AI Annotator – Automating Manual Operations using Agentic AI

Problem Statement: Market Intelligence team at Walmart leverages third party vendors who perform a number of tasks undertaken by humans. One common example of such a process is labelling a given pair of retail items as Exact / Incorrect / Variant / etc.

The AI Annotator project aims to automate such tasks by leveraging state-of-the-art LLMs and Agentic Frameworks. It seeks to significantly reduce manual effort, improve scalability, and optimize costs. The project is designed for plug-and-play deployment, supporting high accuracy and interpretability, and has the potential to make a considerable impact on quality of output, build trust and optimized efficiency.

Scope of the project includes deliverables include an end-to-end modular Agentic pipeline for various annotation tasks (pair validation, image validation, etc.). The system supports multimodal input and has access to AI models hosted through Walmart Internal Services and custom finetuned models via LLM Gateway. The primary KPI would be to measure the percentage of Manual Operations being processed through the Annotator Framework at equivalent/higher MO Level Accuracy.

Context aware multi model image segmentation involving Vision models for personalized recommendation generation

Problem Statement: Current state of the art models in Vision Understanding give part segmentations of the given item images without understanding what are the important parts that need to be segmented. A multi-modal model approach can improve part segmentation by providing (textual) context along with the item. This will enable the model to focus on the important parts of an object to segment as parts, enhancing its understanding and relevance, rather than just segmenting every detail. Use-cases that can serve: 1. Part segmentation based similar items retrieval to improve visually similar personalized item recommendations 2. It can also improve smart crop quality for usage in personalized smart creatives for faster content generation. 3. Personalized Substitute Recommendations for Fashion items with a detailed understanding of items with part segmentations. 4. The project can also be extended for the images in the wild.

The scope of the project includes multi-modal model approach to improve part segmentation of item images by providing (textual) context along with the item. The outcome of the project will help Will help in improving smarter creation of content for product page and other placements using smart creatives for automated generation of content.

Unified algorithmic validation framework for multiple aspects of catalog enrichment

Problem Statement: The project aims to develop an automated, efficient, and robust validation framework to validate the data produced by various catalog enrichment activities – Product type classification, Attribute enrichment, Content compliance, Title normalization, Content scoring, Mismatches etc. The end goal of the project is to minimize dependency on crowd teams for validation and to mitigate manual errors, reduce turnaround time and minimize costs. Further, the framework should be light weight and provide a unified approach for validation across different tasks, efficiently handling high volumes of data while offering swift adaptability to catalog specification updates.

The current manual validation process is time-consuming and inefficient, leading to high turnaround times and restricting validation to smaller data subsets. Furthermore, the process is unable to quickly adapt to changes in catalog specifications and definitions. Further, different aspects of catalog require different skills among crowd teams, leading to slow & smaller manual validations. This project presents an opportunity to automate and streamline this process, reducing errors and improving efficiency with a unified framework and model for all aspects of catalog validations.

The scope of the project involves developing a machine learning-based unified validation framework and model, that can handle high volumes of data with minimal processing time. The framework will provide semantic verification, predict validity, offer confidence values, and score content based on catalog specifications.

Autonomous AI Agents for enhancing Catalog Content Quality and efficient Catalog onboarding with Shift Left Strategy

Problem Statement: Develop a group of autonomous AI agents to simplify the process of onboarding sellers' and suppliers' catalogs into the Walmart marketplace. These agents will make the catalog onboarding process more flexible and efficient by accepting catalog content in any format provided by sellers and automatically converting it to match Walmart's specific format and standards. AI Agents can auto enrich & correct content by sourcing content from external sources by scrapping brand sites & internet. The main goal is to prevent low-quality catalogs from entering the Walmart system.

Currently, the process of setting up sellers & suppliers' catalogs is time-consuming and requires sellers & suppliers to modify their catalog content to match Walmart's guidelines, format, and standards. As most catalog content quality checks are done after the catalog submission, suppliers often need to interact multiple times with

Walmart's systems to successfully list their catalog content. By moving these quality checks to the beginning of the process , we aim to ensure only high-quality content enters Walmart's systems and to simplify the interactions for suppliers.

The scope of the project is to develop an autonomous agent(s) that can accept product information in any given format and interact with the seller/supplier or their automated systems. The agent should be able to:
1. Identify product types and relevant attributes from any content format
2. Standardize titles, descriptions, and images
3. Detect duplicate items across various markets and plan accordingly
4. Check for compliance to identify offensive images and data mismatches
5. And calculate the content quality to approve items for catalog inclusion or provide feedback to sellers for improvements.

Agentic AI For ERP Solutions

Walmart utilizes multiple Enterprise Resource Planning (ERP) systems to manage critical business functions such as Payroll, Compensation, Benefits, and Human Resource Management. These systems, developed over the years, face challenges such as data silos, inflexible and fragmented processes and tools, and a reliance on manual support for issue resolution. As a result, self-serve tools available on associate portals are effective only for straightforward cases. Addressing associate pain-points often involves reconciling multiple data sources across different tools and systems.

The advent of Generative AI offers the potential to streamline many repetitive manual tasks, such as drafting legal documents, answering policy and process questions, and finding and surfacing associate information. However, fragmented and unstructured data that is not systematically exposed through structured interfaces like APIs can quickly limit the capabilities of Generative AI.

We propose three-tiered architecture designed to overcome the limitations posed by the lack of structured processes and APIs. This architecture focuses on automating workflows for repetitive tasks and providing adaptable tools for self-service and associate-driven service. Unlike traditional solutions that address each scenario with a custom API, user interface, and backend jobs, our approach leverages the existing data and services, offering a more flexible and integrated solution.

The scope of the projects include:

- Behavioral analysis on the seller activities to classify them into different tiers.
- Develop a decision support system to aid risk agents in conducting comprehensive assessments.
- Develop a recommendation engine which provides actionable insights to risk agents indicating confidence level for each recommendation. Focus on

developing and optimizing ML algorithms for risk detection and mitigation, primarily for merchants. The AI and Human handover should be seamless.

- Train the model with prior agent actions, ensuring proper labeling to avoid skewness of mitigation actions.
- Enable agents to retrieve comprehensive information during investigations in an efficient and fast manner. Ensure that information retrieval flows are easily extensible.
- Provide linkage analysis to agents as part of the recommendations which helps in detecting coordinated fraudulent activities. Use network interactions to identify suspicious connections.
- Maintain transparency, fairness and compliance with data protection regulations.