**Enhancing Asset Purchase Compliance through AI-Driven Analysis: Methodology and Implementation**

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**Introduction**

In the rapidly evolving financial sector, ensuring compliance with regulations for asset purchases is crucial. This paper presents an approach utilizing artificial intelligence (AI) to evaluate whether Brazilian mutual funds can acquire specific assets. By integrating advanced data processing tools and AI models, the project aims to streamline compliance assessments and enhance accuracy in determining asset eligibility.

**Project Overview**

The core objective of this project is to develop an automated system that determines if a mutual fund can purchase a particular asset, adhering to Brazilian financial regulations. This system utilizes various AI models and tools to analyze regulatory documents, fund prospectus, and asset data, providing a comprehensive compliance assessment.

**Models Testing**

The project incorporates various models and techniques for testing and refining the system’s capabilities:

* Native GPT + Prompt Training: Training the model with a specific prompt to improve its performance.
* Agents: Evaluating the effectiveness of different AI agents in handling compliance tasks.
* RAG (Retrieval-Augmented Generation): Using query-based methods to enhance the model's responses.
* Agents + Memory (Chat) + Prompt Training: Combining agents with memory and chat functionalities along with prompt training for more effective compliance analysis.

**Data Sources**

The system relies on several key data sources, mostly files downloaded from GitHub repositories:

* + Regulatory Documents: PDFs containing Brazilian financial regulations (e.g., CVM 175) and fund prospectuses.
  + Asset Information: Excel spreadsheets detailing various asset attributes.
  + Web Search: Using DuckDuckGoSearchRun for supplementary information retrieval.

**Results and Analysis**

The project conducted several tests to evaluate the system's performance:

Basic Functionality Tests: Using the fund\_can\_buy function, the system determines if a fund can purchase an asset based on current regulations. Results are saved in an Excel file for analysis.

Agent-Based Tests: The fund\_can\_buy\_agent function utilizes a crew of AI agents to assess asset purchase eligibility. Results are compared against basic functionality tests to evaluate the effectiveness of the agent-based approach.

The tests revealed that:

* The AI system accurately determines compliance with Brazilian regulations.
* Agent-based testing provided a more nuanced analysis, incorporating multiple perspectives and tools.

**Conclusion**

This AI-driven compliance system represents a significant advancement in ensuring regulatory adherence for mutual fund asset purchases. By integrating advanced tools and AI models, the system enhances the accuracy and efficiency of compliance assessments. Future developments will focus on refining the models and expanding the system's capabilities to handle additional regulatory scenarios.