ROXANNE - Real time network, text and speaker analytics for combating organized crime

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What is ROXANNE?

ROXANNE project combines the strengths of **speaker data mining, network analysis and video analysis** to provide Law Enforcement Agencies (LEAs) an efficient tool to track and uncover criminals and terrorists using:

- **Conversational nature of speech data.** If A speaks often to B, then detecting A on one side of the call will automatically increase the prior probability of B.

- **Call content.** Standard text-independent speaker identification ignores the content of the call, while a simple sentence "Peter speaking" can completely change the game. Speech-to-text engines will be deployed to generate relevant content information and combine it with acoustic speaker information.

- **Meta-information in link analysis.** Phone, IMEI numbers, geographical information, time-stamps of phone calls are available meta-information, but can be falsified (prepaid SIM cards, Internet anonymization services, etc).

- **Video and geographical meta-data processing.** Make use of other visual and spatial information (such as identifying faces, places, backgrounds) which may accompany the auditory and textual data.

- **Time-relation analysis.** The problem of a suspect not producing enough speech in a call can be turned into an advantage, as this speaker can be identified by the fact that he is speaking little. Hierarchy and trust can be also partially inferred from this analysis.

Keywords

Speech and speaker recognition (ASR, SRE), Natural Language Processing (NLP), Network Analysis (NA), Video Analysis (VA)

Common objectives

Deploy and evaluate the ROXANNE platform on real criminal cases, help the LEAs adopt the technology in their daily work, and comply with EU and INTERPOL legal and ethical frameworks through internal expert analysis and external ethics and stakeholder boards.

How it works?
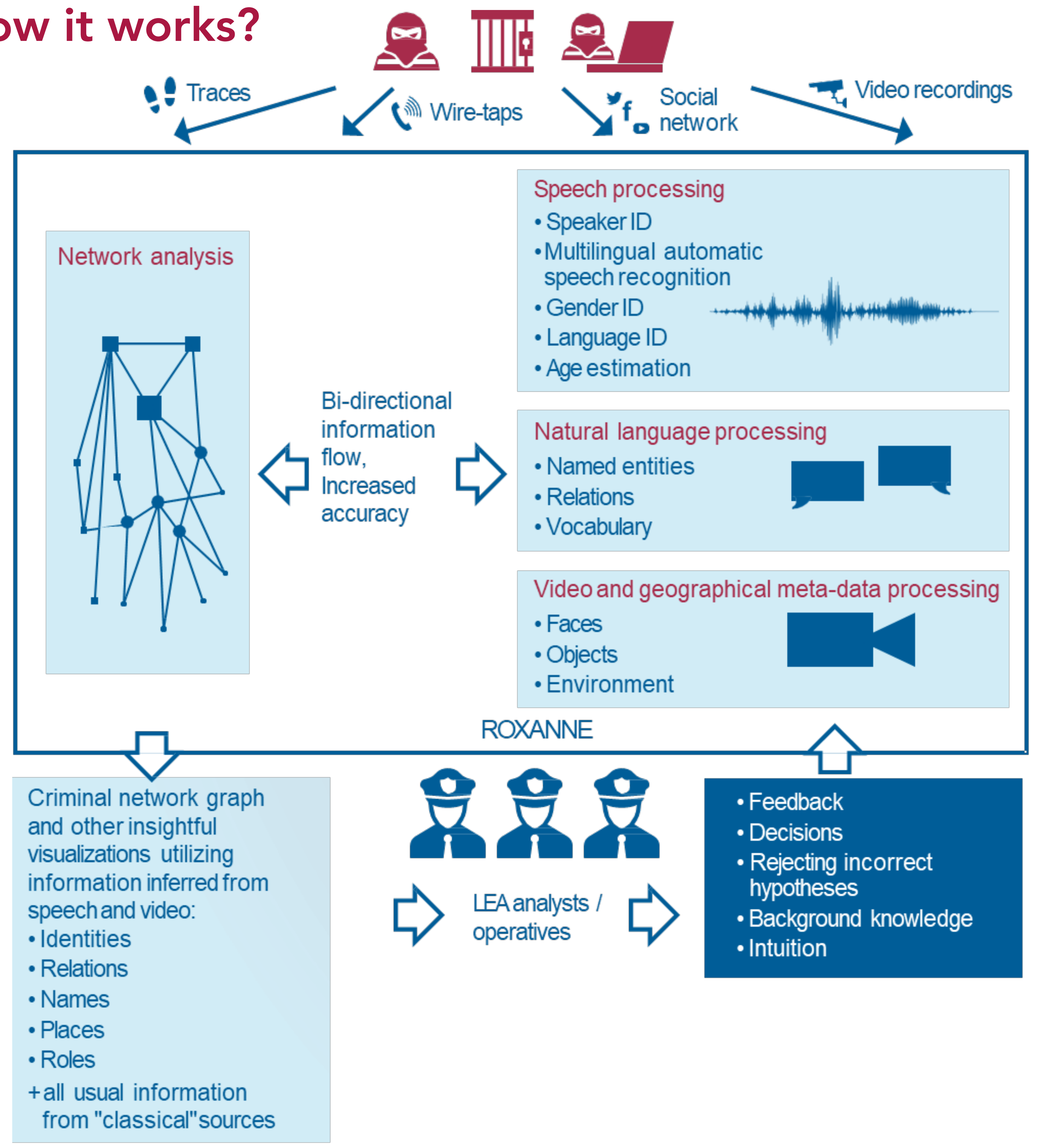
Current state

- Built V0 of the platform
- Created simulated data to evaluate our systems
- Most technologies are integrated in the current platform
- Research on SRE & Network Knowledge, Authorship Attribution on ASR transcripts, Topic Detection in Graphs, place and face diarization on videos…
- First field test with LEAs
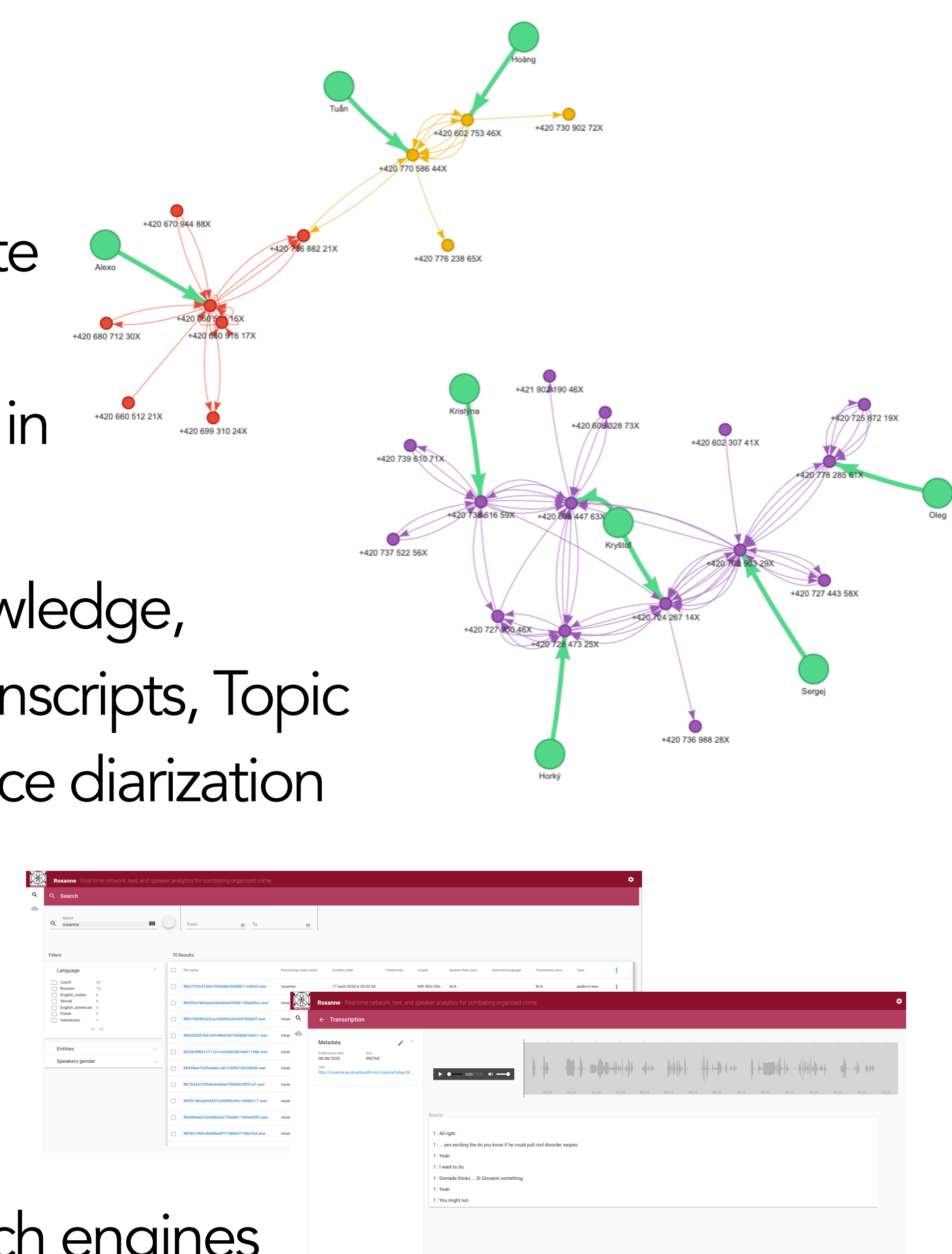
Next steps

- Adding more languages to speech engines
- Add/fine-tune technologies
- Evaluate the performance of ROXANNE on real LEA data
- Cross-disciplinary work on network analysis
- Prepare platform V1
- Additional research on technology fusion

LEAs

Academic

SMEs

Industry