

Transforming iFood's Content Classification: AI-Powered Efficiency and Scalability with Large Language Models

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ABSTRACT

In the online food delivery sector, effective product classification is crucial for maximizing user engagement and optimizing sales. In this context, data labeling is essential to monitor and improve current classification models. Manual labeling, however, is both time-consuming and costly. Leveraging Artificial Intelligence (AI) is pivotal in achieving efficiency at scale. By using large language models (LLMs), iFood developed an AI-driven workflow to build high-precision, high-coverage classifiers, and improve them with increased team productivity. This presentation will explore our experience in deploying and maintaining multiple machine learning models at scale, as well as our usage of generative models in our model's lifecycle. We will discuss the process of building our offer curation platform, challenges we faced while integrating with generative models, and how using LLMs facilitated model monitoring, ultimately improving offer quality on iFood. This research offers valuable insights into practical AI applications, with potential implications for improving classification processes across various industries.

1. POTENTIAL DISCUSSION POINTS

- **Enhanced Model Performance:** Explore how the utilization of multiple Machine Learning models has contributed to an increased precision and recall in offer classification, using our item taxonomy model as the main use case. By automatizing data labeling using large language models [1; 2], we streamlined the process of labeling new data and creating new classes, as well as identifying gaps in model performance. By better utilizing unlabeled data in conjunction with a smaller set of manually labeled data, we can better capture the underlying structure of the data and make more informed classification decisions, leading to a more refined taxonomy and reduced ambiguity in offer categorization.
- **Improved Offer Coverage:** Discuss the effectiveness of automatic labeling in reducing the percentage of items classified with low confidence. Increasing our capacity to identify rare and diverse items, we were able to increase the percentage of validly classified items, improving our offer coverage inside the platform.
- **Scalability and Efficiency:** Investigate the scalability and efficiency benefits of automatic labeling in offer

classification. By reducing the reliance on manually labeled data and leveraging the vast amount of unlabeled data available, LLM labeling enables organizations like iFood to scale their offer classification systems efficiently, handling large volumes of data while maintaining high classification accuracy and reducing operational costs.

- **Model Monitoring:** Discuss how LLMs can be used to collect feedback on models' performance, enabling teams and organizations to track metrics, such as accuracy and precision, on an unprecedented scale. Furthermore, we will talk about statistical techniques to assess the reliability of metric's estimates.

2. RELEVANCE

The pertinence of data labeling using generative models extends beyond the realm of offer classification, resonating deeply within the broader context of supervised machine learning and data mining. Its pragmatic application in real-world scenarios, exemplified by its utilization in refining offer taxonomy within online food delivery platforms like iFood, underscores its transformative potential across diverse domains. By harnessing both labeled and unlabeled data, integrating LLMs to our model's lifecycle offers a pragmatic solution to the perennial challenge of data scarcity, particularly prevalent in industries where manually labeling vast datasets is impractical or cost-prohibitive. This approach not only enhances classification accuracy and reduces ambiguity but also fosters scalability and efficiency, paving the way for more agile and adaptive systems capable of handling large volumes of data while minimizing human intervention. Moreover, the insights gleaned from iFood's implementation of large language models in offer classification resonate deeply within the knowledge discovery and data mining (KDD) community. They not only showcase the practical utility of LLMs but also inspire further innovation and exploration in methodology development and application. As researchers and practitioners seek to address the complex challenges posed by real-world datasets, automatic labeling offers a compelling avenue for advancing the frontier of knowledge discovery, enabling more nuanced insights, and empowering organizations to derive actionable intelligence from their data. Thus, iFood's experience serves as a beacon, illuminating the path toward harnessing the full potential of large language models and generative AI in revolutionizing content classification processes and driving meaningful advancements in machine learning and data mining.

3. THE PRESENTER

Murilo V. F. Menezes is a Staff Data Scientist at iFood, Brazil's leading food delivery company. Murilo acts as a Tech Lead on iFood's catalog understanding platform, and was directly involved in its conception and development. He holds a Master's in Machine Learning from Federal University of Minas Gerais (UFMG), actively working as an associate researcher in kernel methods, representation learning, and pattern classification.

4. THE COMPANY

iFood is the most popular delivery app in Brazil that connects customers with a wide range of businesses, including restaurants, supermarkets, pharmacies, and more, enabling users to order meals and groceries for delivery. With over 80 million orders per month, 300 million items and 300,000 merchants across 1,700 cities, iFood's challenges include pinpointing and tailoring offers for a large and extremely diverse user base.

5. REFERENCES

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- [2] Brown, T., Mann, B., Ryder, N., Subbiah, M., Kaplan, J.D., Dhariwal, P., Neelakantan, A., Shyam, P., Sastry, G., Askell, A., et al.: Language models are few-shot learners. *Advances in neural information processing systems* **33**, 1877–1901 (2020)