In partnership with Ca' Foscari University of Venice and Digital Strategy Innovation

A search engine enhanced with AI to consult the entire company knowledge. Carraro presents the results of the ASK Project

The ASK project, conceived by Carraro, aims to enhance and simplify access to the Group's information assets. The system has been designed to digitize the Group 's information assets and "train" artificial intelligence in order to support internal technical and operational needs, and to quickly respond to customers' questions about products, overcoming language barriers and ensuring security and traceability of information

Campodarsego, July 29, 2025 – The ASK research project, developed by Carraro and co-funded as part of the IRISS Call promoted by SMACT Competence Center, has designed and created a search engine based on artificial intelligence that makes corporate knowledge accessible to the entire work team.

The Padua headquartered group, which specialises in the design, production and marketing of transmission systems for agricultural and earthmoving machinery, invested also in digitalisation, automation and intelligent data management in recent years. And it is in this context of innovation that the ASK project was born – an acronym for "Ai-driven Search in Knowledge base", which aims to make it easier to access all company information, at a technical, structural, managerial and strategic level.

More specifically, Carraro has created an intelligent search engine for querying company knowledge which, through a system based on the latest generation of language models (LLM – Large Language Model), is able to return timely answers to the questions asked by staff to quickly access the wealth of procedures, technical solutions and operational documentation of the Group. The process is carried out in a controlled and personalized manner, without compromising security or intellectual property.

This project has numerous objectives, including overcoming language barriers. Company documents are written in various languages such as Italian, English, Chinese and Spanish, and it happens that the working group finds itself consulting documents that it cannot understand. ASK thus allows the team to ask what is not clear in their own language and receive a comprehensive and understandable natural language answer for any document.

Several development phases characterised this project: a first one that saw the analysis of the company database, while for the second phase the company focused on the design of an intelligent architecture that could manage the large amount of information taken into consideration. To do this, technologies such as RAG (Retrieval-Augmented Generation) were utilized. A first prototype was then developed in collaboration with Ca' Foscari University of Venice and Digital Strategy Innovation and the first feedback was collected. The initial phase of this activity highlighted the need for a process of refinement and to partially revise the architecture of the system itself, both with regard to the search for content within tables and to the generation of targeted answers on the topics of the research.

Through the revision of the overall architecture of the ASK system a significant improvement in the response speed was achieved, going from 12 to 6 seconds, while through a careful benchmark on the multilingual response capacity of the different LLMs, the one that best meets Carraro's needs was identified, significantly improving the relevance of ASK answers to users' questions. Finally, in the last phase, the prototype was tested on real cases in the company. The work team is now experimenting the procedure with a new version of the prototype. The new architecture, integrated with a completely renewed user interface, allows users to have a simplified view of documents and to dialogue with AI with an accurate streaming of responses.

"The results that emerged from the project are already very concrete – explains **Matteo Rosina, Head of IT Infrastructure & Compliance of the Carraro Group** – *ASK is in fact able to answer questions in natural language, return traceable answers with links to the original documents and manage their visibility in a secure way. In the coming months we intend to introduce Micro-RAG, i.e. personalized sessions for users and the team, support new formats, transcribe video calls, but, above all, we wish to extend the use of ASK to other business environments".*

At the same time the Carraro Group is also engaged, again with SMACT and Ca' Foscari at its side, in the development of another project linked to AI, called ReFAInE (Redesign of Factory Artificial Intelligence Environments), which aims to optimize the planning and scheduling process of the mechanical workshop through an advanced algorithm. Its main objective, at the moment, is to verify the reliability of the system. After this validation the work team will develop, together with Digital Strategy Innovation, an advanced platform that will allow to conduct "What If" type analyses: hypothetical simulations in which some parameters can be changed to predict the impact of changes on production processes.

These two projects represent an important step in the Group's digital transformation path, which, by focusing on artificial intelligence, aims to delegate lower value-added activities to technology, focusing on continuous improvement in the quality and efficiency of processes, products and services within an increasingly dynamic and complex global context.

At the same time, a technological process was launched within the Group with a specific focus on artificial intelligence, involving management in the first place as well as the Digital Enablers present in business area, key figures to ensure the adequate dissemination of a new digital culture.

THE CARRARO GROUP

Carraro (www.carraro.com) is a **leading international group in transmission systems for *off-highway* vehicles and specialized tractors.** The Group's activities are divided into **two Business Areas:**
- Drivelines & Components (axles, transmissions and components) mainly for agricultural and earthmoving machinery, as well as a wide range of gears for highly differentiated sectors: from automotive to material handling, from agricultural applications to earthmoving.

- Vehicles (specialized tractors for vineyards and orchards, between 60 and 100 horsepower) aimed at third parties and engineering services aimed at the design of innovative ranges of tractors.

The Group is headquartered in Campodarsego (Padua), **employs 3,623 people as of 31.12.2024 – of which 1,652 in Italy –** and has production facilities in Italy (4), India, China and Argentina.

SMACT

SMACT is the national Competence Center for the digitization of Italian companies, established in the North East in alliance between the universities of Triveneto, research institutions, public facilitation bodies and over 80 technology and early adopter companies. Through an innovation ecosystem, SMACT is the institutional partner that helps companies to start and implement their digital and technological transformation paths. By listening to and analyzing the needs of companies, the Competence Center activates the best skills to offer innovation, training, research and development services. https://smact.it/