The Role of Emerging Predictive IT Tools in Effective Migration Governance

"Advancing Data-Driven Decision-Making in Migration Management"
EMN Georgia and EMN Estonia
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ITFLOWS project summary

Provide accurate predictions on migration (and asylum flows)

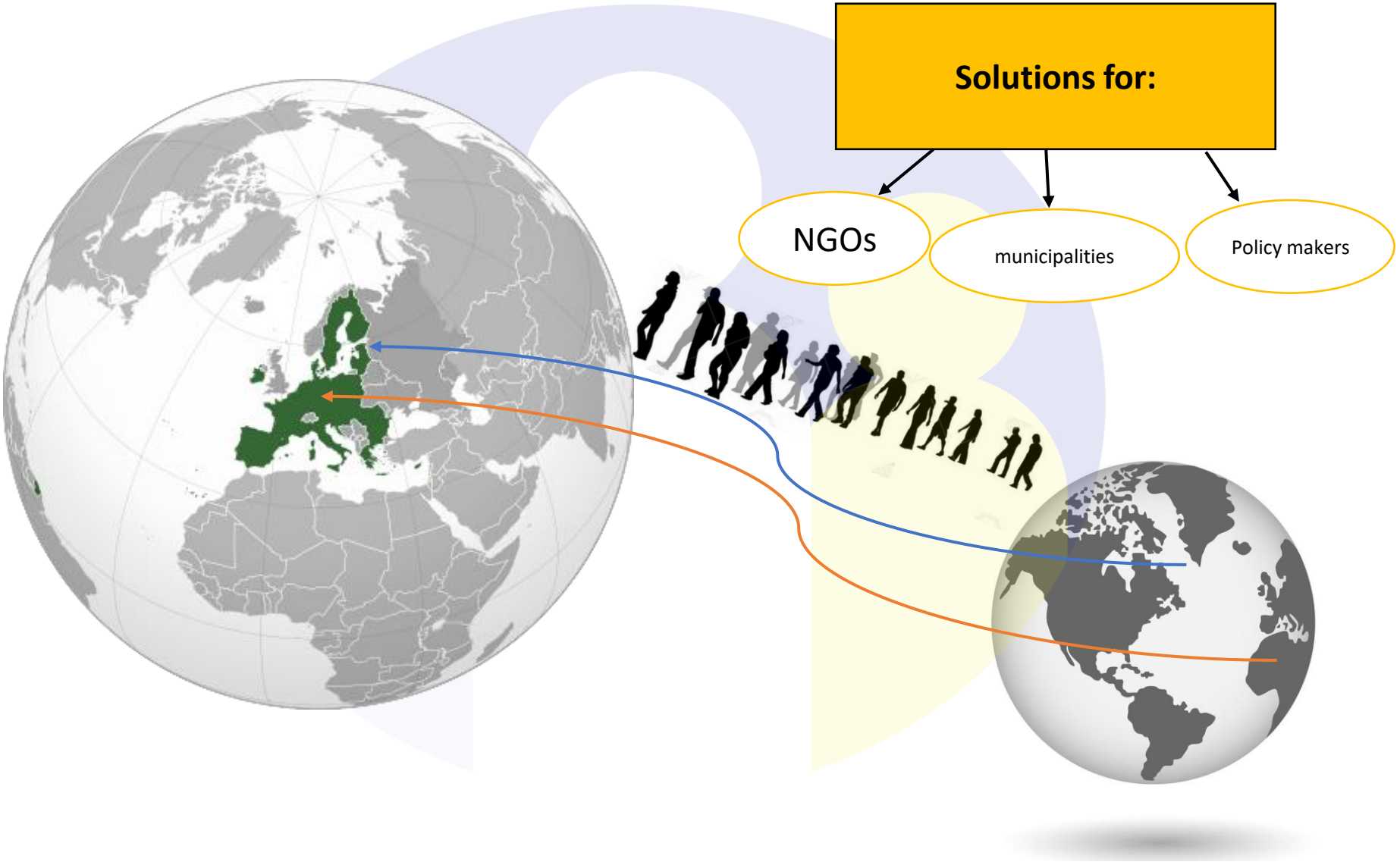
Provide policy solutions for the management of migration and integration of refugees in the EU

Propose solutions for reducing potential conflict/tensions between migrants and EU citizens

KEY FACTS

- 36 months
- 14 EU Partners
- 8 EU Countries
- 1 IT-Tool

New technologies in migration governance/decision-making



Users Board

itflows
IT TOOLS AND METHODS FOR MANAGING MIGRATION FLOWS

GREECE

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BULGARIA

DENMARK

Policy Working Group

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DANISH REFUGEE COUNCIL

IOM's Global Migration Data Analysis Centre GMDAC

ICMPD
International Centre for Migration Policy Development

DSN

Looked at existing forecasting tools

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IT TOOLS AND METHODS FOR MANAGING MIGRATION FLOWS

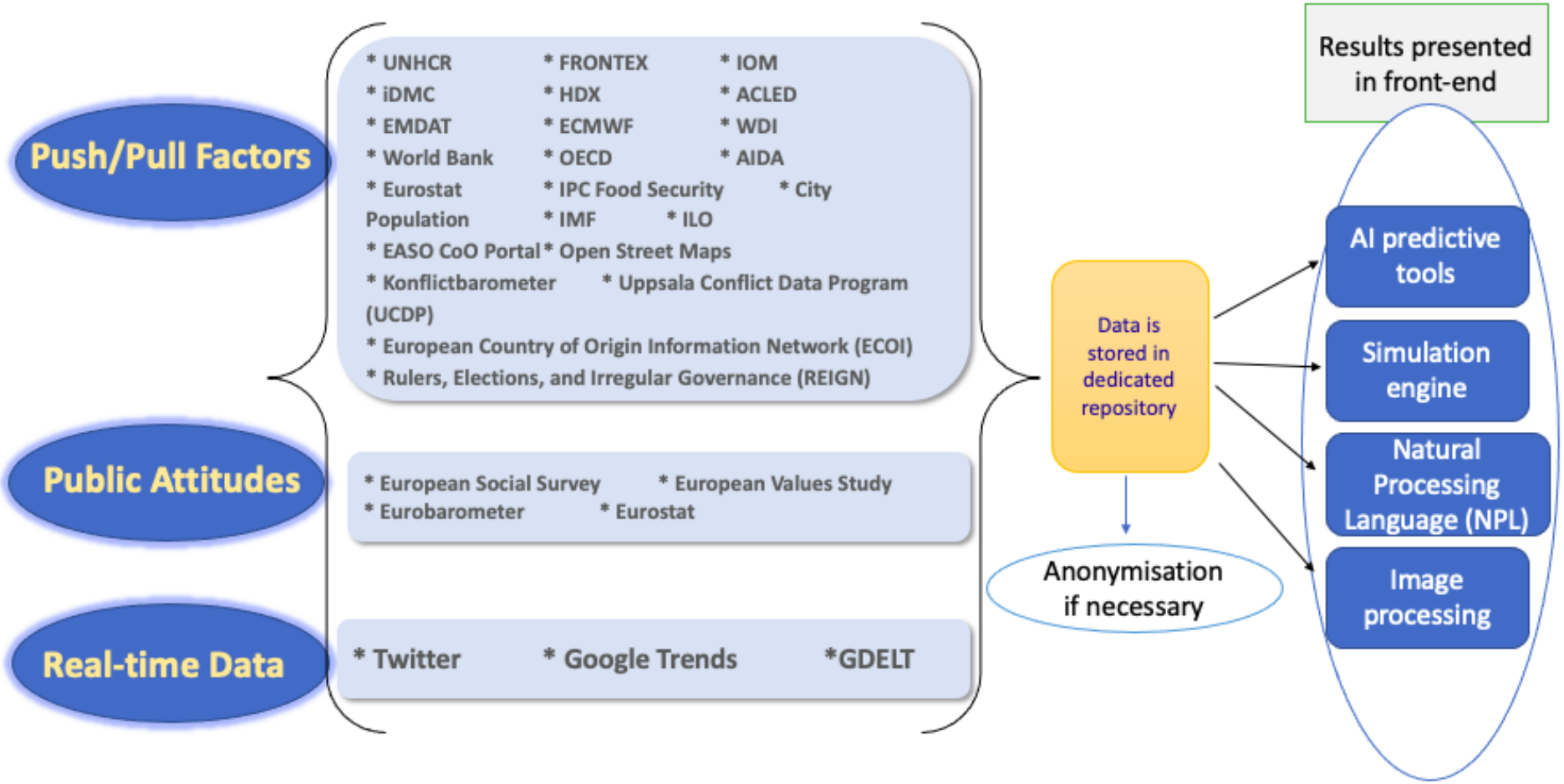
Jetson tool → funded and operated by UN High Commissioner for Refugees

Early Warning and Preparedness System tool (EPS-Forecasting) → funded and operated by the European Asylum Support Office

Foresight → currently funded and operated by Danish Refugee Council (DRC). Initially funded by Danish Ministry of Foreign Affairs, with the model and user interface developed in collaboration with IBM.

The EUMigraTool as part of ITFLOWS

Data sources + the EUMigraTool works



EUMigraTool architecture

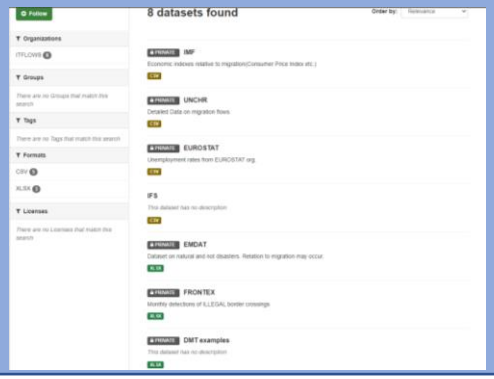
IT TOOLS AND METHODS FOR MANAGING MIGRATION FLOWS

Data

- Social media (e.g., Twitter)
- UNHCR data on migration
- Socio-economic factors
- Frontex migration data
- Google trends
- Media (video/text data)
- GDELT data
- Other data sources (TBD)

Data repository

- Processing/ clean-up
- Storage
- Preview
- Management
- Maintain/update

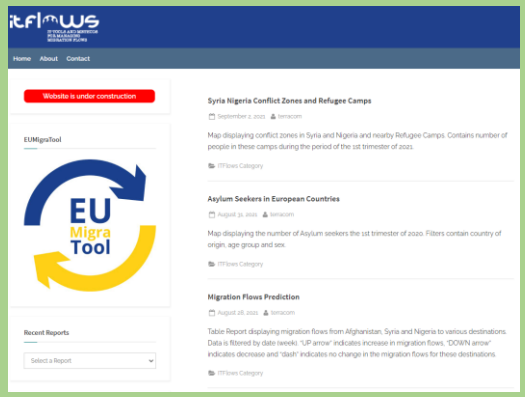


Back-end

- Data analytics
- AI models training
- Simulation engine
- Statistics/reports creation

Front-end

- Advanced visualizations
- Predictions – simulations results
- Customizations (focus on specific areas, topics…)
- Integration – risk of tensions analysis



Models

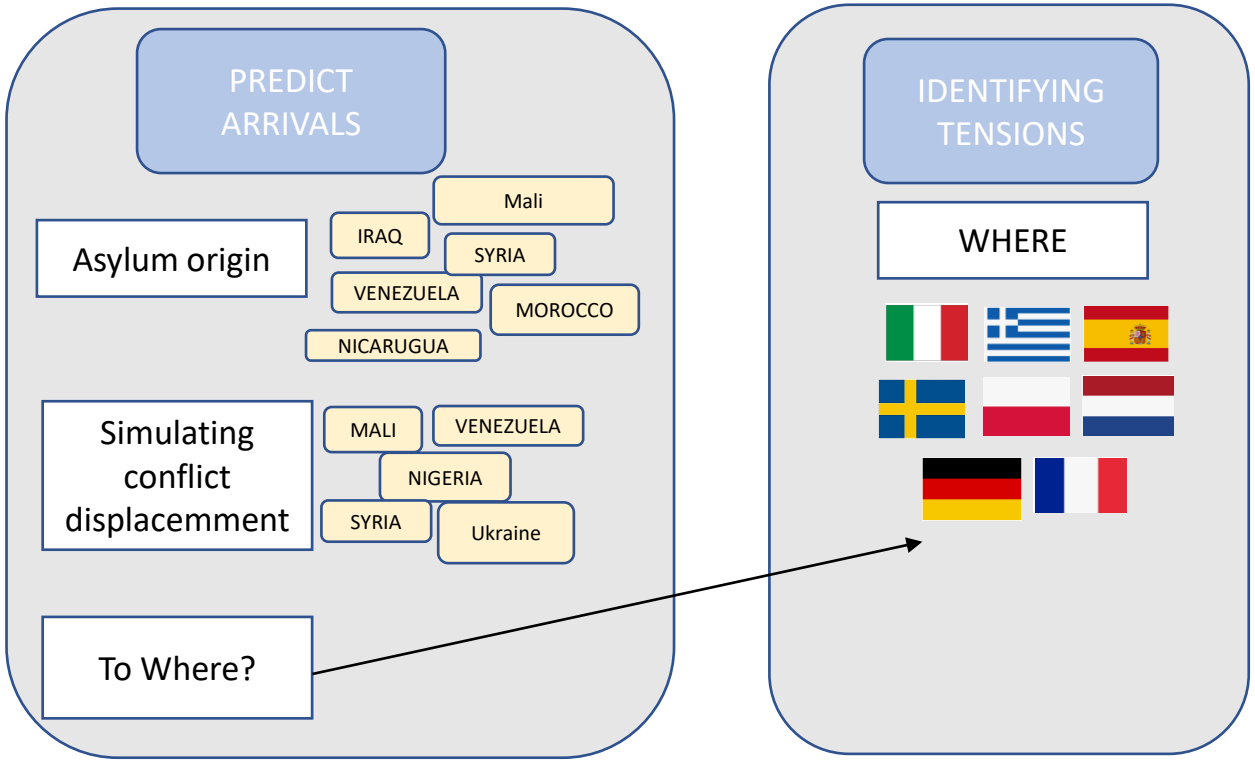
Large scale model

- The Large-Scale Model (LSM) monthly predictions of asylum applications in the EU for a variety of bilateral (i.e., from country of origin to the EU Member State) cases.
- State of the art machine learning approaches, including neural network architectures and time series analysis. correlation analysis between raw data sources and simulation.
- Provides intuitions on attitudes towards migration among populations in all European destination countries, using the Twitter Sentiment Analysis model data as input, and the most influential or relevant determinants of attitudes towards migration.
- Inputs and methods : Topic Modeling by monitoring national press; asylum seeker data from Eurostat (the official EU statistics office); the output files of the agent-based simulation of the EMT's Small Scale model; and output files of asylum application forecasts of the Google Trends Analytics model.

Small scale model

- The Small-Scale Model (SSM) distribution of incoming asylum-seekers/unrecognised refugees arriving to neighbouring countries of conflict origins.
- Generalised and automated simulation development approach and the Flee agent-based simulation code, optimised for simplicity and flexibility.
- Data from the United Nations High Commissioner for Refugees (UNHCR), the Armed Conflict Location and Event Data Project (ACLED), OpenStreetMap and population data using the City Population database or other population sources.
- Conflict model is constructed, run and validated by comparing the simulation results to the existing camp registrations obtained from UNHCR.

Case study countries



EUMigraTool homepage

e EUMIGRATOOL (EMT)

The EMT is a **solution-oriented tool** with two main functions:

(I) **Predicting migration flows**

(II) **Detecting risks of tensions related to migration**

Currently supported functionalities

itflows
IT TOOLS AND METHODS FOR MANAGING MIGRATION FLOWS

twitter

Attitudes in EU countries

Estimated using Twitter data

Tweets that are related to migration are processed and analysed

eurostat

Asylum seekers in EU countries

Using Eurostat data for now

Will improve it with AI models and additional data sources

Simulation for Syria & Nigeria camps

Simulating the number of refugees that are expected to arrive daily in specific camps in neighbouring countries (agent based simulations)

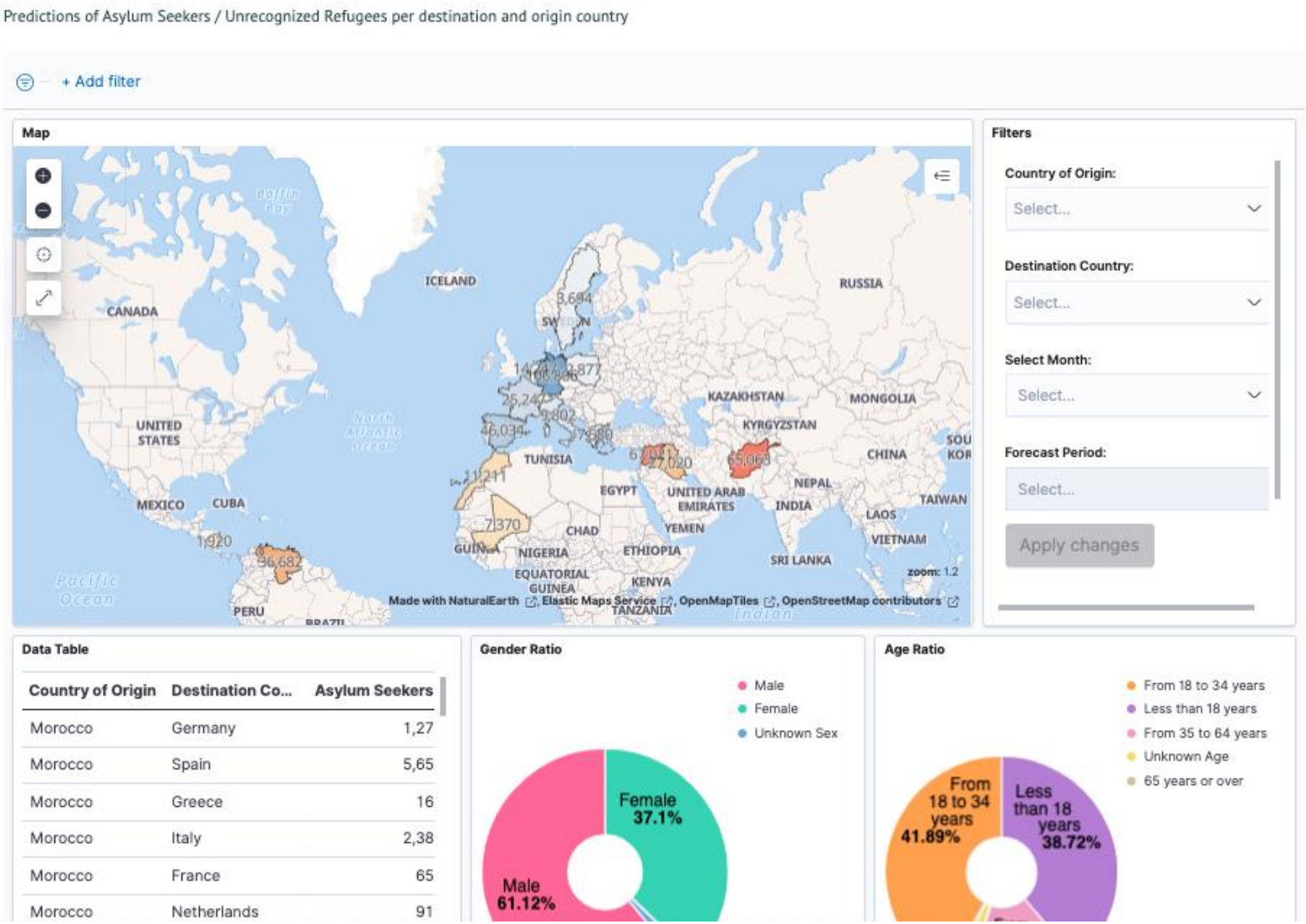
The GDELT Project

Flow predictions

Based on news articles processing

Indications of increate or decrease of migration flows across migration routes specified by FRONTEX

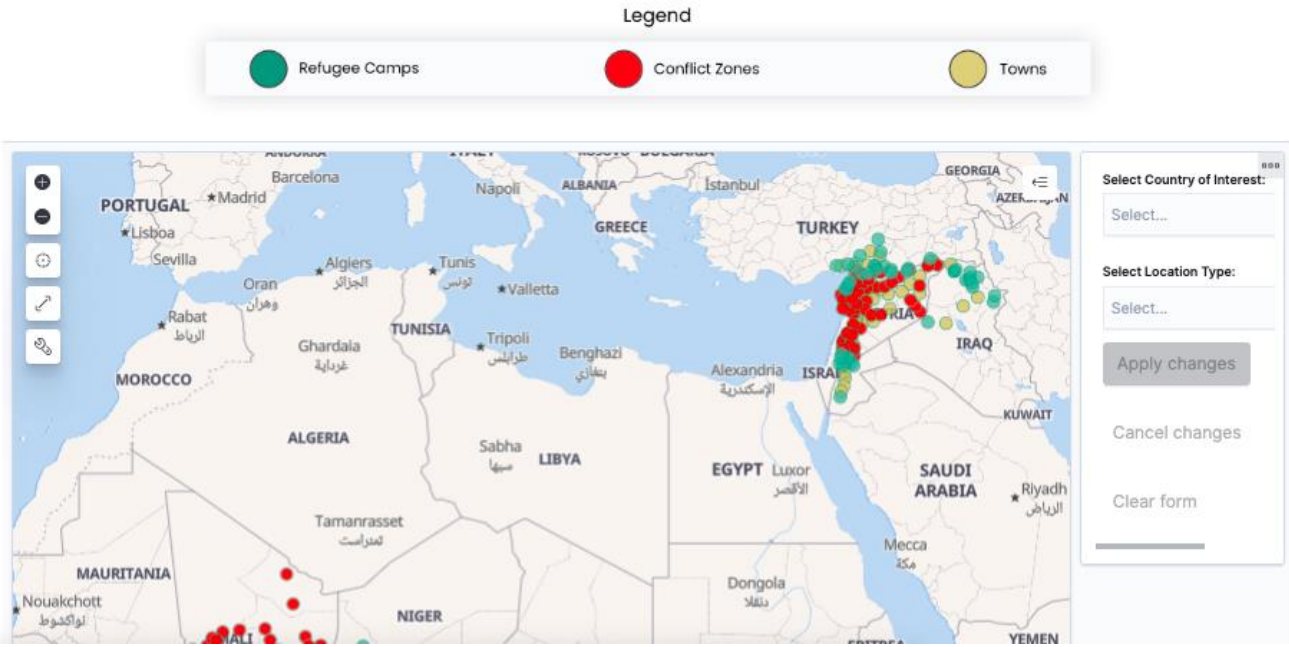
Predictions asylum seekers/unrecognised refugees



Displacement at origin function

1. Origin Countries with conflict locations and Asylum Seekers / Unrecognised refugee camps

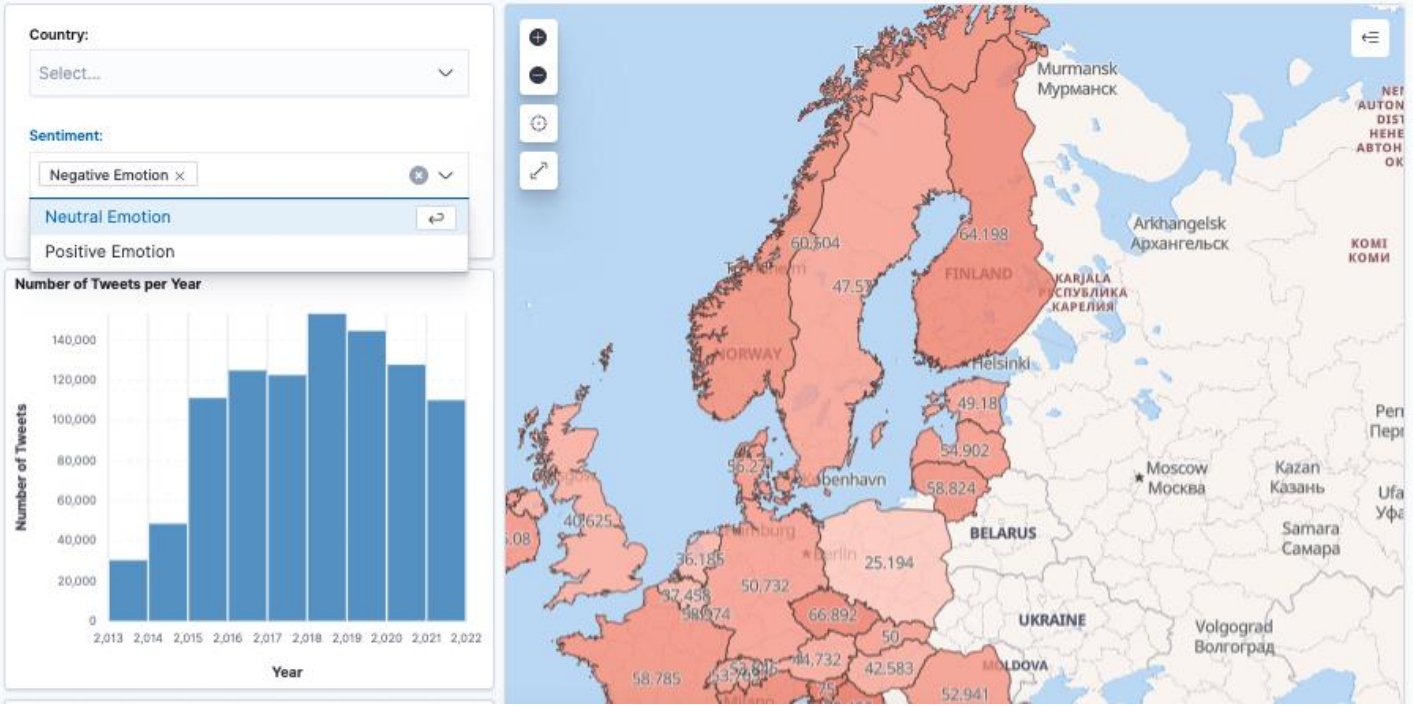
Map displaying conflict zones in various countries and nearby Refugee Camps. Contains number of people in these camps during the period 2016-2022.



Attitudes function

3. Attitudes based on Twitter analysis

Europe Map displaying percentage of tweets expressing sentiments (positive, negative and neutral sentiments) per Country for a period of time (2013 – 2022).



User Friendly /EMT End Users

Simple point-and-click operations

Help/tips integrated within the UI

Web-based application

Examples and guides on how to use the tool

No explicit technical background requirements

Fully customizable operations (data sources, parameters etc.)

Export comprehensive results/reports to printable format

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