INTERNSHIP PROPOSAL

Data Science Students meet Companies 2022

December 1st, 2023 ʒ

ENGINEERING
THE DIGITAL TRANSFORMATION COMPANY

1   PROPOSAL

1.1   WHO WE ARE

Engineering Group is the Digital Transformation Company, leader in Italy and expanding its global footprint, with around 15,000 associates and with over 70 offices.

The Engineering Group, consisting of over 70 companies in 14 countries, has been supporting the continuous evolution of companies and organizations for more than 40 years, thanks to a deep understanding of business processes in all market segments, fully leveraging the opportunities offered by advanced digital technologies and proprietary solutions.

It integrates best-of-breed market solutions, managed services, and continues to expand its expertise through M&As and partnerships with leading technology players. The Group strongly invests both in innovation, through its R&I division, and in human capital, with the internal IT & Management Academy. Engineering is a key player in the creation of digital ecosystems that bridge the gap between different markets, while developing composable solutions that ultimately foster a continuous Business transformation.

COE DATA & ANALYTICS

The Engineering Data & Analytics Center of Exellence consists of more than 200 professionals dedicated and specialized in all the issues that revolve around the analysis of data, with more than 50 projects per year. Data & Analytics CoE drives innovation in data management and advanced analytics by implementing highly customized solutions using a multidisciplinary approach and expertise in order to enable data-driven decision making. Our holistic Data Analytics approach enables our partners to design high performance Data Platforms that manage complex AI use cases while guaranteeing a strong UX. Projects ranges from management and manipulation on traditional tools (DB and ETL), to skills, enabling those capabilities of visual Data Discovery, on Self-Service BI tools, passing through the most innovative frontiers such as the management of unstructured data, linked to the Hadoop ecosystem, up to techniques and tools for complex data analysis that see the use of statistical, exploratory and predictive models, ontologies and semantic analysis, sentiment analysis, data and text mining, image processing, machine and deep learning, artificial intelligence.

1.2   INTERNSHIP PROPOSALS

Several internship topics are available at Advanced Analytics Group: most of them stem from current business activities, in order to get deeper insights about advanced analytical approaches. Therefore, further topics may be available, on the basis of new needs arising from future business projects.

A list of open opportunities can be find below:

- **Generation of synthetic data**: The training of deep learning models usually requires pretty large amount of data. This could be a challenge in many business scenarios: training phase may suffer of low quality data; information might be only partial. In this Interniship activity the candidate will contribute to the development of a platform for the generation of synthetic data (in particular images) starting from:

    o   tools to solve specific problems (healthcare datasets, images datasets etc.)
    o   diffusion models for the generation of targeted images addressed to business problems

    More information about specific business cases will be given in the discussion of proposals.

    (Small) LLM: We have accumulated several years of experience on applications with Natural Language Processing & Understanding algorithms. Today, we are extensively testing and applying in-house LLM models and generative AI for

a number of applications, including smart conversational interaction. We are interested in finding candidates able to experiment and compare, on the basis of benchmark systems and KPIs, the performance of different approaches for specific tasks, in a real-world setting. In particular, we are also interested in finding and experimenting specialized advanced models of smaller dimensions, for a better portability, even in the absence of cutting-edge hardware.

Quantum Computing for Machine Learning: quantum computing represents one of the most challenging and promising technologies. We are currently involved in developing and generalize quantum algorithms, in order to support real-world use cases in simplified settings, using different frameworks. Quantum Computing for Machine Learning is still largely an open innovation field. The internship candidate will support the experimentation and implementation of a quantum strategy in order to solve one of the common issues in Machine Learning problems.

The desired outcome of Internship projects consists in either a standalone application, or a software component, integrated in our internal AI Laboratory. Code will be implemented in Python. A basic knowledge of Statistics, Machine Learning and Deep Learning principles is required. For quantum computation, either a basic knowledge or a strong interest of Quantum Mechanics is required and good mathematical/algebraic skills are required. Knowledge of Microservices basics is a plus.