

Examples of AI tools ready to be applied

- *Language Analysis.* Moses (<http://www.statmt.org/moses/>) is an open source tool to whose development FBK has significantly contributed and which allows machine translation into different languages. Currently in use by more than a thousand users, with more than 15,000 downloads. Based on this tool, FBK has developed solutions for eBay, Amazon, the United Nations, and the European Commission. Thanks to this technology, FBK has launched two spin-offs in collaboration with Translated (<https://www.translated.net/>). Furthermore, the AI techniques used are those of Machine Learning and in particular of Deep Learning. Language technologies (<https://dh.fbk.eu/> and <https://hlt-nlp.fbk.eu/>) have produced a series of tools that can analyze and extract information from text documents. As part of the "Buona Scuola" (Italian school reform program) project, FBK collaborated with MIUR (the Italian Ministry for Education and Research) for machine analysis of 270,000 documents. Natural language analysis tools are also used in the European project H2020 SIMPATICO (<http://www.simpatico-project.eu/>), whose aim is to simplify public administration documents and web services to make them understandable and more easily usable by citizens.
- *Design and verification for the Smart Factory, Automation and Robotics:* The NuSMV system (<http://nusmv.fbk.eu/>) is used by companies such as the European Space Agency (ESA), Boeing Seattle, Honeywell, Rockwell Collins, Thales Alenia Space. The tool was released in its basic open source functionality, with more than 200,000 downloads and more than 1000 users, while some specific algorithms are proprietary. The tool is based on "model checking" techniques, i.e. automatic model verification techniques. AI planning techniques for the exploration of space of the states allow to efficiently check whether there are problems in the modeled system that could lead to dangerous situations. FBK is using this tool in industrial projects, for example for Boeing and ENI SAIPEM. Industrial applications exist in the field of robotics (covered by NDA).
- *Cyber-Security.* The authentication system based on theorem proving techniques (<https://st.fbk.eu/>) is currently used to ensure security in FCA communication systems within the vehicle. It will be important to use this tool for future V2X applications, i.e. vehicle/vehicle and vehicle/infrastructure communication, in all driver-assist and self-driving applications. The same tool is used in security and identity management applications by Poste Italiane, Istituto Poligrafico Zecca dello Stato (the Italian Ministry of Treasure), NATO.
- *Automated planning for smart cities and communities.* The Smart Planner system (<http://www.smartcommunitylab.it/>), released in open source under the Apache 2.0 license, uses techniques of Artificial Intelligence and in particular of Automated Planning to support sustainable mobility policies. At this time the system is being used by more than 15,000 users, in the cities of Trento, Rovereto, Bologna and other European cities. The system was also used in the CLIMB project (Children Independent Mobility), a project awarded as one of the 7 "best practices" selected among more than 400 projects to represent Italy at the G7 transport meeting. The project combines sustainable mobility and education for elementary schools.
- *Agent Systems for Smart Healthcare.* The "Virtual Coaching" system, able to monitor and help patients suffering from chronic diseases and promote healthy lifestyles, developed at FBK using AI techniques such as Semantic Analysis, Automated Reasoning, Intelligent Conversational Agents and Analysis of Natural Language is currently being tested with hundreds of users. The system that will enable the physicians of the Trento Province Healthcare System to prescribe an APP for monitoring patients with diabetes will be released in 2018.