

An Inference Engine based on the Technology Platforms of the European Patent Office

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Introduction

From the pioneering “Eliza” (Joseph Weizenbaum, MIT, 1967) to the advanced chatbots of today (2024), the evolution of human-machine communication has been amazing.

The present project aims to positively influence the strategic decision-making processes of users by integrating into these chatbots the system concept as seen by Henry Paynter (“Analysis and Design of Engineering Systems”, MIT Press, 1960), Jay Wright Forrester (“Principle of Systems”, Pegasus, 1968) and Enzo Tonti (“The Mathematical Structure of Classical and Relativistic Physics - A General Classification Diagram”, Birkhäuser, 2013).

The Inference Engine

We propose a generative artificial intelligence program capable of applying the concept of system to the input data provided by the EPO databases and computing infrastructures.

Based on large language models, the program will embed the EPO databases with the aim of identifying the evolution of technology and generating new trajectories for creativity according to a generalized concept of energy.

Using the concept of generalized rational and emotional energy, our program will conform to the dynamical theories as used in partial differential equations (“Partial Differential Equations for Engineers and Scientists”, S.J. Farlow, John Wiley, 1982) and use feedback-loops to orient a

mental trajectory toward creative objectives (“The Origins of Feedback Control”, Otto Mayr, MIT Press, 1969).

Furthermore, our program should be able to merge technological and biological concepts into a unified system (“Le microscope - Vers une vision globale”, Joël de Rosnay, Seuil, 1975).

User instructions will be given in natural language and transformed into formal expressions which will introduce requests to the EPO databases and provide back pertinent information.

The program will be interactive, allowing the user to trigger new inferences.

The user interface will also integrate features like palettes with buttons and sliders to fine-tune the deduced information given back by the program.

The program will be able of answering user requests such as:

“Who are the patent applicants granted at least one patent in the field of quantum computing during the last 9 months?”

“Draw a geographical map of the EPO states members with each country colored according to the number of patents in force on their territory”;

“For the patent application number FR3006309A1, what is the list of words associated to mathematical concepts present in the application?”

“Draw a timeline plot comparing the number of patent applications filed in Italy and France during the last 20 years”;

“Make a summary list of the interesting legal events concerning patent number FR3006309A1”;

“Draw a tree displaying the patent family of application number EP0332768A2”.

Our program will particularly utilize the concept of entity as used in object-oriented programming. For example, a molecule can be identified by a formula like $\text{CH}_3\text{CH}_2\text{OH}$, an alternative name such as “ethanol” or even an inclusive class such as “alcohol”. The same entity may moreover belong to several classes, such as “organic molecules” and “alcohols”.

The program will identify and handle the entities present in patents and infer answers to the user's requests as well as infer potential creative developments.

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