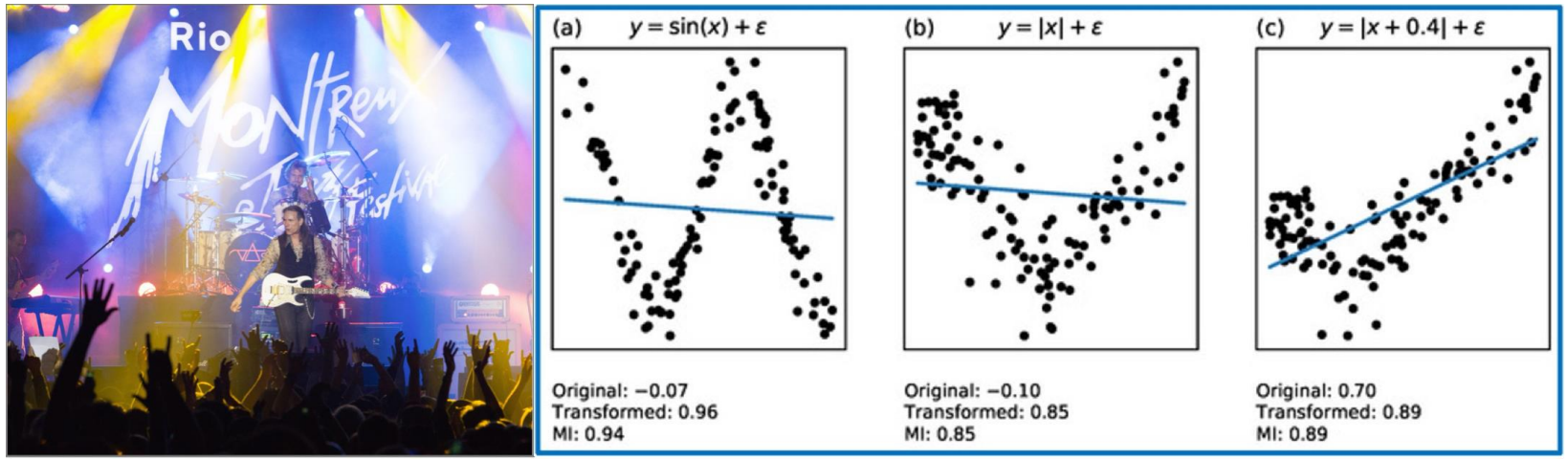
- The system is built using Unreal Engine5 and the C++ programming language.
- Improve existing interaction functionality and provide more exploration pathways.
- Experience in programming with 3D or game engines.

Email: xtan@ifi.uzh.ch

Xiao Tan:
Music Similarity Based on Multivariate Correlation

Music Similarity Based on Multivariate Correlation

- Develop a framework for measuring music similarity based on multivariate correlation analysis of audio features
- Evaluate the similarity measures against trained networks as well as ground-truth labels.
- Experience in programming with Python.



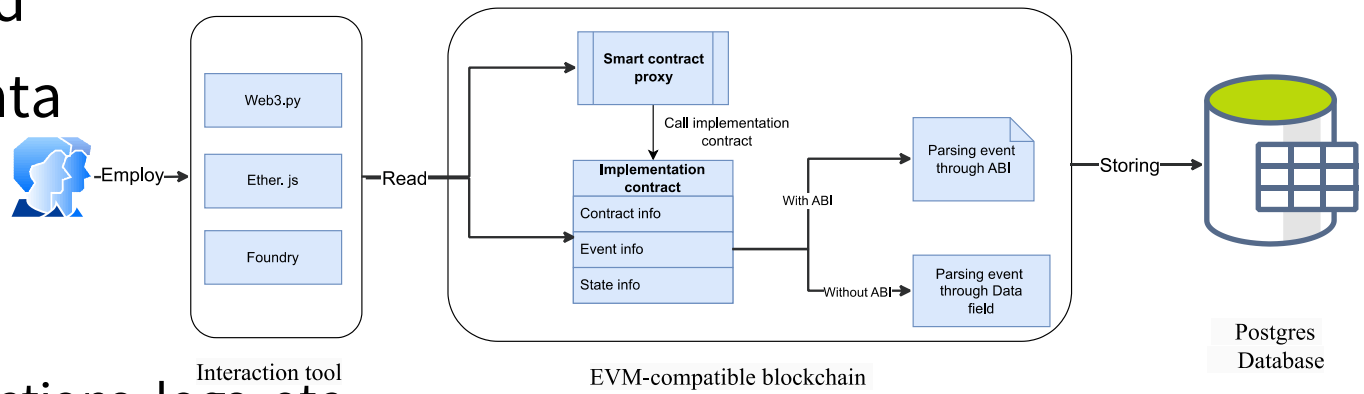
Email: xtan@ifi.uzh.ch

Tao Yan:
A Generalized Pipeline for Blockchain Data ETL

A Generalized Pipeline for Blockchain Data ETL

Collection and organization of blockchain data is challenging due to the large volume and Lack of standardized tools.

This project aims to build a generalized and scalable ETL framework for blockchain data that supports multiple EVM-compatible blockchains:



—Standardizes retrieval of key data: blocks, transactions, logs, etc.

—Integrates components for: Streaming, Storage, Caching, Synchronization

If you would like to explore big data management on blockchain, please contact Tao Yan for further elaboration: yan@ifi.uzh.ch

-Yan, T., Li, S., Kraner, B., Zhang, L., & Tessone, C. J. (2025). A Data Engineering Framework for Ethereum Beacon Chain Rewards: From Data Collection to Decentralization Metrics. Scientific Data, 12(1), 519.

-https://github.com/uzh-eth-mp/app

Tao Yan:
Detecting Cross-Chain Transactions and Anomalies on EVM-Compatible Blockchains

Detecting Cross-Chain Transactions and Anomalies on EVM-Compatible Blockchains

Layer-2 blockchains such as Polygon and Optimism enhanced the scalability of Ethereum, but the cross-chain transactions lack transparency and traceability.

— Our previous work developed an algorithm to trace cross-chain transactions between Ethereum and Polygon, this project aims to extend the methodology to multiple EVM-compatible blockchains.

— Incorporate anomaly detection techniques to identify suspicious cross-chain behaviors.

— Examine stablecoin flows across different blockchains to understand their role in cross-chain liquidity.

Please contact Tao Yan for further elaboration: yan@ifi.uzh.ch

- Yan, T., Huang, C., & Tessone, C. (2025). Tracing Cross-Chain Transactions Between EVM-Based Blockchains: An Analysis of Ethereum-Polygon Bridges. Ledger, 10, 113–134. https://doi.org/10.5195/ledger.2025.433

End of Master’s Project presentations

Interested in a project? Talk to representatives and form groups!

The slides will be uploaded later this afternoon.

http://t.uzh.ch/yi

Good luck with your Master's Project!

For administrative questions: studies@ifi.uzh.ch

Picture generated with Copilot