Uptrendz: API-Centric Real-Time Recommendations in Multi-Domain Settings

Emanuel Lacic
ELACIC@KNOW-CENTER.AT

Tomislav Duricic
TDURICIC@KNOW-CENTER.AT

Leon Fadljevic
LFADLJEVIC@KNOW-CENTER.AT

Dieter Theiler
DTHEILER@KNOW-CENTER.AT

Dominik Kowald
DKOWALD@KNOW-CENTER.AT

KNOW Center

FAIR AI (FAI)

cogsteps

THE UPTRENDZ PLATFORM

Multi-domain support [1]:
- **System-level:** Data belongs to distinct system and is stored separately
- **Item-level:** Domains have different data types (e.g., items) which may share some attributes
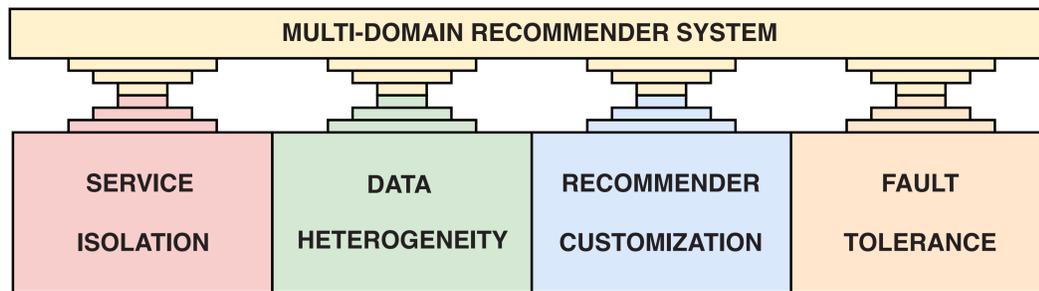
Microservices-based system architecture. Provides a layer on top of the ScaR [2] framework to **dynamically configure** an application domain and to instantly **provide an API** to:

- Upload data about **items**
- Upload data about **users**
- Upload the corresponding **interaction** data
- Request **recommendations**

Domain-specific data model. The underlying algorithm needs to unambiguously know which **source of information** should be used to calculate the recommendations. The Uptrendz platform allows generating **customized data upload APIs** for multiple **item** and **user** entities with the following data types:

Type	Sub-Type	Description
Categorical Text	Single Value	String value, which usually represents a category. Used for **post-filtering** recommendation results.
	Multiple Values	List of string values, which usually represent an array of categories. Used for **post-filtering** recommendation results.
Free Text	English	**English text**, which is processed and utilized for **content-based** recommendations.
	German	**German text**, which is processed and utilized for **content-based** recommendations.
Numeric	Integer	Used for **post-filtering** recommendations (e.g., user age).
	Real	Used for **post-filtering** recommendations (e.g., price).
Date	-	Date information for the respective entity (e.g., creation date)

The **customized interaction API** can support **registered** users, **anonymous sessions** or both. It also supports defining an **unrestricted amount** of **explicit** and **implicit** interaction types.

DEMO WALKTHROUGH: SYSTEM LEVEL DOMAIN

Goal: Create a **real-time movie recommender** and use it in an **API-centric** for an **online setting**.
Code: `https://github.com/lacic/ECIR2023Demo`

API Setup:
- Create a movie domain on the **system-level**
- Configure what meta-data is available for **movies**
- Configure what meta-data is available for **users**
- Configure that we are using **explicit rating interactions**
- Customize **recommendation scenarios** with appropriate algorithms and post-filtering logic

ITEM-LEVEL DOMAIN

Entrepreneurial start-up founding. Need to define **recommendable entities** which users can interact with on the Cogsteps platform:

D1: Co-founder candidates that should be matched with a startup-idea.
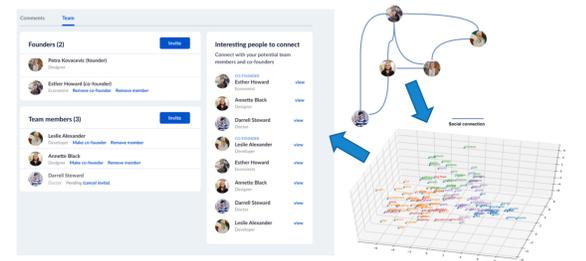
D2: Innovations to be discovered by incubators, innovation hubs, and accelerators.
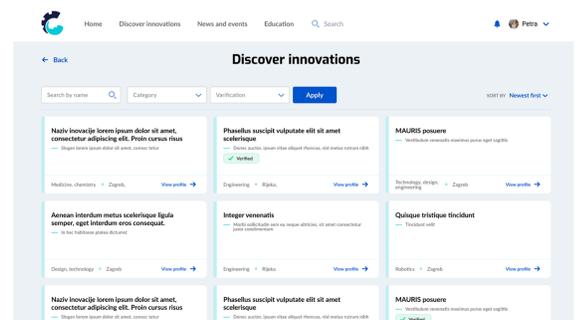
D3: Educational materials until the innovation idea matures enough to form a start-up.
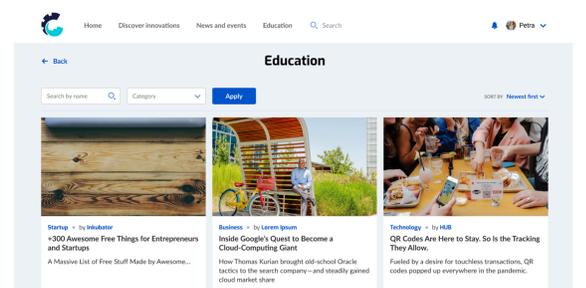
Recommender customization. Defining a recommendation scenario involves configuring a specific algorithm on the data of a respective item-level domain (e.g., innovations).

REFERENCES

[1] Lacic, E., Duricic, T., Fadljevic, L., Theiler, D., Kowald, D. (2023). *Uptrendz: API-Centric Real-time Recommendations in Multi-Domain Settings*. In Proceedings of the 45th European Conference on Information Retrieval (ECIR'2023).

[2] Lacic, E., Kowald, D., Parra, D., Kahr, M., Trattner, C.: *Towards a scalable social recommender engine for online marketplaces: The case of apache solr*. In: Workshop Proceedings of WWW'2014. pp. 817–822 (2014)