

Data Guardians: Elevating PII Protection with Advanced NER

42578 Advanced Business Analytics

April 26th 2024

Executive Summary

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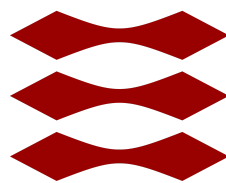


Table 1: The following is a table of our main responsibilities throughout this project, however, it's important to note that this is a formality, and we all vouch for equal accountability for all parts of this project. With that being said here is a table of the main responsibilities.

Student	Main Responsibilities
s204139	Heuristic Mixture Model
s194262	Data Analysis & The PII-Masking tool App
s184984	Deep Learning DeBERTa LLM
ALL	Executive Summary

Executive Summary

Problem Summary

Personal Identifiable Information, PII, is a highly potent issue in the modern data environment. Transfers and transactions of data involving PII are heavily regulated with more to come. Moreover, businesses face significant challenges in effectively identifying and safeguarding PII, with substantial risks linked to data breaches and regulatory non-compliance. Some of these regulations attempt to restrict the amount of a person's online identity being diluted into 'Big Data' and used against personal needs for company profit. On the other hand, some platforms attempt to automate the process of releasing open-source data, allowing researchers to utilize large public datasets for the benefits of e.g. education¹. Therefore, to protect both the individual's right to their own identity and to be considered equally online, a mechanism to detect and handle PII information in data is crucial. Hence, in this project, we develop a Named Entity Recognition tool to identify and label words in texts for Obfuscation, Aliasing or Masking. Specifically, we develop a tool for businesses to parse text objects and reduce the amount of bias inducing words for a more just decision making.

Project Overview & Main Findings

Valuing interpretability and transparency, we have in this project built a heuristic based machine learning model with NLP techniques and feature extraction methods to identify Personal Identifiable Information in texts. Furthermore, we have compared our heuristic model to State-of-the-art models such as the DeBerta model. Though the heuristic model falls short in some aspects the feasibility of the approach is solid. The model therefore allows the end user to effectively identify PII in text data, while maintaining complete interpretability of the model, leading to the best informed decision making in PII handling. Moreover, we implemented this model in a minimum viable product web tool for the company instantly getting value from the model. We built this MVP using streamlit², which with its minimalist design can easily be expanded. Lastly, our implementation makes it easy to switch and compare models.

Conclusion & Recommendation

With our solution we provide the full implementation of an MVP for the client, enabling them to deploy it into different business processes. Focusing on the individuals right to be assessed equally online, we recommend our solution to be implemented in the hiring / recruiting business process, to filter out bias-inducing information. Such a solution helps the client achieve higher ESG scores by potentially increasing diversity along with helping their decision process to be more just.

¹Kaggle: <https://www.kaggle.com/competitions/pii-detection-removal-from-educational-data>

²<https://streamlit.io>