Chair of Financial Management and Capital Markets
TUM School of Management
Technical University of Munich

Assessing Corporate Digitalization Levels: ChatGPT vs. Bag-of-Words

Keywords: Digitalization, Natural Language Processing, ChatGPT, Machine Learning in Finance

Project description

With an increasing level of digitalization of the economy, a company's adaptability and digital competency increasingly defines its competitiveness, efficiency, and even its survival. Therefore, assessing a firm's level of digitalization is getting more critical for investors. Traditional methods, such as the bag-of-words (BoW) method, have been applied in this context (e.g. Drechsler, Müller and Wagner, 2021). However, without understanding context, semantics, and the nuances of human language, word-based approaches could overlook relevant aspects of a company's digital strategy.

In this project, the student will be asked to devise a system that utilizes the power of AI (specifically, OpenAI's language model, ChatGPT) to assess the level of digitalization of a firm based on the analysis of its Management Discussion and Analysis (MD&A) section of the 10-K filings. The student will develop a metric for the digitalization level of a company by using prompt engineering and other programming techniques in close collaboration with his advisor. This new digitalization metric will be compared to a more traditional approach - the Bag-of-Words (BoW) method. Next, to calculate the correlation of these measures, the student will replicate key analyses from Drechsler, Müller and Wagner (2021) using this AI-powered measure of digitalization.

The student will get access to a sample of MD&A sections and instructions on accessing the required APIs. The student will receive sufficient funds to execute the analysis if the calculations exceed the free tier.

Overall, the student should have a strong programming background in Python, a general understanding of language models, and a strong interest in Finance and data analysis.

Chair of Financial Management and Capital Markets
TUM School of Management
Technical University of Munich

What we are looking for

- Strong analytical and project management skills
- Determination and passion for your areas of expertise
- Good Python programming skills
- Interest to work at the intersection of finance and IT
- 1 or 2 persons

What we offer

- Knowledge in quantitative finance, corporate finance and machine learning
- Kick-off session including introduction to relevant finance and/or business topics
- Experience with IDPs
- Open dialogue and support
- Access to prime capital markets databases (Bloomberg, Datastream, Thomson Reuters, etc)
- Potential for publication and/or evaluation of future use cases
- Both single and group projects are possible

Interested?

Please send an e-mail with CV, academic transcript and your preference for this project to sebastian.mueller.hn@tum.de

Questions?

In case of any (e.g. topic related) questions, please contact Sebastian Müller (sebastian.mueller.hn@tum.de)

References

Drechsler, Katharina, Sebastian Müller, and Heinz-Theo Wagner. "The Digital Premium: Why Does Digitalization Drive Stock Returns?." *Available at SSRN 3972173* (2022).