Comtrade Three-Sixty

CASE STUDY

Identification of the essential well-being parameters

Industry

Occupational health

Technology

As the background, we used the Scikit-learn machine learning library, that allows the usage of “all” state-of-the-art solutions. The usage of Scikit-learn has two important benefits:

(a) Scientists publish results as a part of their scientific articles in Scikit-learn libraries.

(b) Cython can be used to increase performance and overbridge the execution speed limitations of Python.

The solution was “Dockerised”, allowing the execution on supercomputers in the case of extensions that request high-performance results.

At a glance

Our task was to develop a tool that will help psychologists identify essential well-being parameters. Based on the AH-Model, this data was collected by using a Questionnaire of Actual Availability (QAA). We implemented the classification method, and the results were presented as a decision tree. The AH-Model and the Questionnaire of Actual Availability was developed by Dr. Marija Molan, Ass. Prof., Senior health councillor for occupational health.

The decision tree is an output that enables psychologists and physicians to determine the well-being parameters that can effectively track workers’ efficiency. Moreover, it determines the parameters that need to be examined and adequately changed or adopted. The classification method was implemented with Python code in Jupyter Notebooks.

Client and the problem

Our clients are psychologists and physicians that work in occupational health.

Similarly to the task for AI/ML scientists, the client needs to have a deep understanding of the varieties of the AI results. There are different possible results regarding the semantics (i.e. identification of unknown patterns, pattern recognition, prediction, classification, anomaly detection, etc.) and different possible results regarding the syntax of the output (tables, sentences, classification trees, etc.).

The goal of AI/ML scientists is to determine the best and most appropriate output format for the AI/ML results, in order to solve a certain problem for the end user. It means that both inputs are needed: understanding the problem that the AI/ML scientist has, and the adequate format for the possible methods and results for the end user.

Project goal

The main goal of this project was to develop a tool that will help psychologists identify essential well-being parameters , and, to provide results from the AI/ML program that can be interpreted by domain experts. Its end format is shown in the form of a decision tree.
The most important part for the development of the AI/ML methods was the collaboration between domain knowledge experts (occupational health psychologists, ergonomics and mathematics) and AI/ML experts.

About Comtrade 360

Comtrade 360, a member of the Comtrade Group, helps businesses stay ahead in an ever-evolving digital world. For more than 30 years, we have accelerated innovation and growth by providing solutions to key technology partners.

Our clients, leading enterprise infrastructure and system software vendors across the globe, know what we're about: delivering a comprehensive range of top-notch software development services and solutions for your IT challenge.

Challenge

There were some challenging tasks during our implementation of machine learning. Here are some of the most important ones:

1. To determine, collect and properly clean-up essential data, and subsequently create adequate well-being parameters.

2. There was a need to deep-dive into the "client's problem or task" to fully understand the problem that we wanted to address by using AI/ML.

3. Have a clear understanding of the end user's point of view, how to interpret the results, and finally, how to prepare and collect input data.

4. We had to avoid implementation of "low-hanging fruit". The method needed to be either (a) developed and specially trained for the specific task or (b) find a high-tech method that was developed for a similar problem. Our choice method was (b).

Results

Comtrade 360's proven track record and long-lasting expertise in the AI and ML field, ensured a successful execution of the project. Our talented team of engineers designed a tool that serves as a formal argumentation and proof of the scientific excellence for domain knowledge experts, decision makers, psychologists, and physicians.

This AI/ML solution continues our long-term collaboration between Comtrade 360 and the University Medical Centre Ljubljana since 1996. The developed solution is used as a tool for psychologists, to help with suggestions when faced with difficult and complex decisions. A professional approach and successful tool development led to complete satisfaction of all involved parties, which enabled us to broaden the partnership and collaborate on next product version releases, while also opening doors for future engagements on other projects and products for our clients.

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