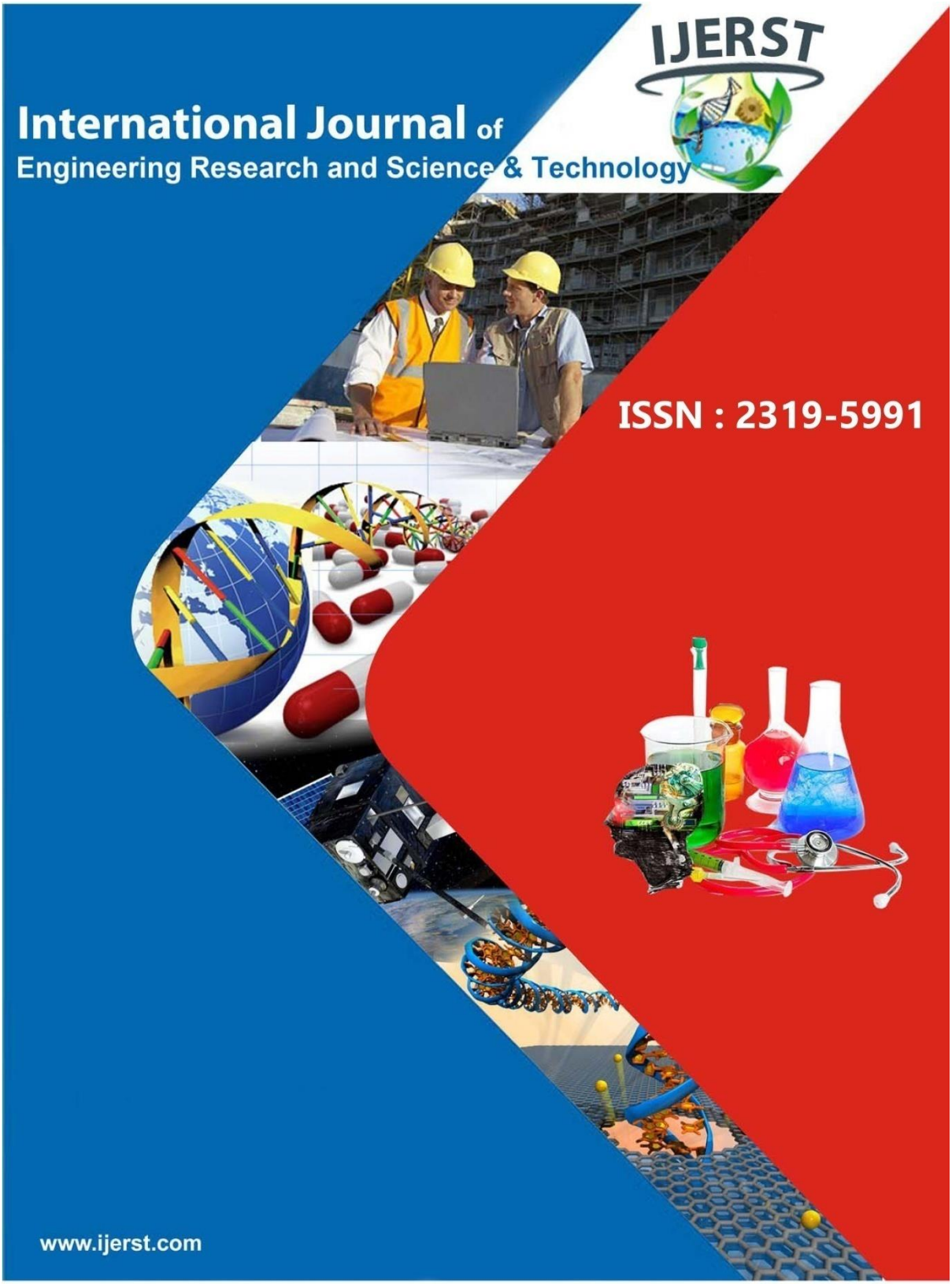

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NSE Stock Monitoring & Prediction Using Robotic Process Automation

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Abstract: The core objective of the project is to automate the backend office work of monitoring stocks daily. The project uses "Robotic Process Automation" to download the daily stock values from NSE website, feed the data into an Excel Sheet and send it to the required recipient through E-mail. Software for robotic process automation (RPA) is designed to perform basic tasks across applications just like human workers. A process with multiple steps and applications is taught to the software robot, such as taking received forms, sending a receipt note, verifying the completeness of the document, uploading the form in a folder, and updating a spreadsheet with the form name, the date submitted, etc. Like deep learning, with some support from programmers, the software robots used in robotic process automation are programmed by the employees to do the tasks in a specific workflow. The software is not learning on its own or trying to adapt new efficiencies or new insights such as tools for enterprise resource management (ERM). RPA acts as a remote worker assistant by clearing up the burdensome, simple tasks that eat up part of the day of each office worker.

Key-words: Robotic Process Automation (RPA), NSE (National Stock Exchange), Stock Monitoring, Automation, Stock Market Prediction.

1. INTRODUCTION

In the fast-paced financial sector, stock market monitoring is a crucial yet time-consuming task, requiring continuous updates and quick decision-making based on daily stock fluctuations. The National Stock Exchange (NSE) serves as a vital platform where companies list their stocks for trading, and real-time monitoring of these stocks is essential for investors, financial institutions, and brokerage firms. Manually tracking and managing stock data across various companies is a labor-intensive process, often prone to human error and inefficiency. To address these challenges, Robotic Process Automation (RPA) offers an innovative solution by automating repetitive backend tasks, thereby optimizing workflows and improving operational efficiency. RPA technology mimics human actions and automates processes such as data extraction, report generation, and email distribution, without the need for human intervention. This makes it particularly useful in automating the monitoring of daily stock values, generating reports, and distributing them efficiently. The primary aim of this project is to develop an RPA-based system that automates the entire process of downloading daily stock values from the NSE website, updating Excel sheets, and sending the updated reports via email to designated recipients. By integrating RPA into the

stock monitoring process, businesses can significantly reduce the time spent on routine administrative tasks, minimize human error, and allow employees to focus on more strategic decision-making. Unlike machine learning models, which require training and adaptation, RPA is programmed with predefined steps and executes tasks precisely as designed. The result is a remote assistant that manages simple yet essential tasks, ensuring that the backend office work of monitoring stock prices is handled efficiently and accurately. This project highlights the application of RPA in the financial sector, showcasing its ability to enhance productivity, streamline workflows, and improve the overall efficiency of stock monitoring and reporting processes.

II. LITERATURE REVIEW

A review by Aguirre and Rodriguez [1] highlights the increasing adoption of RPA in various business domains, emphasizing its potential in automating mundane tasks. The finance sector, in particular, has greatly benefited from these innovations. Sharma et al. [2] demonstrated how RPA can be applied to automate stock monitoring, showcasing its ability to reduce manual intervention and errors in financial transactions. Similarly, Patel and Bhatia [3] provide a comparative analysis of different RPA tools used in financial automation, noting how specific tools offer enhanced performance based on the task's complexity.

In the banking sector, Roy and Mukherjee [4] explored how RPA could streamline operations, particularly in financial process automation, thereby minimizing human errors and increasing operational speed. Moreover, Mehta and Tan [5] introduced a synergistic approach that combines RPA with machine learning to predict stock market trends, reflecting the growing interest in combining multiple technologies for superior outcomes. The challenges and opportunities of implementing RPA for stock data processing are comprehensively discussed by Jain et al. [6], who identified data integration issues and potential scalability as major challenges but acknowledged the immense benefits once overcome. Meanwhile, Rossi [7] delved into how RPA is reshaping back-office operations in financial markets, leading to better resource allocation and cost savings.

RPA, when integrated with artificial intelligence (AI), provides even more powerful automation solutions. Gupta and Ahuja [8] presented a study on automating stock market operations using RPA and AI, showcasing how this integration can handle large data volumes efficiently. Additionally, Lee and Park [9] proposed a novel framework that combines RPA with cloud computing, emphasizing how financial automation can be taken to new levels of scalability and flexibility. The specific use case of RPA in stock portfolio management is explored by Zhang et al. [10], who demonstrated how automated systems can enhance decision-making in managing financial portfolios. This is supported by Agarwal and Singh [11], who highlight the critical role RPA plays in enhancing stock market analysis, allowing for more precise and timely insights. Financial reporting has also seen considerable improvements thanks to RPA, as noted by Roberts and Lee [12], who discussed advances in financial reporting automation. This theme continues with Liu and Chen [13], who analyzed a case study where RPA significantly improved stock market predictions. Additionally, Das and Narang [14] identified both the applications and challenges of RPA in the financial industry, focusing on its transformative potential.

Monitoring stock markets using RPA has become a critical area of focus, as Khan and Ahmad [15] reviewed recent trends, highlighting how RPA tools can offer real-time tracking and analysis. Patel and Desai [16] further added to this discussion by exploring how predictive analytics combined with RPA could enhance the accuracy of stock data. Incorporating RPA into financial operations is not without its challenges, but researchers like Smith and

Wong [17] have provided actionable insights on overcoming hurdles in automating stock data reporting. Similarly, Rao and Prasad [18] developed a hybrid model that combines RPA with machine learning, showcasing how this combination can tackle high-complexity financial tasks more efficiently. Finally, Thompson and Green [19] argued that RPA acts as a catalyst for financial transformation, driving automation in tasks ranging from reporting to predictive analytics. In summary, the literature shows that RPA, combined with other technologies such as AI and cloud computing, is driving significant advancements in financial automation. These studies provide a foundation for future research and development in automating complex financial processes, with a focus on improving accuracy, reducing costs, and enabling scalability.

III.METHODOLOGY

The proposed system for automating the download and dissemination of the Equities Historical Record from the NIFTY50 list using Robotic Process Automation (RPA) consists of several key steps. This methodology outlines the systematic process for implementing the solution.

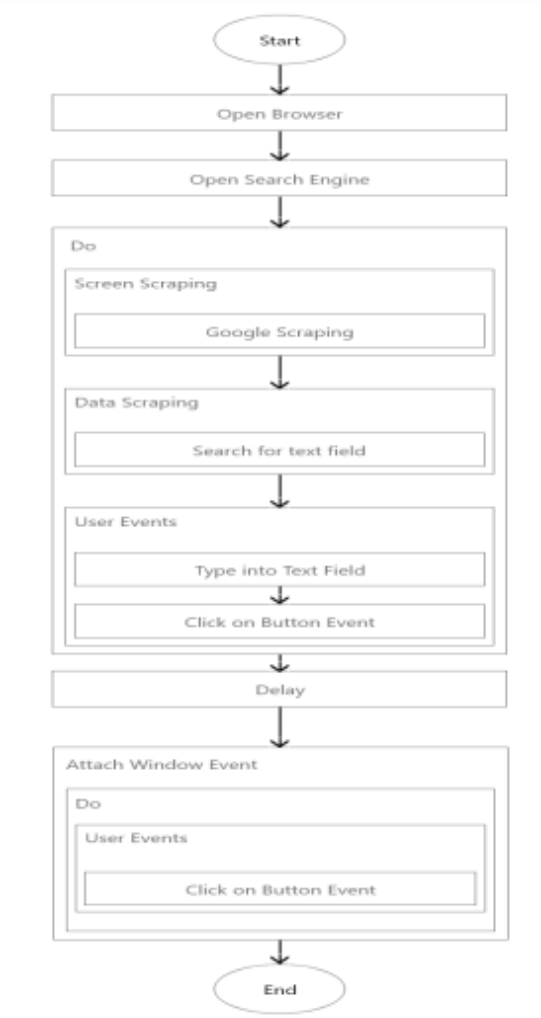


Fig-1: System Architecture

Step 1: Requirement Gathering and Analysis: The primary objective of this automation is to identify and streamline the manual processes involved in downloading the Equities Historical Record of the top firm from the NIFTY50 list on the NSE India website and emailing it to designated recipients. Currently, this process is performed manually, requiring daily visits to the website, data extraction, and email dissemination. To facilitate automation, it is crucial to understand user requirements, such as the specific data to be extracted, the timing of the task (aligned with stock market opening hours), and the identification of the intended recipients. Furthermore, any constraints, including the required data format and timing of execution, must be clearly defined.

Step 2: Tool Selection and Environment Setup: The next step involves selecting an appropriate RPA tool and establishing the necessary development environment. Tools such as UiPath, Automation Anywhere, or Blue Prism are suitable choices, as they provide robust platforms for automating web-based processes. The environment setup includes installing the selected RPA tool, configuring email settings for seamless communication with recipients, and preparing the development machine for automation. Additionally, ensuring reliable internet connectivity is essential for regular access to the NSE India website and retrieving the necessary equity data.

Step 3: Bot Design and Development: The objective at this stage is to develop a bot that automates the entire process. Development begins with web scraping, where the bot is programmed to navigate to the NSE India website daily at a specified time (coinciding with stock market opening hours) to extract the equity data of the top firm from the NIFTY50 list. This step involves using selectors such as CSS or XPath to accurately identify and extract the required data fields. The bot is scheduled to trigger automatically at the designated time. Following data extraction, the bot downloads the equity records in a specified format, such as CSV or Excel, with built-in validation to ensure data accuracy. The final component of this step is email automation, where the bot is configured to send the extracted equity data to predefined recipients. This includes configuring SMTP settings or integrating API services like Gmail or Outlook to facilitate the automated email process. The bot attaches the downloaded equity file and formats the email appropriately before dispatching it to the recipients.

Step 4: Monitoring and Maintenance: The objective of this phase is to continuously monitor and update the bot as necessary to ensure optimal performance. To achieve this, logging mechanisms are implemented to track the bot's execution, record any errors, and generate daily reports that provide insights into the bot's activities. Regular maintenance is crucial; this includes checking for updates or changes on the NSE India website, which may necessitate adjustments to the bot's web-scraping mechanism. Additionally, it is important to update email recipients as needed to maintain effective communication. By ensuring the bot is well-maintained and responsive to changes, its efficiency and reliability in automating the process will be significantly enhanced.

By following this methodology, the manual process of extracting and emailing the daily Equities Historical Record from the NIFTY50 list is effectively automated, resulting in time savings and reduced operational costs associated with manual labor. The system guarantees timely and accurate data delivery to the intended recipients.

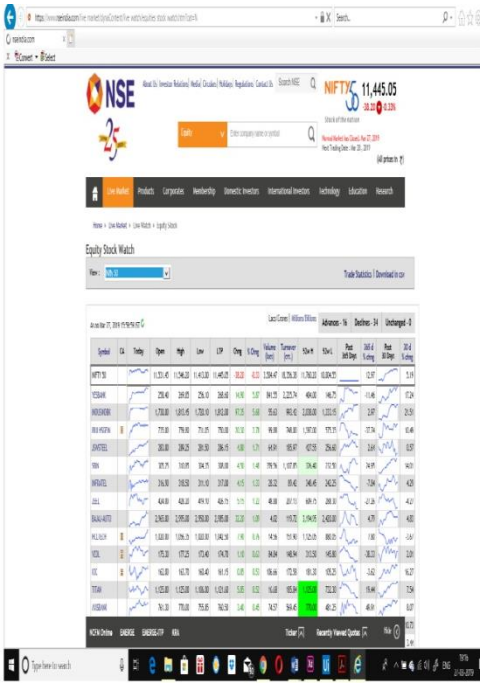
ALGORITHM

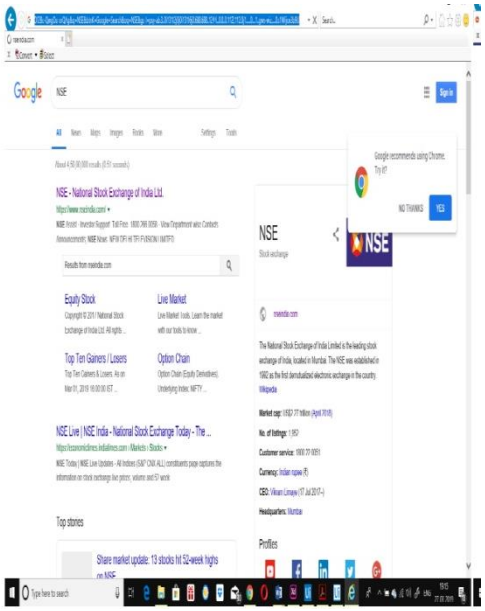
1. Trigger the RPA Bot: The RPA bot is activated to initiate the process.
2. Launch the Default Browser: The bot starts the process by opening the default web browser.
3. Open Google Search Engine: The Google search engine is launched, and the search textbox is populated with the query “NSE Stocks.” The search results are displayed after clicking the “Google Search” button.
4. Match Predefined Keywords: The bot compares the predefined keywords with the displayed website names in the search results. It opens the most relevant link: https://www.nseindia.com/website.
5. Navigate to Live Market: The bot accesses the "Live Market" section, followed by "Live Watch," and then selects the "Equity Stock" page.
6. Open Equity Page: The equity page of the top firm on the Nifty50 list is opened for further processing.
7. Download Equities Historical Data: The bot downloads the historical equity data and saves it in a designated folder.

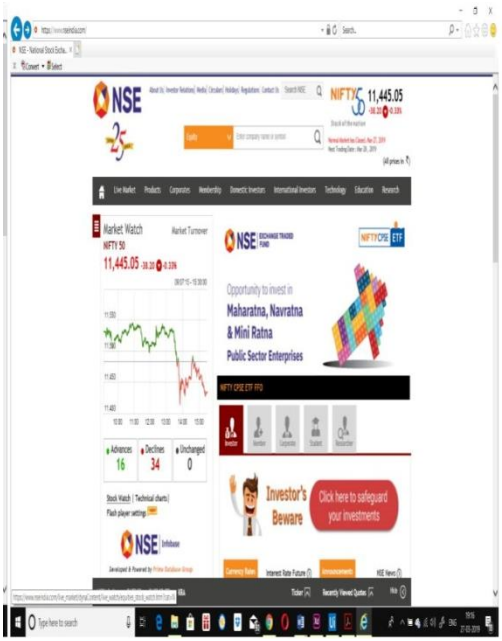
8. Email the Downloaded File: The downloaded file is sent to the assigned recipients via Gmail.
9. Check Process Completion: The bot verifies whether the entire process has been completed successfully.
10. Shutdown and Await Next Trigger: The bot is turned off and remains in standby mode, waiting for the next trigger to initiate the process again.

IV. RESULTS AND DISCUSSION

The implementation of Robotic Process Automation (RPA) in the automation of downloading and disseminating the Equities Historical Record from the NIFTY50 list demonstrates significant potential for enhancing productivity and operational efficiency within organizations. This section discusses the results achieved from the RPA deployment and explores the implications for businesses in the context of broader industry trends.







V. CONCLUSION

Academic studies predict that RPA is expected to drive a new wave of productivity gains and efficiency improvements on the global labor market, among other technological developments. Although not directly attributable to RPA alone, Oxford University conjectures that by 2035 may have automated up to 35 percent of all employment. Since the days of simplistic screen scraping and simple process management tools first appeared in the 1990s, RPA techniques have evolved significantly. Today, RPA has changed how businesses around the globe approach their business activities, particularly in terms of operational improvement and streamlining. We can't know precisely how automation systems will evolve in years to come, yet we have good evidence that RPA's future is very promising. When RPA prevalence grows and automation experiences a greater degree of adoption in more diverse industries, not only will the full advantages of automation technology be understood, but they will also be leveraged as a crucial competitive advantage in a variety of crowded, growing industries.

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