ITEA 4

Project Results

OMD

Optimal demand management with AI

To address the high demand for online service support, the ITEA project OMD (Optimal Management of Demand) has created a reference architecture, artificial intelligence (AI) models, and tools that help service providers allocate the best solutions to problems across a variety of domains.

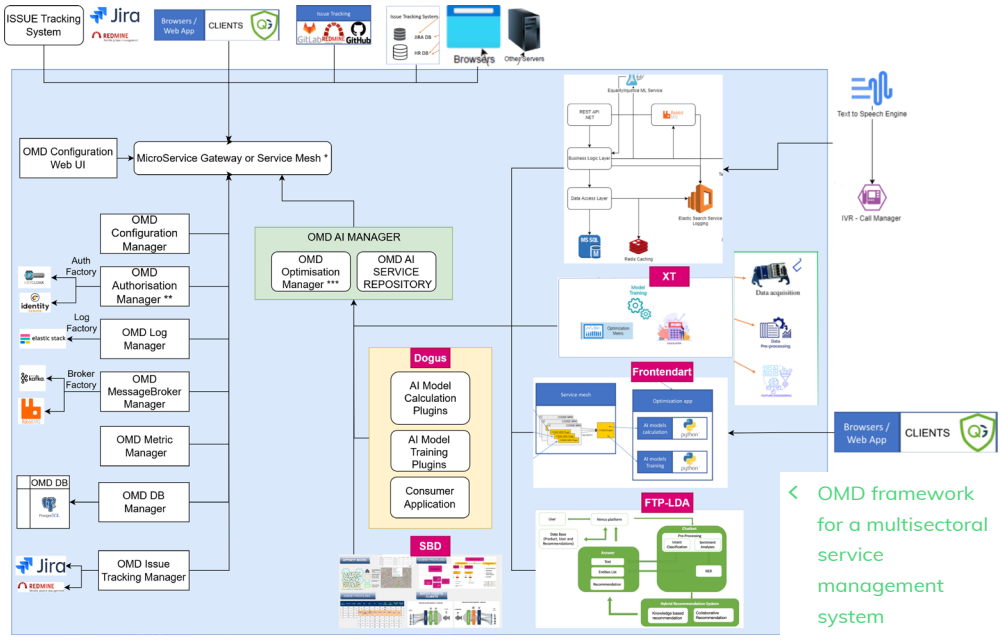
Online service support faces high demand, which has only increased in the remote working conditions of the COVID-19 pandemic. This translates into greater time pressure per customer request and introduces the need for automation, yet service desk management tools rarely incorporate AI capabilities that could enable this. A key reason is that mistakes in ticket categorisation or prioritisation can quickly lead to latencies, low productivity and unhappy customers. Advanced approaches are therefore needed to optimise demand management and resource usage accurately and effectively.

To enable this, OMD has created a series of tools in which AI models optimise service provider operations while functioning as decision support systems, including analytics dashboards for service desk management. Unlike existing methods that rely on human assessment of limited data, OMD's models process large-scale data from customers and service providers for global decision-making. This shortens the time taken to solve customer issues and reduces the cost of operations by avoiding repetition. These tools are further distinguished by their application to diverse sectors via use-cases on logistics and operations support, consumer electronics, healthcare, software support, software development, e-commerce, telemarketing, and judiciary.

Technology applied

The seven tools produced in OMD comprise various combinations of shared modules and technologies, united by a reference architecture for multi-domain service management. Each offers a recommendation function in which demands are received and processed with domain-specific models that utilise AI to respond to the needs of specific customers. To simplify ticket creation, for instance, deep learning is used for intent classification and entity recognition models automatically populate ticket fields. Optimisation models can then ensure the fastest and most cost-effective resolution of tickets by analysing incoming tickets against previously resolved cases to recommend solutions and assign the appropriate expert. Each use-case also features natural language processing (NLP), whereby AI models like BERT and Siamese Networks analyse unstructured customer input to generate structured, labelled data and automate responses before ticket creation.

Despite their commonalities, OMD has demonstrated a vast scope for such tools. The Equality in Justice tool, for example, offers automated, explainable and near-real-time attorney assignment based on location, expertise and availability. In healthcare, conversely, Speech2Service streamlines healthcare documentation using conversational AI to identify and suggest services during real-time nurse-patient dialogues, reducing administrative load. Additionally, OMD has created optimal demand assignment modules in the software domain, including an AI-supported IT support desk management module that classifies and optimises software support ticket assignment to the best experts (Tickota) and a software maintenance task assignment (OSMTA) module that processes software,



OMD framework for a multisectoral service management system

developer and task data and applies an AI model for optimal maintenance in the context of any use-case.

Making the difference

OMD was a project of firsts: the resulting tools were all created completely from scratch with raw data; these are now living models that continue to be fed with new data and will be used to improve the processes and offerings of the consortium. Regarding internal optimisation, for instance, the OSMTA module has reduced the average software maintenance time from 24.2 hours to 19.3 hours, resulting in a 20% cost reduction. As for commercial outputs, a notable success is Doğuş' SmartFix tool that provides support for electronics issues and has reduced the average processing time per support ticket from seven minutes to under a minute, thereby increasing customer satisfaction. A prototype kiosk has now been created that uses NLP and a Turkish large language model (LLM) to provide human-like recommendations for customer complaints; this will soon be trialled in Samsung stores in shopping centres.

Additionally, OMD has a strong societal component. For healthcare services, AI models can automate administration and process more parameters than humans, giving practitioners the time and information to provide better care to patients. The project has thereby allowed Caretronic to achieve a documentation accuracy of over 95% and improve workflow efficiency by over 20%. Likewise, the judiciary use-case has decreased attorney assignment time from >30 minutes to under 15 seconds. Crucially, it also provides a more egalitarian legal approach by considering the characteristics of the case and the attorney to match disadvantaged groups with better counsel.

The future

With the majority of tools currently at TRL 4-5, the next step for the consortium is to pursue individual exploitation plans that will allow them to expand in an IT service management software market expected to reach USD 4991 million by 2026 at an 11.7% compound annual growth rate. In doing so, the partners will enhance this market with AI but also expand it to new sectors: the ITEA project SIREN aims to introduce OMD's innovations to disaster management by matching needs to aid, while the healthcare partners are pursuing plans to transfer their results to elderly homes. These are just a few of the areas in which optimal demand management can make an important difference, and OMD intends to continue these developments far beyond the project's conclusion.

Major project outcomes

Dissemination

- 9 publications.
- 36 presentations at conferences/fairs, e.g. Cluj Innovation Days, Manufacturing Performance Days, Hannover Messe, Arab Health and AltenPflege.

Exploitation (so far)

- Reference Architecture for Multi-domain assignment tool.
- **Tickota** predicts completion times of IT service management tasks and classifies priority / urgency of a ticket, minimising response times and reducing SLA penalties.
- **OSMTA** applies an AI model for optimal software maintenance task assignment, improving efficiency and reducing time to fix as well as costs.
- **Recommend4U** customises shoes via a chatbot, making product filtering and recommendations more effective.
- **Telemarketing AI model** that coordinates the agent-client allocation process based on history and location.
- **Speech2service AI** documents a large volume of services during nurse-patient interactions, reducing the administrative burden on healthcare personnell.
- **SmartFix** AI-powered customer support delivers human-like interaction and automatically detects and resolves customer issues in real time.
- **Equality In Justice** offers automated, explainable and near-real-time attorney assignment based on location, expertise, and availability.

ITEA is the Eureka RD&I Cluster on software innovation, enabling a large international community of large industry, SMEs, start-ups, academia and customer organisations, to collaborate in funded projects that turn innovative ideas into new businesses, jobs, economic growth and benefits for society. ITEA is part of the Eureka Clusters Programme (ECP).

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Partners

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- University of Szeged

Portugal
- FTP
- Instituto Superior de Engenharia do Porto (ISEP)

Slovenia
- Caretronic

Spain
- Strategy Big Data

Türkiye
- ARD Group
- DOGUŞ Teknoloji
- Experteam
- Hiperlink

Project start
January 2022

Project end
December 2024

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