EARS

Explainable recommendation systems that learn from each other

The ITEA project EARS (Environment Adaptive Recommendation System) will create a platform for cross-domain collaboration between recommendation systems (RS) while preserving user privacy, thereby enabling faster and more accurate recommendation services.

Addressing the challenge

Knowledge is crucial to success in any domain, but digitalisation has led to an information overload problem: an enormous amount of data across numerous categories and markets makes it difficult to find the right service or product. Recommendation systems offer a solution, but time and data are needed to train their algorithms. User engagement with the system is therefore a must, requiring mutual trust via reasonable and explainable solutions. However, an explainable RS is not enough in and of itself; it also needs a mechanism to make better recommendations while keeping data from different domains and algorithms private and secure.

Proposed solutions

To address this, EARS will develop efficient methods to make AI explanation information available to users and at differing levels, such as AI experts and system creators. This will be achieved via a federated framework with a multi-black box model that shares the outputs of recommencation systems and not direct data from users, thereby preserving privacy. Communication between cross-domain RS will be enabled via standardised application programming interfaces (APIs). Another key innovation will be the integration of location intelligence with knowledge graphs and explainable AI, which – in combination with the federated model concept – will position EARS beyond the state of the art. Following the platform's implementation, algorithm developers

will provide algorithms based on shared intellectual assets and register these as services through the platform. Likewise, RS developers will provide their assets as a service via the standardised APIs and learn from other recommendation systems using the federation approach.

in healthcare, for instance, RS are increasingly used to explore diagnosis and treatment options. While improvements will depend on the domain and number of collaborating recommendation systems, the consortium expects an increase of at least 10% in recommendation precision and at least 5% in RS efficiency compared to the respective baselines. In addition, new recommendation systems will enjoy quicker starts through the option to learn from other RS, while RS providers will be able to expand their business cases in a
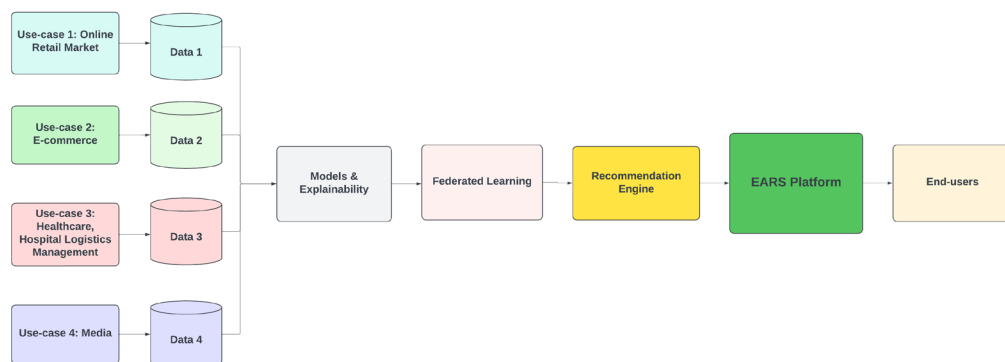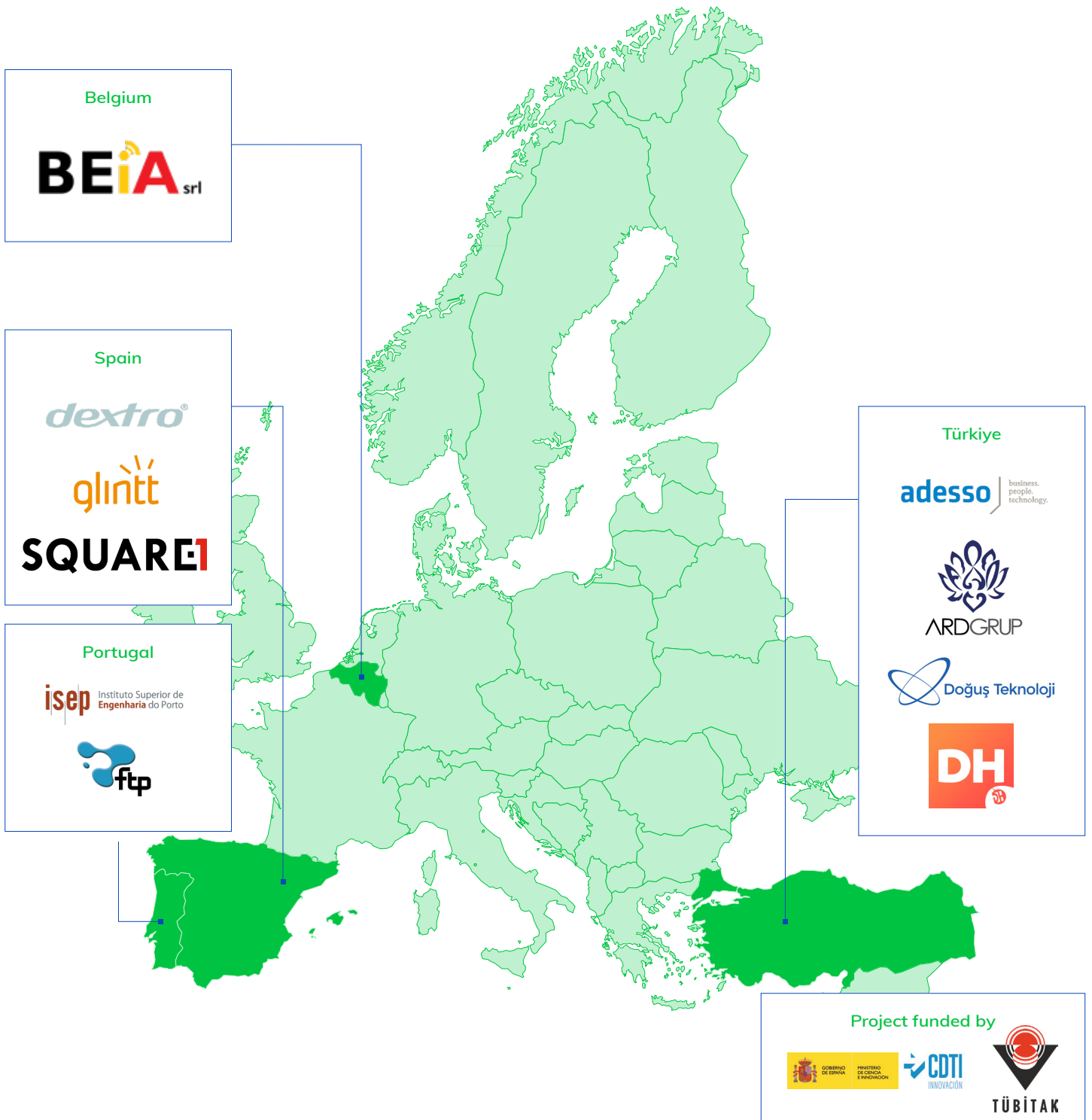

^ EARS Workflow Diagram

Projected results and impact

EARS' results will offer a solution to four major technological challenges:
1. enabling a federated, cross-domain approach to increase RS accuracy,
2. incorporating explainable capabilities to boost user engagement,
3. preserving data privacy between silos, and
4. allowing companies to benefit from shared intellectual assets on a central platform.

As the project's use-cases will demonstrate, the domains that can benefit extend far beyond retail:

global recommendation engine market worth USD 1.77 billion in 2020 and expected to grow at a 33% compound annual growth rate up to 2028. EARS therefore represents a major step from the traditional silo-based approach to the future of multi-domain RS.

Project partners

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