



AI-POWERED FINANCIAL TECHNOLOGY FOR IMPROVED INVESTMENT DECISION- MAKING AND RISK MANAGEMENT

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ABSTRACT

This paper outlines the creation of a groundbreaking AI-based retail investment application that utilizes the wisdom of renowned fund managers in the United States. Designed to bolster individual investors' decisions, manage risks, and encourage dollar-cost averaging, the App effectively addresses several challenges typically faced by retail investors, such as limited financial literacy, time limitations, and the struggle to make well-timed investments and risk evaluations. The App offers tailor-made investment advice aligning with users' individual preferences and risk tolerance, allowing them to mirror the strategies employed by successful fund managers. It also features a comprehensive analytics dashboard for tracking portfolio performance and delivers alerts about shifts in leading funds' portfolios. With a user-centric design, the application ensures accessibility and ease of use for both beginner and seasoned investors alike. Through a robust market research process encompassing interviews, feedback, and surveys, we identified the difficulties retail investors encounter and their desire for inventive financial solutions. The application taps into the industry's shift towards AI and fintech solutions, meeting the surging demand for digital investment tools. The App's ultimate goal is to enhance the retail investing experience by addressing prevalent investor challenges and delivering customized solutions. It empowers individual investors to traverse the financial market more confidently and achieve their financial objectives. The paper wraps up by underlining the prospective advantages that retail investors can reap from this approach.

Key words: Artificial Intelligence, AI, Machine Learning, Data Science, Financial Technology, Retail Investing, Smart Money, Risk Management, Personalized Financial Recommendations, Portfolio Optimization

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1. INTRODUCTION

In today's fast-paced world, retail investors face several challenges, such as time constraints, lack of or limited financial knowledge, and difficulties in determining the right timing and risk-taking abilities. To address these challenges, we propose a retail investing App that leverages public filings of the largest fund managers in the US, allowing users to replicate their strategies and benefit from their expertise.

Individual investors face numerous challenges when trying to navigate the stock market, often due to time constraints and lack of expertise. This section elaborates on these struggles, examining their inability to assess risk and the factors leading to suboptimal investment decisions. Furthermore, it highlights market research data, including interviews, feedback, and surveys, to support these claims.

1.1. Time Constraints and Lack of Expertise

The vast majority of individual investors juggle full-time occupations and personal obligations, thus finding only a scarce amount of time available for the in-depth study of market trends, corporate performance, and macroeconomic parameters impacting equity prices. Consequently, the lack of specialized knowledge and skills hinders them from making informed investment choices, posing a significant challenge in effectively managing their investment portfolios.

1.2. Difficulty in Assessing Risk

The ability to accurately evaluate risk forms a pivotal aspect of investment processes as it allows investors to gauge the potential gains and losses associated with different investment options. However, the necessary experience and knowledge to assess risk correctly often eludes individual investors. This lack of knowledge can consequently precipitate unsound investment decisions, thereby increasing the possibility of monetary losses.

1.3. Investment Decisions

Individual investors, due to their limited time and lack of specialized knowledge, might encounter difficulties when deciding on the ideal timing to buy, retain, or sell equities. Furthermore, accurately determining and managing the right level of risk in their investment portfolios can pose a significant challenge. These constraints frequently culminate in less-than-ideal investment decisions, which may subsequently result in reduced returns or financial losses.

2. MARKET RESEARCH INSIGHTS AND INDUSTRY TRENDS

Several market research methods, including interviews, user feedback, and surveys, have been employed to understand the struggles and needs of individual investors. This data, when contextualized with industry trends, offers compelling insights.

2.1. Interviews

A series of one-on-one interviews with several private investors unveiled widespread apprehension regarding limited time and deficiency in financial acumen. One such respondent, James, a 30-year-old software engineer residing in San Francisco, vocalized his unease with these prevailing obstacles. He perceived these challenges as significant contributors to his less-than-satisfactory investment choices, which he felt consequently led to suboptimal returns.

2.2. User Feedback

Analysis of feedback from various investment platforms underscored individuals' difficulties in assessing risk and making timely decisions about buying, holding, or selling stocks. Sarah, a 45-year-old teacher from Boston and a frequent platform user, articulated her struggles with risk assessment and decision-making, highlighting the impact on her investment strategy.

2.3. Surveys

A comprehensive survey found a significant proportion of individual investors lack confidence in managing their investment portfolios effectively. Robert, a 60-year-old retired doctor from New York and a respondent in the survey, was part of a large percentage of investors who admitted to a lack of confidence in managing their investments, reflecting a pervasive industry issue.

Our market research emphasizes the need for an AI-enhanced solution that can address these challenges, thereby improving investment outcomes for individual investors. By integrating AI functionalities into a user-friendly retail investing app, it's possible to alleviate common challenges faced by investors and align with the rising industry trend toward digital investment solutions.

3. THE AI-BASED RETAIL INVESTING APP SOLUTION

The proposed retail investing App combines publicly available investment data from top financial firms with an AI-based solution to simplify smart investing for users. By following the mantra "Just follow the experts! Compound their knowledge to compound your returns!" the App enables users to replicate the strategies of market leaders and outsmart the majority of retail investors. This section presents case studies of users who have benefited from the App, demonstrating its effectiveness in addressing the challenges faced by individual investors.

3.1. PROCESS FLOWCHART: A VISUAL REPRESENTATION OF THE RETAIL INVESTING APP'S FUNCTIONALITY AND KEY COMPONENTS

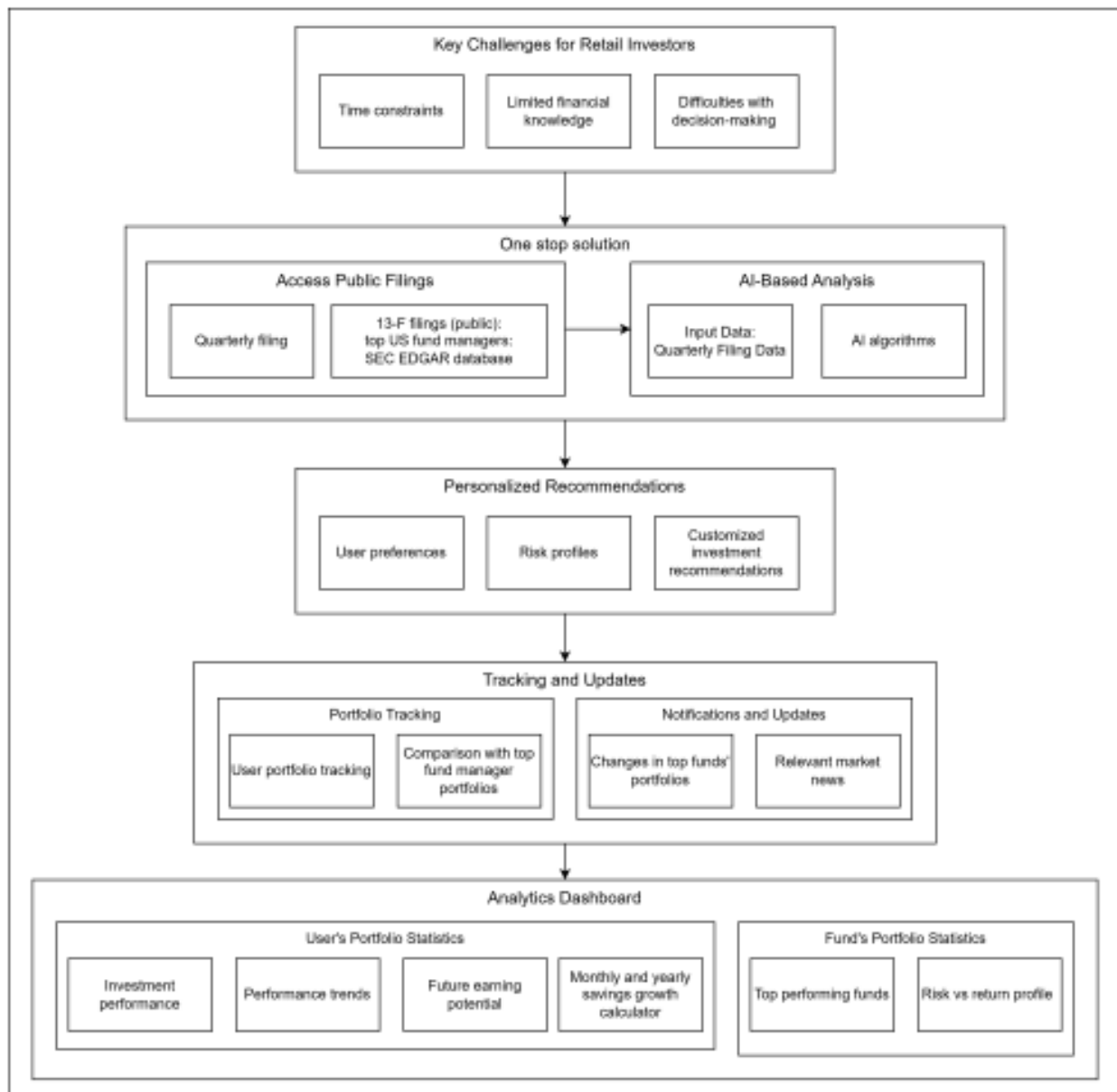


Figure 1: Process steps for utilizing top US fund managers' public filings in a retail investing App, offering personalized suggestions, portfolio tracking, and in-depth analytics to help individual investors make smart investments and reach their financial objectives

The process flowchart in Figure 1 outlines the key steps and components of the one-stop solution provided by the retail investing App. The flowchart demonstrates how the App addresses the challenges faced by retail investors and utilizes public filings of top US fund managers for effective investment decision-making. The flowchart starts by highlighting the key challenges faced by retail investors, including time constraints, limited financial knowledge, and difficulties with decision-making. It then shows that the App accesses public filings, specifically the 13-F filings of top US fund managers from the SEC EDGAR database.

These quarterly filings serve as a valuable source of investment data. The industry sector information for each company was added by the authors using the North American Industry Classification System (NAICS).

Next, the flowchart depicts the AI-based analysis that the App employs. The quarterly filing data is fed into an AI algorithm, which performs in-depth analysis and extracts valuable insights. This analysis forms the basis for personalized recommendations tailored to user preferences and risk profiles. The flowchart further demonstrates how the App enables users to track their portfolios and compare them with those of top fund managers. Users can monitor their investment performance, analyze performance trends, and receive notifications of changes in top funds' portfolios. The App also keeps users updated with relevant market news that may impact their investments.

Additionally, the flowchart highlights the App's functionality in providing insights into future earning potential, top-performing funds, and the risk versus return profile of investments. It also includes a savings growth calculator to track monthly and yearly savings growth. Overall, the process flowchart showcases the comprehensive features and functionalities of the retail investing App, providing users with a user-friendly platform to make informed investment decisions and track their portfolios effectively.

3.2. Features and Benefits of the Retail Investing App

The retail investing App offers a range of features and benefits:

- Replicates the strategies of top fund managers to optimize investments.
- Provides a proprietary scoring system to compare users' portfolios with those of top fund managers.
- Recommends personalized investment decisions based on users' preferences and risk profiles.
- Back-tests strategies to evaluate the effectiveness of various investment approaches.
- Generates notifications for changes in top funds' portfolios, enabling individual investors to stay informed.
- Provides a comprehensive analytics dashboard to monitor portfolio performance.

3.3. User Interface and Functionality

3.3.1. Ease of Use

The App is intuitively designed, minimizing the learning curve for new users. Regardless of their financial expertise, users can navigate seamlessly through the App. For example, key features such as portfolio overview, stock recommendations, and risk analysis are clearly labeled and easily accessible from the home screen.

3.3.2. Risk/Return Categories

The App offers predefined risk/return categories, from conservative to aggressive, allowing users to align their investments with their risk tolerance and financial goals. For instance, a risk-averse user could select the 'Conservative' category and receive investment recommendations primarily consisting of low-risk bonds and blue-chip stocks.

3.3.3. Viral Components

The App incorporates features to boost user engagement and viral growth. One notable feature is the 'Share Your Portfolio' option, which enables users to showcase their portfolio performance on social media platforms, inspiring their network to explore the App as well.

3.3.4. Intuitive Filter

The App provides easy-to-use filters similar to the online shopping experience, enabling users to customize their view of investment options based on parameters such as industry sector, risk level, or past performance. For example, a user interested in technology stocks could apply the 'Tech Sector' filter to receive recommendations specifically within that industry.

3.3.5. Back-Testing Strategy

The App includes a back-testing feature that lets users see how different investment strategies would have performed historically. For example, users can use this feature to evaluate the historical performance of high-risk, high-return strategies, empowering them to make well-informed decisions.

3.3.6. Notification Mechanism

To encourage regular investment habits, the App sends monthly notifications reminding users to allocate a portion of their savings to stocks. These reminders help users maintain a disciplined investment approach, promoting dollar-cost averaging and helping to mitigate the effects of market volatility.

3.4. Analyzing Specific Fund Positions and Holdings

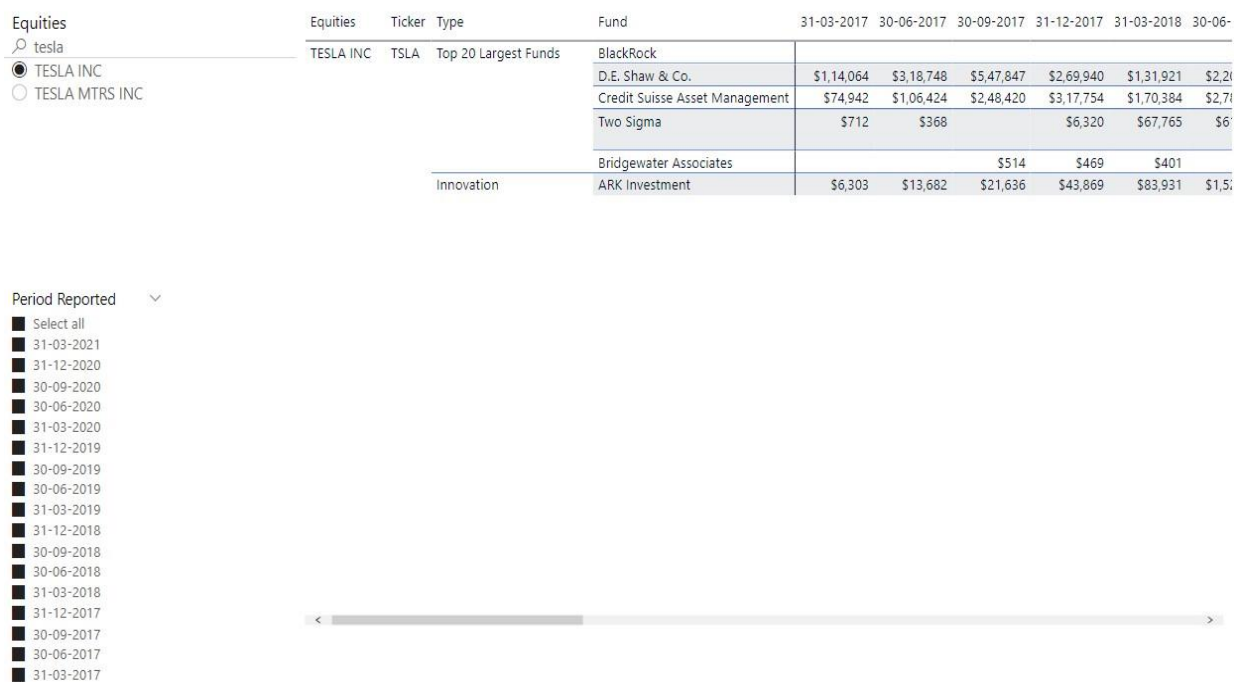


Figure 2: Top fund holdings of Tesla Inc. over multiple quarters

Users can access valuable information about specific fund positions and holdings, including fund performance analysis, top position holdings, position changes, sector/industry view, fund history analysis, and company analysis. The information empowers individuals to make well-informed investment choices. For example, consider the portfolio of top funds that Tesla Inc. had held for each of the quarters in 2017 and beyond. The information in Figure 2 would help a user to look at the investment positions of different fund managers on stocks to get an idea about their investment patterns.

3.5. Unique Selling Points

3.5.1. Investment Features: Invest Like Billionaire Fund Managers

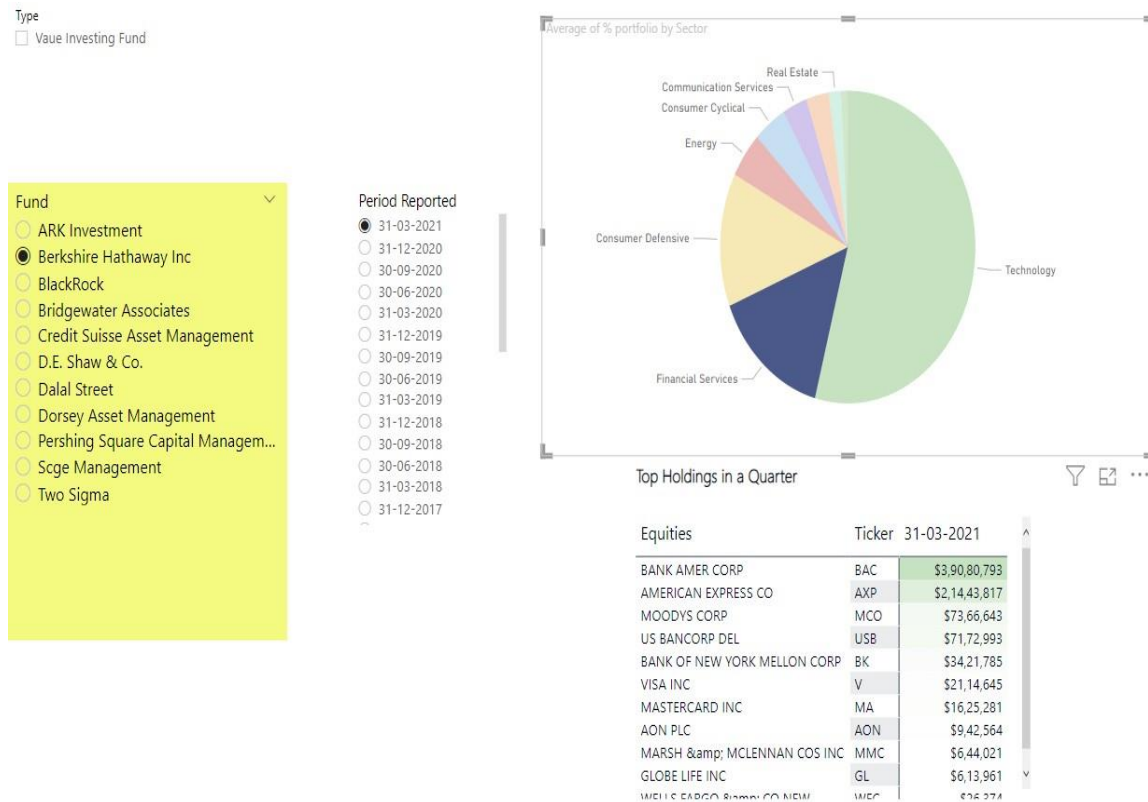


Figure 3: Sector-wise holdings of Berkshire Hathaway Inc. for a quarter, guiding users to strategize

Access to Top Fund Managers' Strategies

The App allows users to access public filings from top US fund managers, empowering them to replicate investment strategies employed by successful individuals like Warren Buffet. By following smart money, users can leverage the expertise of these market leaders to make better investment decisions. The information in Figure 3 focuses the users' attention on specific sectors that they might want to prioritize their investments in, given the relative importance given to those sectors by different fund managers.

Historical Risk vs Reward Profile of Top Investors

Type	Fund Manager	Fund	Top_N_strategy	Expected Rewards: Median of Yearly Returns %	Maximum Risk: Worst Yearly Returns %	Risk
Innovation	Catherine D. Wood	ARK Investment	Top_03_Holdings	10.5%	-37.5%	High Risk
Innovation	Catherine D. Wood	ARK Investment	Top_05_Holdings	13.0%	-38.5%	High Risk
Innovation	Catherine D. Wood	ARK Investment	Top_10_Holdings	10.8%	-38.2%	High Risk
Innovation	Catherine D. Wood	ARK Investment	Top_15_Holdings	9.5%	-36.2%	High Risk
Top Performing Fund in last 3 years	Christopher Lyle	Scge Management	Top_03_Holdings	6.8%	-37.3%	High Risk
Top Performing Fund in last 3 years	Christopher Lyle	Scge Management	Top_05_Holdings	9.3%	-24.9%	High Risk
Top Performing Fund in last 3 years	Christopher Lyle	Scge Management	Top_10_Holdings	8.7%	-25.7%	High Risk
Top Performing Fund in last 3 years	Christopher Lyle	Scge Management	Top_15_Holdings	8.1%	-23.5%	High Risk
Vaue Investing Fund	Bill Ackmann	Pershing Square Capital Management, L.P.Ā	Top_03_Holdings	7.6%	-24.5%	High Risk
Vaue Investing Fund	Bill Ackmann	Pershing Square Capital Management, L.P.Ā	Top_10_Holdings	6.9%	-26.4%	High Risk
Vaue Investing Fund	Bill Ackmann	Pershing Square Capital Management, L.P.Ā	Top_15_Holdings	6.9%	-26.4%	High Risk
Vaue Investing Fund	Mohnish Pabrai	Dalal Street	Top_03_Holdings	7.4%	-22.9%	High Risk
Vaue Investing Fund	Mohnish Pabrai	Dalal Street	Top_05_Holdings	4.1%	-22.9%	High Risk
Vaue Investing Fund	Mohnish Pabrai	Dalal Street	Top_10_Holdings	5.1%	-22.9%	High Risk
Vaue Investing Fund	Mohnish Pabrai	Dalal Street	Top_15_Holdings	5.1%	-22.9%	High Risk
Vaue Investing Fund	Warren Buffet	Berkshire Hathaway Inc	Top_03_Holdings	1.1%	-23.4%	High Risk
Vaue Investing Fund	Warren Buffet	Berkshire Hathaway Inc	Top_05_Holdings	3.0%	-32.0%	High Risk
Vaue Investing Fund	Warren Buffet	Berkshire Hathaway Inc	Top_10_Holdings	3.0%	-24.7%	High Risk
Vaue Investing Fund	Warren Buffet	Berkshire Hathaway Inc	Top_15_Holdings	3.5%	-27.0%	High Risk
Top 20 Largest Funds	Larry Fink	BlackRock	Top_03_Holdings	8.1%	-2.2%	Low Risk
Top 20 Largest Funds	Larry Fink	BlackRock	Top_05_Holdings	9.6%	3.8%	Low Risk
Top 20 Largest Funds	Larry Fink	BlackRock	Top_10_Holdings	13.4%	6.8%	Low Risk
Top 20 Largest Funds	Larry Fink	BlackRock	Top_15_Holdings	13.7%	5.3%	Low Risk
Top 20 Largest Funds	Credit Suisse Group	Credit Suisse Asset Management	Top_03_Holdings	3.7%	-11.4%	Medium Risk
Top 20 Largest Funds	Credit Suisse Group	Credit Suisse Asset Management	Top_05_Holdings	4.7%	-9.8%	Medium Risk
Top 20 Largest Funds	Credit Suisse Group	Credit Suisse Asset Management	Top_10_Holdings	4.1%	-10.8%	Medium Risk
Top 20 Largest Funds	Credit Suisse Group	Credit Suisse Asset Management	Top_15_Holdings	4.7%	-10.2%	Medium Risk

Figure 4: Historical Risk vs Reward profile of top investors helping users to identify trends and spot investment opportunities

AI-Powered Analysis

The App uses advanced AI algorithms to analyze the public filings of top fund managers and extract valuable insights. This enables users to identify trends, spot investment opportunities, and gain a deeper understanding of the market landscape. Figure 4 depicts a way for a given user to spot trends in investments of top portfolio managers and estimate their own risk vs. reward metrics aligned with those potential investments. The top three holdings shown as Top 03 Holdings depicted in the figure represent the three financial instruments with the highest market value in that fund on the filing date. The same applies to the top five, top ten, and top fifteen holdings, indicated by Top 05 Holdings, Top 10 Holdings, and Top 15 Holdings, respectively.



Figure 5: Growth Analytics of top funds to help users optimize their portfolios for maximizing returns.

Portfolio Comparison

Users can compare their portfolios with those of top fund managers to evaluate their investment choices and identify areas for improvement. This feature helps users optimize their portfolios to get maximum returns. Figure 5 allows a user to measure the growth of their investments based on analytics of stocks held by different fund managers.

3.5.2. Financial Planning Capabilities: Achieve Financial Goals

Personalized Recommendations

The App provides tailored investment suggestions, taking into account the individual user’s preferences, risk appetite, and financial objectives. This empowers users to curate an investment portfolio that is congruent with their unique requirements and goals.

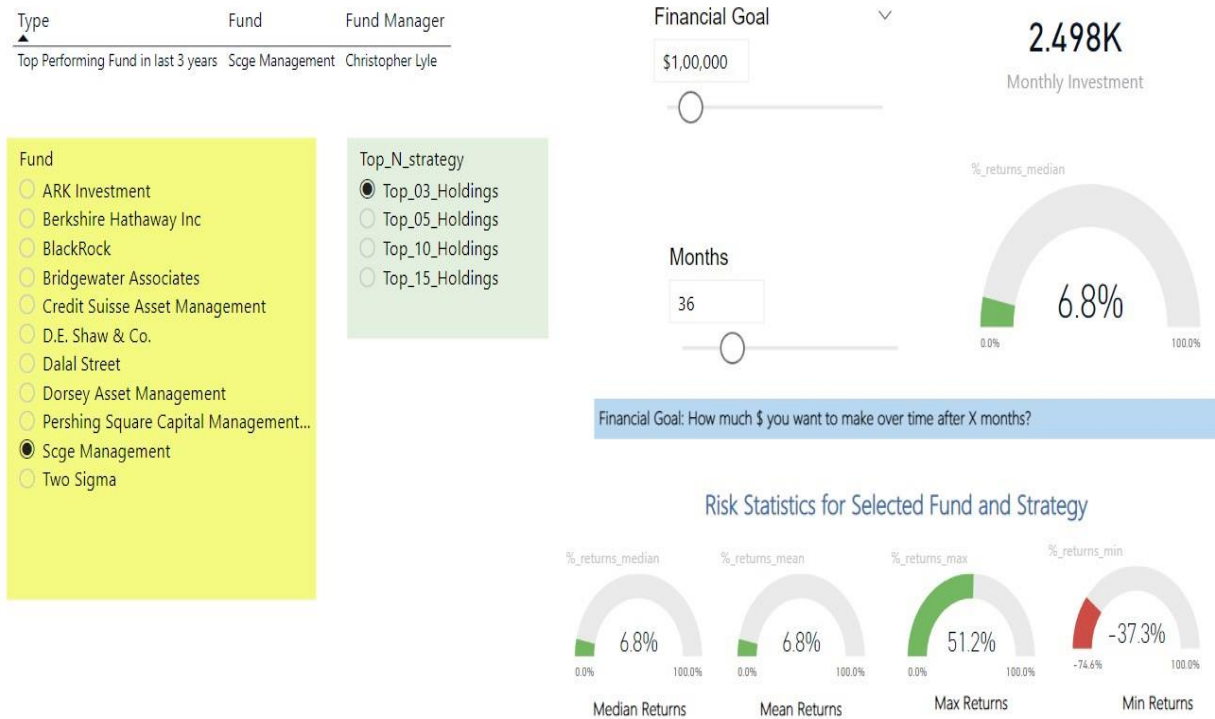


Figure 6: Risk statistics of top funds to enable users to measure and keep track of their financial goals.

Goal Tracking

Users can specify particular financial goals, like purchasing a home, financing their offspring’s education, or strategizing for retirement. The application measures users’ progression towards these objectives, assisting them in maintaining focus and modifying their investment approaches as necessary. Figure 6 helps a user track how they are doing with regard to their own financial goals by monitoring and reporting benefits provided by investments done by top fund managers on their selected stocks.

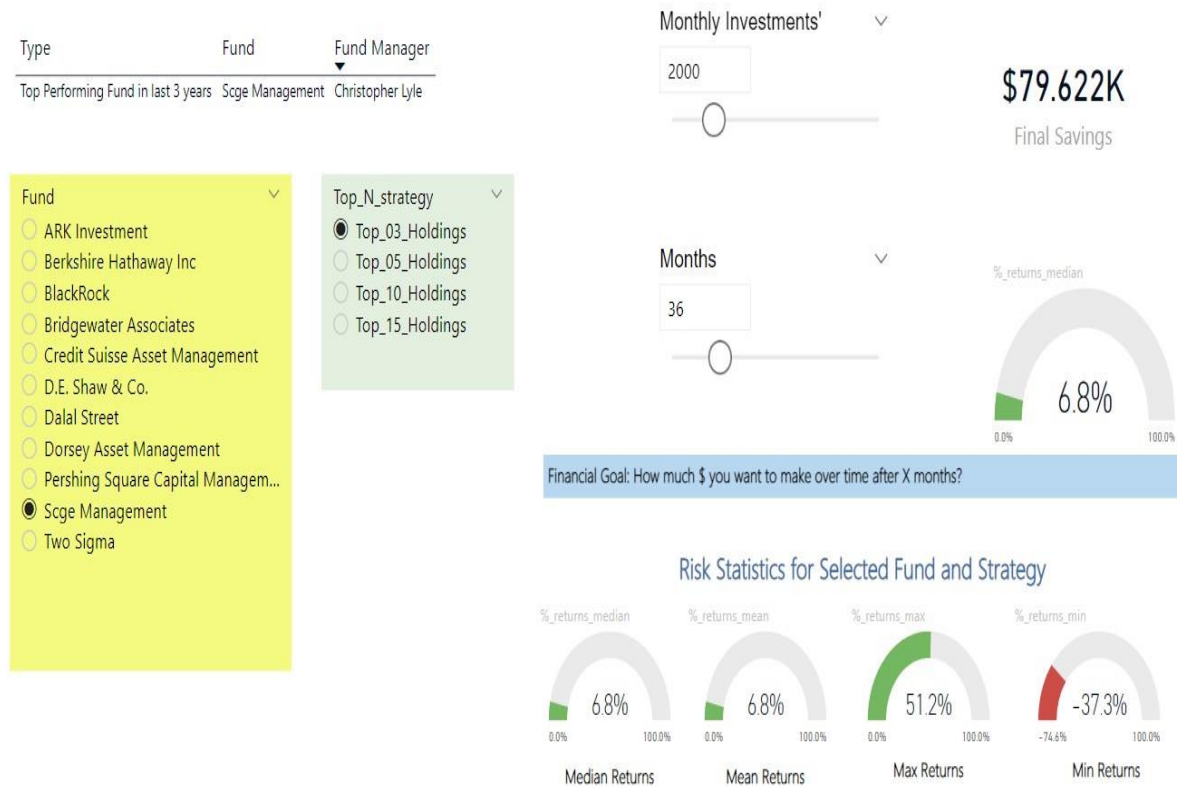


Figure 7: Top funds-based regular money investing strategies using dollar-cost averaging for users to minimize risk and maximize returns.

Dollar-Cost Averaging

The App incorporates dollar-cost averaging, a time-tested investment method involving the investment of a fixed monetary sum at regular intervals. This tactic aids users in mitigating market turbulence and lessens the likelihood of suboptimal investment choices based on temporary market fluctuations. Figure 7 provides valuable insights into money investing strategies followed by top fund managers that users can apply as part of their investment strategies.



Figure 8: Seamless user interface to assess financial data to enable smart investment decisions.

3.5.3. User-Friendly Experience: Intuitive and Easy-to-Use

Streamlined Interface

The app sports a clean, intuitive interface, allowing users to effortlessly navigate and retrieve required information effortlessly. This facilitates a lower entry threshold for beginner investors and guarantees a seamless user experience. Figure 8 shows how varied information on financial data is made easily accessible and customized per user’s needs, thereby aiding its ease of use.



Figure 9: Chronological simulation of various portfolios to optimize incremental investment decisions.

Comprehensive Analytics Dashboard

The app furnishes a comprehensive analytics dashboard, offering users a clear overview of their investment performance, prevailing trends, and portfolio structure. This empowers users to make decisions backed by data and keep track of their progression over time. A comprehensive Analytics dashboard, as depicted in Figure 9, presents an insightful simulation of various portfolios of fund managers and helps users optimize their incremental investment decisions over time.

Regular Updates and Notifications

Users receive regular updates and notifications about changes in top funds’ portfolios and relevant market news. This ensures that they stay informed about the latest market developments and can adjust their investment strategies accordingly.

The App’s unique selling points, including its Investment Features, Financial Planning Capabilities, and User-Friendly Experience, make it a powerful tool for individual investors seeking to overcome the challenges they face in the stock market and achieve their financial goals.

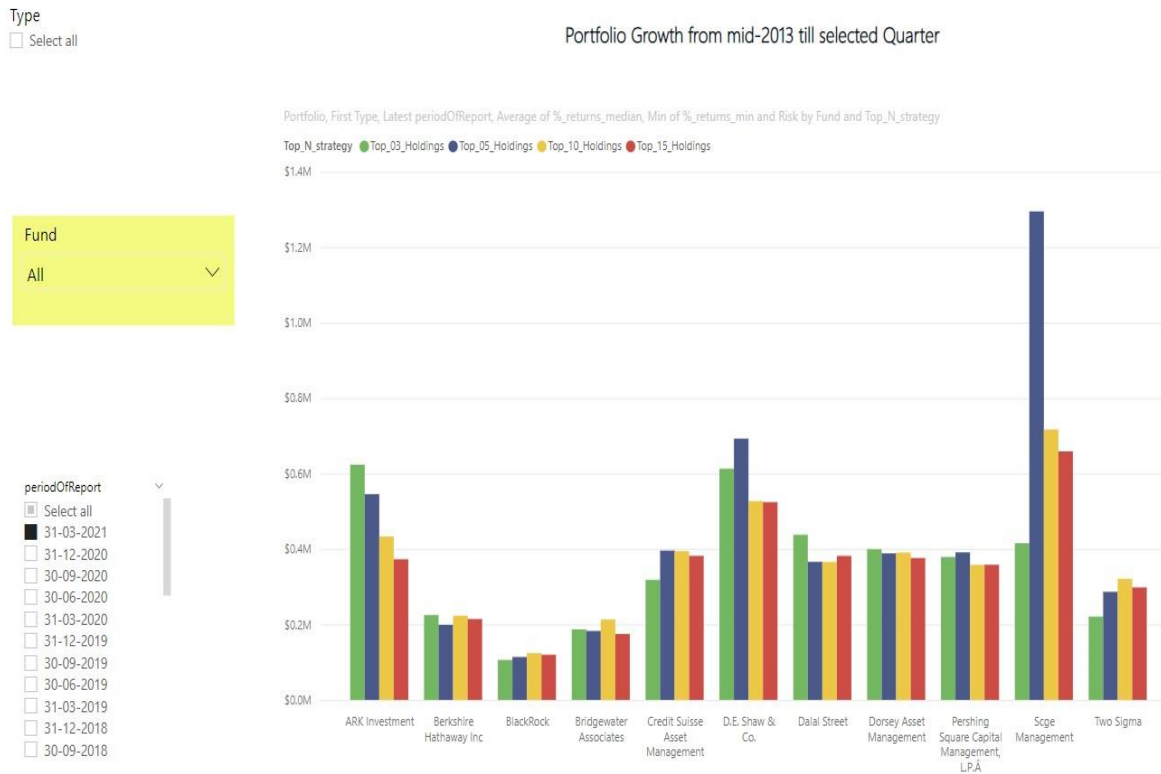


Figure 10: Comparative position with top funds to assess portfolio growth over time.

3.6. Investor Behavior and Business Value Proposition

Investors have diverse preferences, ranging from those who favor passive investment strategies to risk-averse individuals seeking portfolio diversification and even those willing to invest in comprehensive subscription-based solutions. The App recognizes these variations and strives to cater to each user’s distinct needs and preferences, delivering substantial value in the process. Figure 10 shows the comparative positions of top funds and measures their portfolio growth over time so that users can mix and match their selections to maximize their investment gains.

3.6.1. Passive Investors

For those who prefer a more hands-off approach, the App provides an easy solution with simple rebalancing strategies. This allows users to effortlessly maintain a well-balanced portfolio without the need for constant monitoring and active management. By automating the rebalancing process, investors can save valuable time and eliminate the stress associated with actively managing their investments.

3.6.2. Risk-Averse Investors

Understanding the concerns of risk-averse investors, the App provides options for diversified portfolios. This helps users mitigate company-specific risks and achieve more stable returns in the long term. By offering a range of investment options, the App enables users to create a tailored portfolio that aligns with their risk tolerance.

3.6.3. Subscription-Based Comprehensive Solution

For investors willing to pay a subscription fee, the App offers a comprehensive investment solution that includes access to top fund managers' strategies, AI-powered analysis, personalized recommendations, goal tracking, and more. By providing a complete suite of investment tools and resources, the App helps users make well-formed decisions and optimize their investment returns. The App recognizes diverse investor behaviors and preferences and strives to deliver significant value to its users by addressing their individual needs through a range of tailored features and solutions.

4. ADDRESSING INVESTOR CHALLENGES WITH THE APP

In this section, we discuss how the App offers solutions to the common challenges faced by individual investors - time constraints, limited financial knowledge, and difficulties in determining the right timing and risk-taking ability.

4.1. Overcoming Time Constraints

Busy investors often struggle to find time for in-depth market analysis and portfolio rebalancing. The App alleviates this pain point by offering automated portfolio management and rebalancing features. With these, users can maintain a diversified portfolio that aligns with their risk tolerance and investment objectives, even with minimal market monitoring. This efficient use of technology not only saves time for investors but also ensures they stay updated with the market trends.

4.2. Bridging the Financial Knowledge Gap

Not all individual investors possess comprehensive financial knowledge. This can hinder their ability to make optimal investment decisions. The App's AI-powered analysis and personalized investment recommendations help fill this knowledge gap. By providing accessible and actionable insights, the App empowers even novice investors to make informed decisions and enhance their potential for improved returns.

4.3. Optimizing Investment

Timing and Risk Management Timing the market and assessing investment risk are complex tasks that often pose challenges to individual investors. To address this, the App provides access to top fund managers' strategies and supports dollar-cost averaging, a technique that reduces the impact of market volatility on investment performance. This feature enables users to make strategic decisions about when to invest while effectively managing their risk exposure, leading to a more confident and successful investment experience. By directly addressing these common pain points, the App offers a tailored solution that enhances the retail investing experience, enabling individual investors to navigate the market more efficiently and effectively.

5. CONCLUSION

The landscape of retail investing can be daunting for individual investors due to the challenges of time constraints, limited financial knowledge, and difficulties in risk assessment and investment timing. This paper outlines how the retail investing App, leveraging AI and FinTech, provides targeted solutions to address these challenges. The App leverages the public filings of the largest fund managers in the US to offer a streamlined, user-friendly interface that empowers investors to replicate the strategies of these market leaders. By automating portfolio management and offering personalized investment recommendations, the App not only saves time for busy investors but also bridges the gap in financial knowledge. Furthermore, the App's innovative features, such as advanced filters, back-testing strategies, and notification mechanisms, offer a tailored investment experience. These features allow investors to customize their investments, gain insights from historical data, and maintain consistent investment practices, thereby effectively managing their risk and enhancing returns. In addition, the App has been designed with a focus on user engagement and organic growth, incorporating viral components and social sharing options, which can further broaden its reach and impact. Overall, the retail investing App represents a significant advancement for individual investing, providing a platform that is not just technologically advanced but also responsive to the needs of its users. By directly addressing common investor pain points, the App has the potential to revolutionize retail investing, enabling users to navigate the market more effectively, make smarter investment decisions, and ultimately achieve their financial goals.

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