# Case Study 1 - Case (Part 1)

| Summary | In this codelab, you'll find Proof-of-Concept and the architecture for the use case. There is also a press release Internal and external FAQs listed |
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| Author | Anshul Chaudhary, Narayani Arun Patil, Agash Uthayasuriyan |

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# Introducing StockWise AI



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**What is StockWise AI?**

In the dynamic realm of stock trading, the significance of staying well-informed and acting promptly cannot be overstated. Allow me to introduce StockWise AI, an innovative system poised to elevate stock market engagement to unprecedented levels. Our platform has been meticulously crafted with a robust data pipeline, adept at capturing and analyzing real-time news updates, with a specific focus on pivotal factors influencing stock prices. Explore the potency of actionable intelligence as we seamlessly integrate with data, delivering users timely insights into the potential impact of breaking news on their stock portfolios.

StockWise AI utilizes a dynamic real-time data pipeline, ensuring the immediate reception of the latest news updates. Stay ahead of market shifts with up-to-the-minute information on factors shaping stock prices. Experience the prowess of Artificial Intelligence as StockWise AI interprets streamed news data, conducts sentiment analysis, and forecasts stock price influences, providing users with a profound understanding of market dynamics to facilitate informed decision-making.

Effortlessly navigate through our intuitive dashboard, thoughtfully designed for both seasoned traders and novices alike. StockWise AI offers a user-centric design, ensuring a seamless and enjoyable experience. Tailor your experience by setting customized alerts for specific stocks; StockWise AI will keep you well-informed through instant notifications, enabling you to make strategic decisions and seize opportunities.

Your trust is our priority. StockWise AI ensures the security and privacy of your data through robust measures and encryption protocols, providing a secure environment for your targeted stocks.
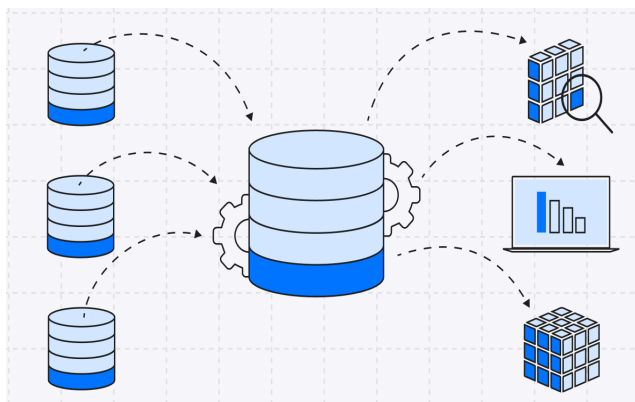
## Press Release

# Unveiling StockWise AI: A Revolutionary AI-Powered System Redefining Stock Market Intelligence

[Boston, 2024-01-24] — Today, XYZ corporation, a trailblazer in technological innovation, proudly introduces StockWise AI, an advanced system designed to transform the landscape of stock market intelligence.

In an era where the financial markets are dynamic and evolving, the need for advanced tools that empower users to make informed decisions has never been more critical. XYZ corporation has risen to the occasion, introducing a transformative technology that not only enhances but revolutionizes the way investment decisions are approached.

This game-changing technology, seamlessly integrated into our flagship system StockWise AI, leverages cutting-edge advancements to provide users with unparalleled insights and analysis. By drawing inspiration from gaming technology, XYZ corporation has created a platform that goes beyond conventional market analysis, bringing a new level of engagement and precision to the decision-making process.
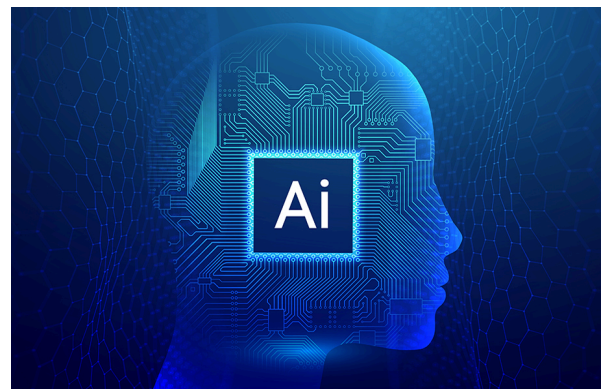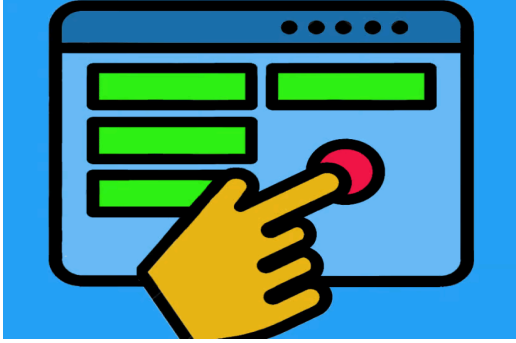


**Real-Time Data Pipeline:**
StockWise AI boasts a state-of-the-art real-time data pipeline, ensuring users receive instant updates on news that can impact stock prices. This dynamic pipeline captures information swiftly, enabling users to stay ahead of market trends and make informed decisions.

**AI at the Helm:**
At the heart of StockWise AI is a sophisticated Artificial Intelligence system, empowering users with unparalleled analysis in interpreting real-time news updates. This innovative AI-driven approach goes beyond traditional market analysis, providing users with deep insights into how breaking news influences stock.

**Navigate Effortlessly:**
StockWise AI boasts an intuitive user interface designed for seamless navigation. Our user-centric design ensures effortless exploration, making stock market intelligence accessible and impactful. Users command the ability to set customized alerts tailored to specific stock prices or events. Brace yourself for immediate notifications that thrust you into proactive and strategic decision-making.

"StockWise AI is not just a tool; it's a paradigm shift in how users engage with the stock market. It's the fusion of AI brilliance and real-time agility, empowering users to conquer the complexities of the market." **declares CEO XYZ corporation.**

# External FAQ

**Q: How does StockWise AI stay updated with real-time news, and what sources does it cover?**

**A:** StockWise AI employs a dynamic real-time data pipeline to capture news updates swiftly. It covers a wide range of reputable financial news sources, ensuring comprehensive and up-to-date information on factors influencing stock prices.

**Q: How frequently does StockWise AI update the news, and is there a delay in receiving real-time information?**

**A:** StockWise AI updates news every 4 minutes, minimizing any delays. Our platform is designed to provide users with the most current information, ensuring timely insights into market changes.

**Q: Can I use StockWise AI for any stock market, or is it specific to certain regions?**

**A:** StockWise AI is designed to be suited only for U.S stocks at this point and can be used for U.S stock market. The system captures global news, in future there are plans to make this system versatile to work globally.

**Q: How does the AI in StockWise AI interpret news and conduct sentiment analysis?**

**A:** The AI in StockWise AI utilizes advanced transformer based natural language processing (NLP) algorithms to interpret news articles. It conducts sentiment analysis to gauge the emotional tone of the news, helping users understand how market sentiment might be influenced.

**Q: How secure is the user data on StockWise AI, and what measures are in place to protect privacy?**

**A:** Security is paramount. StockWise AI prioritizes user data security through robust measures and encryption protocols. We adhere to stringent privacy standards to ensure the confidentiality and protection of user information in a secure environment.

**Q: Can I access StockWise AI on multiple devices, and is there a mobile app available?**

**A:** Yes, StockWise AI is accessible on multiple devices, including desktops, laptops, Mobiles and tablets. There is no mobile app as of now but the web app is responsive anc can be accessed on any device.

**Q: How does StockWise AI handle system outages or technical issues to ensure uninterrupted service?**

**A:** At XYZ corporation, we prioritize a seamless user experience. In the rare event of system outages or technical issues, our dedicated technical support team works swiftly to resolve issues and ensure uninterrupted service, minimizing any impact on users.

**Q. Are there any limits on the number of personalized alerts users can set within StockWise AI?**

**A:** StockWise AI does not impose strict limits on the number of personalized alerts users can set. Users have the flexibility to customize alerts based on their individual stock monitoring preferences and investment strategies.

# Internal FAQ

**Q: What is the process of data collection and storage?**

**A:** The data collection is done by scrapping news data from various news platforms then streamed it over to a lambda function which extracts required data from the HTML tags and then puts the data into an S3 bucket, the data can then be queried using Athena.

**Q: Can users customize the frequency of receiving the news updates?**

**A:** No, users can not customize the frequency of news updates. StockWise AI updates the news repository every 4 minutes. The Data pipeline is scheduled to run every 4 mins where it extracts news from news sites and transformers the news data and loads into the data repository.

**Q: How does the AI-powered analysis in StockWise AI differentiate between significant and less relevant news updates?**

**A:** StockWise AI employs advanced algorithms that prioritize and weigh various factors, including the source's credibility and news sentiment. This ensures a focus on significant news updates that are likely to impact stock prices. The gives out a score ranging from -1 to 1 where -1 is the most negative impact and 1 is a very positive news.

**Q: What is the delay from receiving news updates to sending out analysis to the end user?**

**A:** The news is collected every 4 minutes and it will take between 1-2 minutes for all the processing and data reaching the final storage. The model sentimental analysis runs when there is news update in a particular stream changel. All of this process should take about 5-6 min.
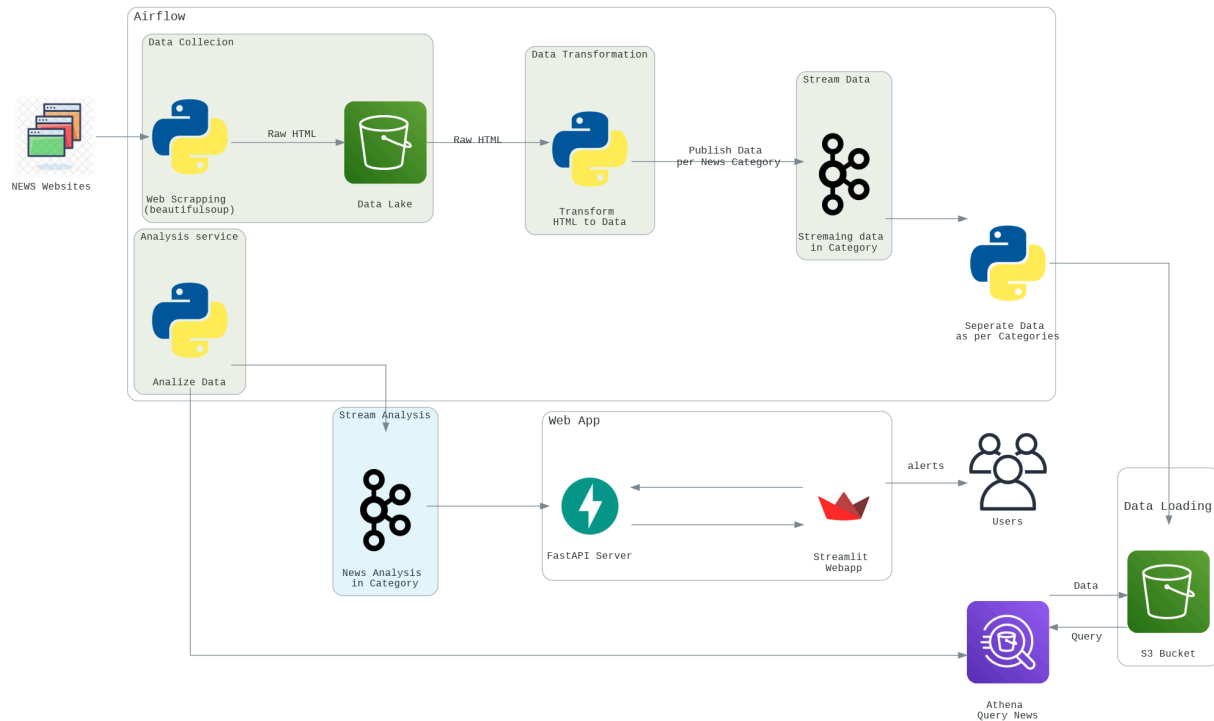
**Q: How accurate is the model analysis on the news?**

**A:** The model's accuracy in news analysis is a result of continuous refinement and rigorous testing. Our data science team fine-tunes the model based on real-time market feedback and historical performance evaluations. While no model can guarantee 100% accuracy, StockWise AI strives for high precision and recall rates. Backtesting against historical market data, user feedback, and ongoing adjustments to the algorithms contribute to maintaining and enhancing the accuracy of the model's analysis on news, providing users with reliable and actionable insights.

**Q: How is the system detecting Fake news?**

**A:** The system employs a multi-faceted approach to detect and filter out fake news. It assesses the credibility of news sources, and cross-reference information from multiple reliable sources. Additionally, the system incorporates machine learning models trained on historical data to identify and flag content that exhibits characteristics commonly associated with misinformation. Regular updates and improvements to the model ensure an evolving and robust defense against fake news.

# Architecture Diagram



Architecture Diagram
Workflow : Real Time Stock Market News Analysis

**Airflow:**
Airflow is leveraged to schedule and orchestrate Directed Acyclic Graphs (DAGs) for efficient extraction of data. Data extraction occurs every 4 minutes.

DAG-1: Data Extraction
- Used to execute a python script to scrape HTML data from News web pages.
- Beautifulsoup library is used to extract the HTML contents.
- Raw Data is stored in an Amazon S3 bucket.

DAG-2: Data Processing
- Usable data is collected from the raw data that was loaded into S3.
- The News data is then separated into categories and the data is streamed over kafka

DAG-3: Kafka(news stream)
- Kafka channels are used to stream real-time data for storing into S3 buckets as per news categories.

- Airflow has a built-in connector for Kafka that allows to write data to a Kafka stream and incorporate it into a DAG workflow

DAG-4: Data Separator
- Python script running on an EC2 instance is constantly listening to the kafka stream and updating the data into S3 buckets.
- Airflow has a built-in connector for Kafka that allows to read data from a Kafka stream and incorporate it into a DAG workflow

DAG-5: Analysis Service
- This is an asynchronous process used to run sentimental analysis on the news collected by the previous processes.
- The analysis is then streamed to the users.

**Amazon S3:**
S3 buckets are used to store news data in separate categories for running sentimental analysis in further steps.

**Amazon Athena:**
Athena is used by DAG-5 to query the S3 bucket and get new news data to run analysis.

**Kafka(analysis stream):**
Kafka channels are used to stream the analysis for the end users. There are different channels used based on the type of stock.

**FastAPI Server:**
There is a FastAPI server to send alerts and manage the stock setting of the end User.

**Streamlit App:**
Streamlit  is used to create a web based application for the end user to use.

# References

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