

RB-EV BASED NEWS EVENT-DRIVEN STOCK FLUCTUATIONS DETECTION IN PAKISTAN'S MARKET THROUGH DATA MINING

¹Subhan Arif, ^{*2}Muhammad Umer Ghani, ³Shehroz Tariq, ⁴Zaki Akram,
⁵Riyan Athar, ⁶Muhammad Talha Dar, ⁷Anam Ikram

¹Department of Computer Science, National University of Modern Languages, Faisalabad
38000, Pakistan

^{*2}Department of Software Engineering, National University of Modern Languages,
Faisalabad 38000, Pakistan

³Department of Artificial Intelligence and Data Science, FAST National University of
Computer and Emerging Sciences, Chiniot-Faisalabad Campus

⁴Department of Software Engineering, FAST National University of Computer and Emerging
Sciences, Chiniot-Faisalabad Campus

⁵Department of Artificial Intelligence and Data Science, FAST National University of
Computer and Emerging Sciences, Chiniot-Faisalabad Campus

⁶Department of Software Engineering, FAST National University of Computer and Emerging
Sciences, Chiniot-Faisalabad Campus

⁷Department of Computer Science, Government College University, Faisalabad.

¹subhan.arif@numl.edu.pk / subhanarif91@gmail.com ^{*2}umer.ghani@numl.edu.pk

³shehroz.tariq@nu.edu.pk ⁴zaki.akram@nu.edu.pk ⁵riyan.athar@nu.edu.pk

⁶muhammad.talha@nu.edu.pk ⁷anamikram38@gmail.com

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Corresponding Author:

Muhammad Umer Ghani

Abstract

Stock market plays a vital role in the development of firms, textile and industries, because it directly influences the economy of a country. Investor feels hesitation for investment because he does not know about the current situation of the stock market. The impacts of the news are more crucial for the investor as he invests in the appropriate company on the correct time. This research helps the investor for better understanding of the market situation and ups downs of Pakistan Stock Exchange (PSX). First, we need to parse data from news sites such as Daily times, daily Pakistan as well as from PSX. Afterward, we extract the news events according to categories to check their impact on PSX. For this purpose, we created a two-week date sliding window and then checked the impact of these dates on the stock market by using mapping technique. We set a Threshold to decide the importance of news, which affect positively and negatively on stock market. Then we perform validation of positive and negative events to check the accuracy of each event and overall accuracy of that method. After identifying event-related news using text mining and information extraction, the study uses association analysis to link these events to shifts in stock prices. The events' potential effects on the Pakistan Stock Market are then assessed using a rule-based classification technique (RB-EV Algorithm). The results of this study show positive events accuracy on 100 indexes is 66.71 % or negative events accuracy on 100 indexes is 67.02 %. The purpose of this research is to help the investors for decision-making.



1. Introduction

In recent days active area of research is event detection from text data [1]. For text mining algorithms data extraction serves as a beginning stage which is a key issue of text mining [2]. It seeks to discover triggers for events with particular variants and their arguments that are a vital and hard job [3]. Generally, text mining is covering these areas for extracting the useful information which is reliable for the masses. In electronic format, the text data and news articles are generated on daily basis. Text mining techniques are implementing on related research data sets to extract the reliable results [4]. The stock market plays a major role in companies' growth and because it directly influences the economy of a nation. The properties of textile and clothing are most important for the country because these things are the hub of economy [5]. Especially in Pakistan textile plays a vital role and supports its economy. Investor feels hesitation for investment because he does not know about the current situation of the stock market [6]. Moreover, the current situation of the textile stability. On the net News is the medium of events, stories and alternative data. The same as newspapers, the identical stories are typically reported by many news representatives. In addition, the identical stories and occurrences are recorded numerous times to extend the effect on the crowd. Generally, the news affects the stock exchange situation and it changes the circumstances of the company [7]. The impacts of the news are more crucial for the investor because he invests their capital according to correct time to gain profits [8].

News of events mostly causes fluctuations in the stock market as well as textile. The investor would be interested to know the impact and especially the after-effects of particular events on the stock market. Therefore, the need of the hours is to develop a method of event extraction from the online news that affects the stock market and particular impact on textile.

The main objectives of this research are to Develop the method that can extract news events affecting the stock market.

1.1 Text Extraction

Information learned from preprocess text is related to text mining. Data is separated from different sources for example messages, blogs and

news using Natural language processing methods and put in database in an organized way [9]. By means of text mining a particular sort of learning that can be extracted from text is an event, which can be characterized as a composite of mixture to a lot of exact perceptions from text [10]. Extracting event from unstructured data for example news, messages can be helpful to the information extraction in different ways. Because of user preferences and identifying events news can be selected more precisely, which improve the presentation of customized news frameworks [11, 12].

1.2 Web extraction of information

There is a wealth of textual information on the World Wide Web as free content. An abundant data stays difficult to reach to a computerized knowledge discovery methodology until a text extraction framework changes it into an explicit layout. Effective text extraction is restricted to site pages that incorporate tables of data. To restrict table entries a system will extract knowledge with nice consistency addicted to the markup language tags and such type of systems can't deal with vast extent of text data that is in account structure [13].

1.3 Web scrapping

Semantic Web is designed to tackle present web issues by structuring web content, adding semiconducting and extracting maximum advantage from machine and web processing power. The semantic web in which data has a well-defined meaning, making it easier for computers and individuals to work together [14]. The concept of having information defined and connected on the Web in such a manner that computer can use it not only for demonstration reasons, but also to automate, integrate and reprocess information through different applications [15]. Web Mining shows an essential role in attaining this as it allows us to discover the data we need rapidly and easily. Web mining means discovering and analyzing helpful data on the World Wide Web. It is primarily aimed at acquiring helpful information and expertise from a big amount of website pages, and can be considered as the data mining that continues to be used on the internet, which can automatically appeal, standardize and analyze the information [16, 48]. There are distinct kinds of web mining to find automatic knowledge mining of user access patterns from multiple web servers. Web

usage mining is represented as exploitation information mining strategies to extract important user patterns from net server access logs [17]. Internet data extraction and extracts helpful information from HTML pages in different ways is known as web scraping and it is the method of gathering helpful information from the internet automatically [18]. The semantic annotation offers a more accurate description of the information contained in the document and of the domain semantics [19, 20]. Web Scraping is an automatic web data extraction method for extracting information from the website's HTML by parsing websites using specially coded manipulation programs such as XML [21].

1.4 Web data extraction phases

Web Data Extraction scheme accesses the Web source and extracts the stored information which is the first stage of web data extraction [22]. Web pages usually match by internet sources. Some business applications include a Graphical User Interface integrated with data extraction tools for full visual and interactive navigation of HTML pages. The second phase of extraction of internet information is a wrapper generation and execution. A wrapper generation and wrapper execution aid must be implemented by a web data extraction scheme. Software that extracts data from Web pages with altering text automatically and repeatedly, Web page information with evolving content that provides extracted information to a database or other application [23]. Web data extraction has three elements such as transformation of data, automation and scheduling, and the use of extracted data.

1.5 Rule-Based Event Validation (RB-EV) algorithm phases

A Rule-Based Event Validation (RB-EV) algorithm is introduced to classify these events into positive or negative categories based on their observed market impact. By providing validated insights into how events influence stock behavior, this study contributes toward developing intelligent, data-driven support systems for investors.

The key contribution of this study is the development of a Rule-Based Event Validation (RB-EV) algorithm that integrates data mining techniques to validate event-driven news against stock market fluctuations, thereby providing

actionable insights to support investor decision-making. By this system its helpful for the investor to understand the situation of stock market according to news headlines if there is positive news then market goes up if there is negative news then market goes down. The results of this study show positive events accuracy on 100 indexes is 66.71 % or negative events accuracy on 100 indexes is 67.02 %. The purpose of this research is to help the investors for decision-making. We identified the positive and negative event results with the original data set, then counted the events and extracted their corresponding date. Then map this date with stock and find out the positive and negative value and calculate the accuracy of each event. At last, we calculated the overall accuracy by counting all events and their cross-ponding effect on stock volume and calculate the accuracy of their positive and negative value. The results of this study show positive events accuracy on 100 indexes is 66.71 % or negative events accuracy on 100 indexes is 67.02 %. After check the accuracy of events we calculate the support and confidence to ensure the impact of events on stock market. The proposed result helps the investors to check the stock market condition and take a decision whether to invest or not.

2 Literature Review

Recent studies in financial data mining have emphasized the importance of analyzing unstructured news data to predict stock market behavior. Text mining and sentiment analysis have been widely applied to extract meaningful patterns from financial news, enabling researchers to correlate public sentiment with market trends. For example, several works have demonstrated how association analysis can link significant news events to abnormal stock price movements. However, most existing approaches focus heavily on sentiment polarity rather than validating events with actual market outcomes. This creates a gap in ensuring whether reported news truly aligns with corresponding stock fluctuations. To address this, the present study introduces a Rule-Based Event Validation (RB-EV) algorithm that builds upon traditional data mining techniques by systematically matching extracted events with historical stock data [1,3]. This hybrid approach not only improves the reliability of event classification but also

strengthens the role of event-driven analysis in supporting investor decision-making, particularly in the context of the Pakistan Stock Market.

A form of text skimming that selectively processes the appropriate text while efficiently ignoring the surrounding text which is believed to be meaningless to the domain. The work described here is based on CIRCUS, a conceptual phrase analyzer. CIRCUS depends on a domain-specific notion node dictionary to extract data from text. A notion node is fundamentally a case frame activated in a particular linguistic context and triggered by a lexical item. Each idea node definition includes a set of enabling circumstances that must be met in order to activate the idea node. For instance, their terrorism domain dictionary includes a notion node called "kidnap-passive," which extracts data about kidnapping incidents [4,5]. The authors proved that a feasible alternative to manual knowledge engineering is automated dictionary building. For real-world applications, natural linguistic processing systems will only be practical if their domain-dependent dictionaries can be automatically built. Their strategy to automated dictionary building is an important step towards scalability and portability of information extraction systems to fresh domains [24, 49].

Developers of net document manufacture text in image to beat the rhetorical limitations of HTML, and this text has a potentially high semantic value. Instead of classifying individual components as either personalities or background parts, the suggested technique seeks to identify groups of collinear components as prospective text lines. The rationale for character identification based on text-line is that a set of comparable parts arranged as a prospective text line will most likely match text. At this stage, it should be pointed out that the characters are not necessarily positioned along straight lines in any Web picture. The technique can deal with curved lines of text, but there is a trade-off between the maximum permitted curvature and precision of detection. This paper describes a whole approach to the segmentation and extraction of text from internet pictures for resultant recognition, to ultimately succeed each effective classification and presentation by non-visual suggests that the method delineate here permits the extraction of

text in complicated things like within the presence of varied color. Additionally, precisely, in relevancy exploitation structural characteristics, segmentation follows a split-and-merge approach supported the color depiction of Hue-Lightness-Saturation (HLS) because the initial approximation of associate partiality manifestation of hue and lightness variations. Character-like components are then obtained during a range of directions and on curves as text lines are fashioned [25].

To extract useful info to guide decision-making processes, it's necessary to get unstructured news things from several numerous foundations. Therefore, they propose SPEED (Semantics-based Economic Event Detection) that seeks to get monetary events from journals and annotate them with meta-data at speeds that alter time period use. Authors reused a number of the ANNIE GATE elements to implement the SPEED pipeline and created recent one's sort of a superior dictionary, word cluster look-up component, and sense clarify. Whereas they think about the monetary domain, SPEED is often generalized to alternative domains as we tend to separate the domain-specific parts from the domain-independent elements. Authors launched a number of new options into the pipeline. Their elements within the pipeline are activated semantically. Additionally, the pipeline results with linguistics, that presents a feedback loop; once events are found, the cognitive content utilized in the pipeline are often changed to represent the current state of the world. Authors thus integrate learning behavior, creating the identification of events a lot of adaptation. Consequently, the benefit of their pipeline lies within the use of linguistics that permits for wider ability of applications. Alternative contributions are among the gazette ring rate and therefore the enhancements to a current sense clarification algorithmic program. These novelties cause higher accuracy and remembrance [26].

Over the past decade, they have experienced an ever-growing trend in the use of NLP techniques that go beyond simply looking for keywords to automatically discover understanding from the huge quantity of textual information accessible on the Internet. This article introduces a real-time extraction scheme for news events created

by the European Commission's Joint Research Centre. It is able to extract violent and catastrophe incidents from internet news correctly and effectively without the use of a lot of linguistic sophistication. In specific, clustered news has been strongly utilized at multiple processing phases in our comparatively trivial strategy to event extraction. The article examines the engineering of the plan, news geotagging, programmed example learning, design particular language, total of information, issues of consolidating occasion information into a worldwide emergency reconnaissance plot, and new exploratory appraisal. Constant occasion extraction from web news for overall emergency reconnaissance, which has been totally operational every minute of every day since December 2007, was exhibited. In explicit, we propelled nexus which behaviors group level information combination to meld fractional information into undeniable occasion depictions. The assessment results on the extraction of fierce occasions demonstrate that the nexus can be utilized to screen worldwide emergency progressively. All the center content preparing apparatuses they use depend on limited state innovation to meet the prerequisites of a continuous content handling situation [27, 50]. Tweets are the most up-to-date and inclusive data stream and commentary on current events, but they are also fragmented and noisy, motivating the need for systems capable of extracting, aggregating and categorizing significant activities. This paper describes TwiCal Twitter's first open-domain system for event extraction and categorization. They show that it is actually possible to correctly extract an open-domain calendar of major occurrences from Twitter. They also present a novel approach to the discovery of significant categories of events and the classification of extracted events based on latent variable models. Their strategy achieves a 14 percent rise over a monitored baseline by leveraging big quantities of unlabeled information. In a manual assessment, they assessed the superiority of these events indicating a clear development in results over the program baseline, proposing a novel strategy to categorizing events with unknown kinds. Their strategy, based on latent variable models, first finds data-compatible event kinds that are then

used to classify aggregate occurrences without annotated examples. Because this strategy can leverage big amounts of unlabeled information, it is 14% higher than a monitored baseline. A possible avenue for future work is the extraction, while maintaining domain independence, of even richer event representations. For instance: grouping associated entities together, classifying entities in relation to their event roles, and thereby extracting a frame-based event representation [28, 44].

Extracting supportive electronic information is the most significant issue of enthusiasm for semantic web acknowledgment. This can be cultivated by a few different ways that have a huge impact in Web Usage Mining, Web Scrapping and Semantic Annotation. Web mining enables the fitting results to be gotten from the web and is utilized to get noteworthy information from the examples of disclosure held in the servers. Web use mining is a type of web mining that mines clients visiting sites information about access directors. Web scratching, another procedure, is a procedure of extricating helpful data from HTML pages which might be executed utilizing a scripting language known as Prolog Server Pages dependent on Prolog. Third, semantic comment is a method that permits the expansion of semantics and a formal structure to unstructured printed archives, a significant angle in the extraction of semantic data that can be done by an apparatus called Knowledge Information Management. In this report, they survey, examine and talk about some electronic data extraction strategies, for example, online mining, web rejecting and semantic comment for better or successful electronic data extraction [29].

With the proliferation of news articles from thousands of distinct sources now accessible on the Web, it is becoming progressively essential to summarize such data. Their study focuses on combining news event descriptions from various sources to provide a concise description that incorporates the data from each source. In particular, in newspapers referring to the same case, they define and assess techniques for grouping phrases. The main concept is to use two novel distance metrics to cluster the phrases. The first distance metric takes advantage of regularities within a document in the sequential

composition of occurrences. The second metric utilizes a weighting system similar to TF-IDF, improved to capture word frequencies in incidents even though the events themselves are not a priori known. Typical news articles contain phrases not describing particular occurrences. Machine learning techniques are used to distinguish between phrases describing one or more occurrences and those that do not. Before starting the clustering process, they extract non-event phrases. This strategy demonstrates important improvements in the general efficiency of clusters. In this paper, in an article with a set of identifiers specifying which event(s) the phrase mentions, they define and assess techniques for annotating each phrase. They introduce two new approaches to event annotation and show a small rise in precision for both methods through assessment with our baseline scheme. Typical news articles comprise different levels of non-event-related phrases. They embrace a strategy based on machine learning that classifies each phrase as either a case or a nonevent phrase. They trained a classifier capable of achieving more than 80% precision with restricted training information [30].

Finance study over the past three centuries has generated a tremendous number of articles examining the impact on financial markets of news announcements. The theory of asset pricing claims that factors affecting the amount of ingestion and the set investment chance would influence asset prices. Examples of such variables are macroeconomic factors. Authors examine in this article whether actual financial news in the industry influences stock returns. While the theory of finance indicates that such a correlation should exist, the empirical evidence was rather weak in support of this hypothesis. They claim that one of the reasons why this proof is not found is that it is not only the statistical reality of the financial announcement that is applicable to inventory prices, but also the public's interpretation of it. As a consequence, they choose a distinct strategy and use the coverage of newspapers as our proxy to interpret macroeconomic news to investors. Authors examine news about unemployment, retail sales, and sustainable products and discover that inventory returns are considerably affected by the news development and unemployment. The

relationships among stock returns and news about sustainable products and marketing are statistically small despite having an anticipated sign [31, 40].

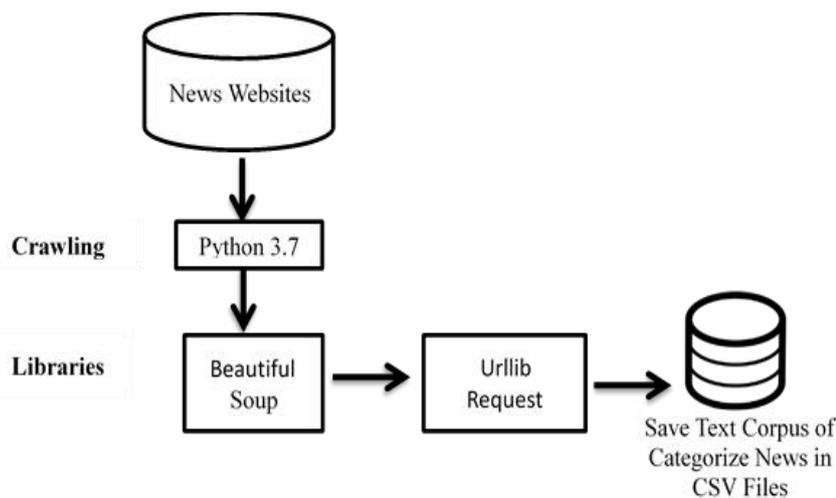
This research examines the interdependent interactions in the U.S. context between the stock market and financial news. 2,440 Reuters and Bloomberg financial tweets released in September 2015 were evaluated at short intervals and 50 important Bloomberg market coverage stories spread over the same period via their terminals. Using analyzes of Vector Auto Regression, it was discovered that news quantity, news significance, and expert opinion in tweets appear to have a positive impact on the fluctuation of the Dow Jones Industrial Average (DJI), while financial news tends to react to market fluctuations with less coverage, including fewer re-tweets, favorites, updates, or expert views. The findings of inspecting Bloomberg's important market stories suggest that while Bloomberg terminals provide experts with first-hand market data, tweets appear to give follow-up reports to the public. Moreover, given that the impact of financial tweets on DJI fluctuations has been found to be strongest within longer periods of time. The results suggest that government traders need more time to assess data and create a trade choice than professional investors [32, 42]. This study's primary aim is to empirically evaluate the Arbitrage Pricing Theory (APT) on a monthly basis in Istanbul Stock Exchange (ISE) from February 2001 to September 2005. In this document, multiple macroeconomic factors represent the fundamental indicator of an employed economy: cash supply (M2), industrial manufacturing, crude oil price, consumer price index (CPI), import, export, gold price, exchange rate, interest rate, gross national product (GDP), foreign reserve, unemployment rate and the authors' market pressure index (MPI). Authors evaluated 13 macroeconomic variables against Istanbul Stock Exchange sector portfolios to observe the impacts on stock returns of those factors. They noted using normal least square (OLS) method that there are some variations between portfolios in the industry sector. This document examined the impact of macroeconomic variables on portfolio yields, and the findings show that macroeconomic factors in Istanbul Stock Exchange (ISE) have no important

impact on stock returns. However, by macroeconomic factors, each portfolio may influence distinct industries in distinct ways, a macroeconomic factor may have a positive impact on one sector, but may have a negative impact on the other. The findings of regression show that there is no important price relationship between the return on inventory and the macroeconomic variables tested [34, 41].

3 Research Methodology

In this research, we proposed methods to extract the news events which affect the Pakistan stock exchange and particular impact of textile companies. This study employs a data mining-based methodology to validate the impact of event-driven news on the Pakistan Stock Market. The proposed Rule-Based Event Validation (RB-EV) algorithm was designed to extract, process, and match financial events with historical stock performance. To accomplish this task, we have collected data from news sites such as Daily Times, Daily Pakistan based on English linguistic. We have taken news Headlines that are published on daily base on these websites. We have extracted only that news which is date wise and categories wise such as Business & Finance News, Economy News, and Political news, Textile News, Crime News, Terror News, Oil & Gas News and CPEC News. So, in this research News datasets like Headlines, Published Date of News

and Category of the news are the important Variables. On the other hand, we have extracted data from stock exchange sites like Karachi Stock Exchange and Pakistan stock Exchange. We have taken 100 index data from January 2016 to April 2019 and we have taken News events effect on stock market. News events effect on stock market News are read from data base and taken published date of this news. We have created the date sliding window to check the effect of news on stock values by mapping the date sliding window with stock volume index date and stock index values are taken according to the stock volume index date. System does counts how much are negative values and how much are positive values. If the stock volume goes below -100 then it counts as negative event as well as if the stock volume goes above +100 then it counts as positive event in the date sliding window range. We set the threshold to a specific value, and then check that value with the negative and positive event. If the negative event exceeds the threshold value, then that event will be negative, and similarly if the positive event exceeds the threshold value then that event will be positive. And then we extracted maximum, minimum and average affected value in PSX on the bases of these positive and negative events. The following steps are proposed in research:



- Data Collection of News (Extract form News agencies Like Daily Times, Daily Pakistan)
- Data Collection of Stock Volume (Extract from Pakistan Stock Exchange)
- Data preprocessing (Remove stops words)
- Date Sliding Window
- Date Mapping
- Extract Positive News effect on Stock Market
- Extract Negative News effect on Stock Market
- Threshold

- Event Validation using RB-EV Algorithm of positive and negative events affect on Stock Market.
- Support and confidence of validate positive and negative events

4 Experimental Work

4.1 Data crawling/ Scrapper

In data crawling, we extract news from news websites and store in database. We have extracted only that news which are categories wise such as Business & Finance News, Economy News, and Political news, Crime News, Terror News, Oil & Gas News and CPEC News as shown in Figure 1. Similarly, data is scrap from the Pakistan stock exchange website and scraped data is organized in the database as shown in Figure 1 & 2.

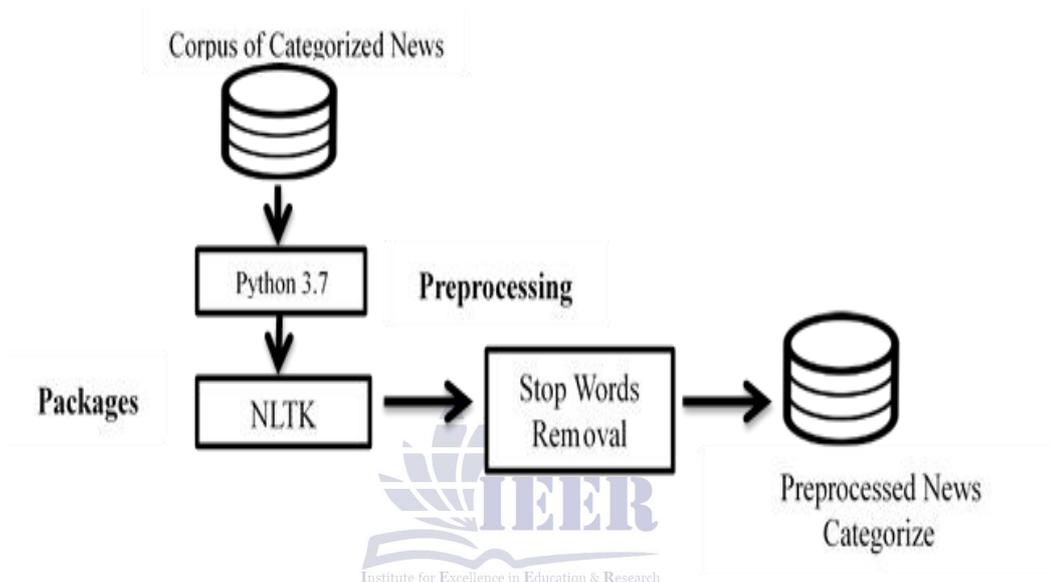


Figure 1 Data crawling from News Sites

Data Preprocessing

After gathering a big quantity of information from news sites that is also known as high-dimensional information, pre-processing data is taken to decrease data dimensionality before information is analyzed. This elevated dimension can trigger inconsistency or search problems. Preprocessing is a better way to manage space and information complexity. When information is provided as input, consistency limitations are

verified to ensure pre-analysis accuracy of information. The quantity of information will be complicated and more room will be needed which will also slow down the search process. Extracting appropriate data from the big database is not simple. By decreasing the quantity of irrelevant information, efficiency can be enhanced. Data is preprocessing by using natural language processing NLTK packages as shown in Figure 3.

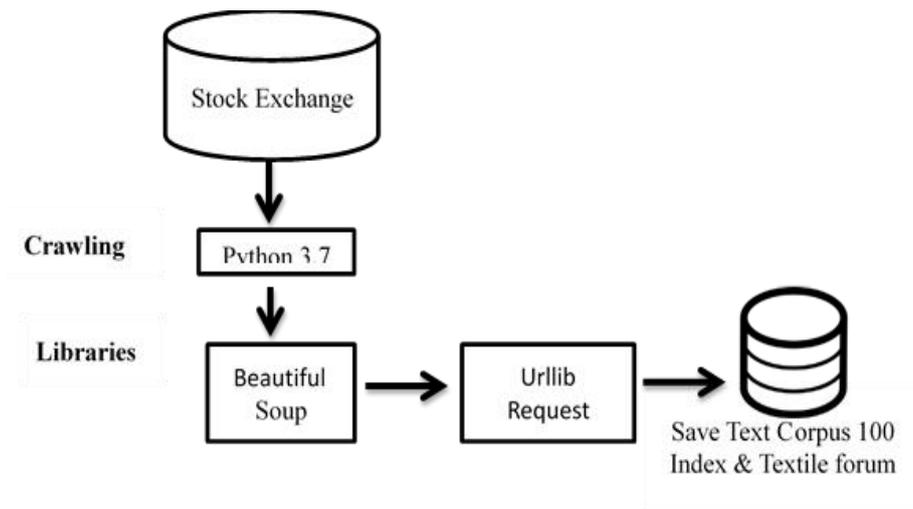


Figure 2 Stock Exchange Sites

4.2 Date sliding window

News is read from the database and taken published date of this news. We have created the date sliding window to check the effect of news on stock values by mapping the date sliding

window with stock volume index date and stock index values are taken according to the stock volume index date. It generates the 14 days sliding window. We have used the date-time library for making the date sliding window.

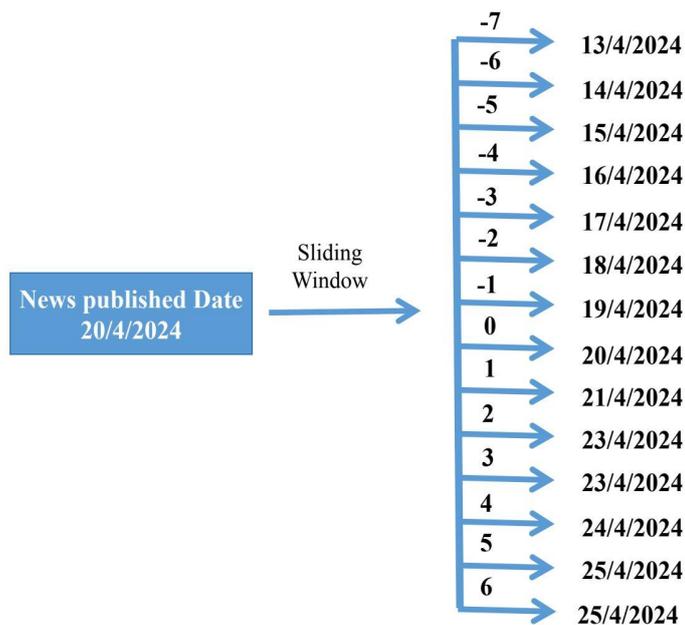


Figure 4 Date Sliding Window

4.3 Date mapping

We have created the date sliding window to check the effect of the news on stock values by mapping the date sliding window with stock volume index date and stock index values are taken according to the stock volume index date. The system does counts how much are negative values and how much are positive values as shown in Figure 5.

4.4 Threshold

Minimum or maximum value set for an attribute, feature or parameter that serves as a comparison or guidance benchmark. The system does counts how much are negative values and how much are positive values. We set a Threshold to decide the importance of news, which affect positively and negatively on the stock market as shown in Figure 5.

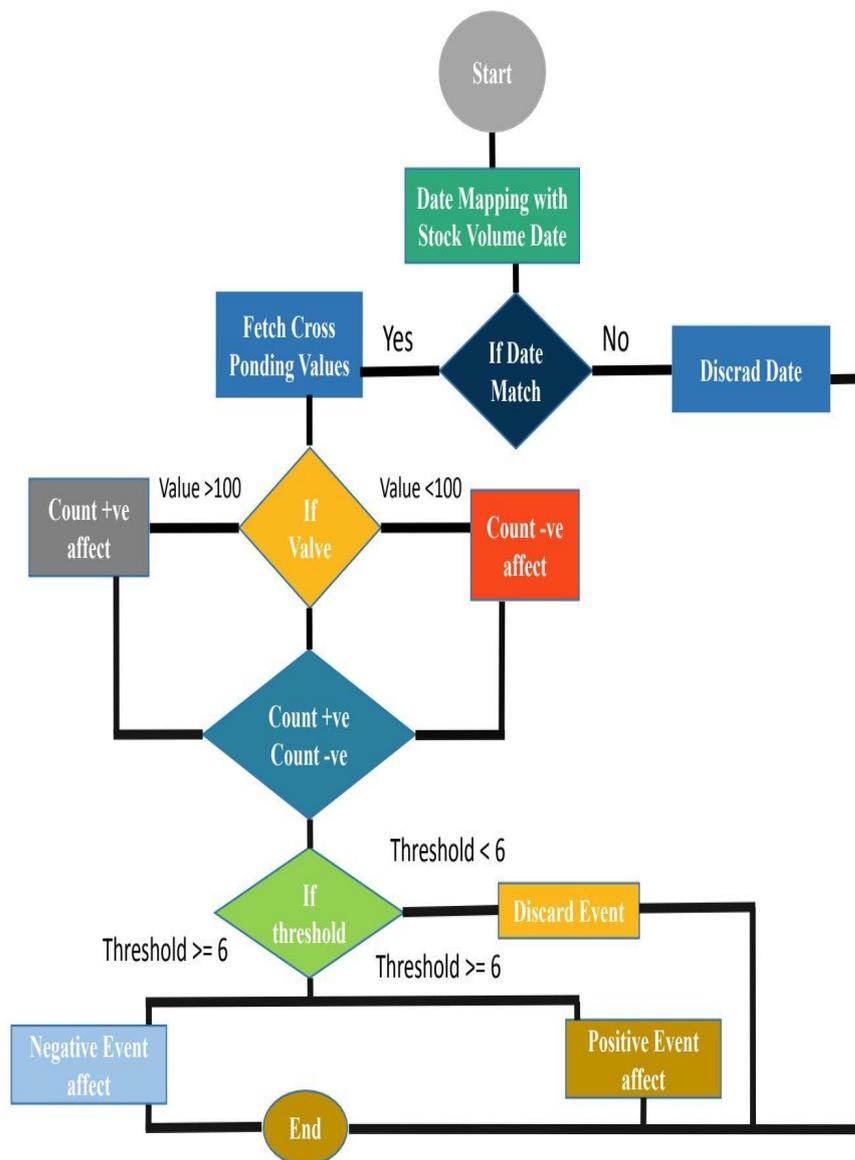


Figure 5 Threshold and Date Mapping

4.5 Event Validation using RB-EV Algorithm Positive and Negative Events affect on stock market

The results of this study show positive events that have positive effect on the stock market 100

index as well as the negative events effect on 100 index stock market using Reule Based techniques of data mining as shown in Figure 6.

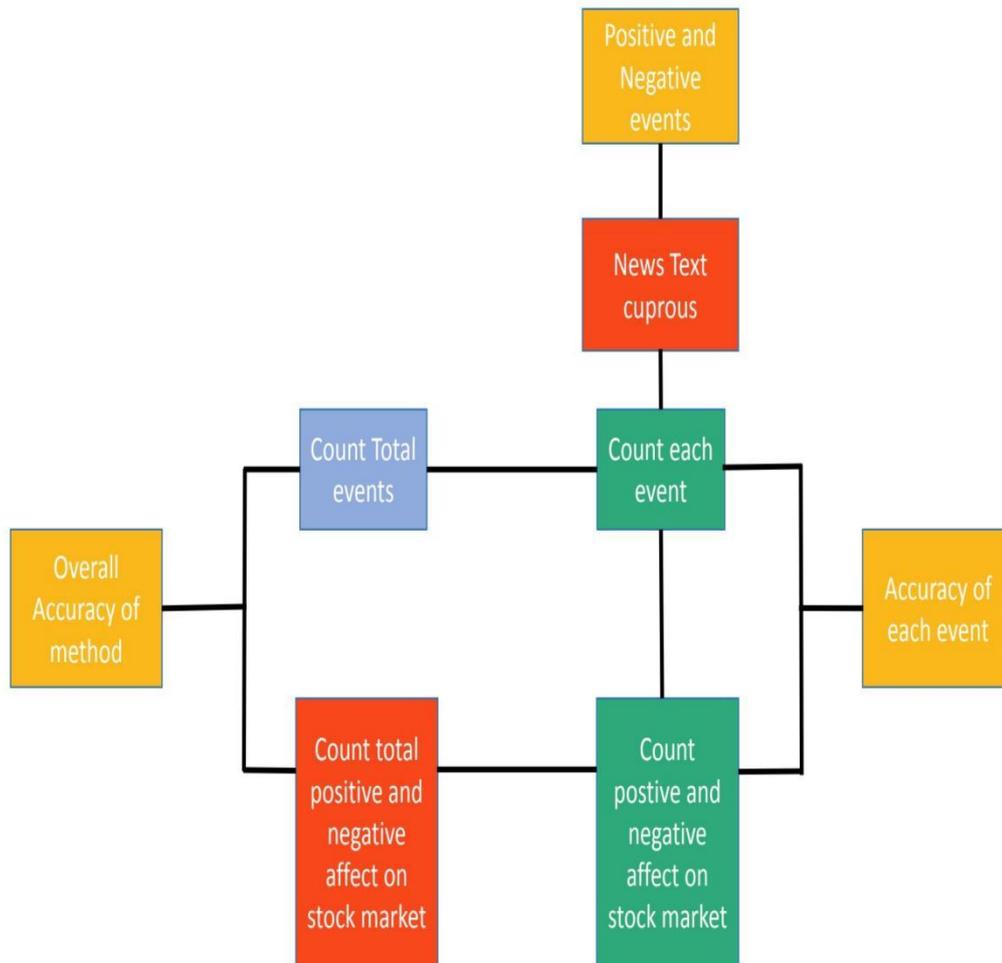


Figure 6 Positive and Negative events affect on stock market

4.6 Accuracy of positive and negative events effect of stock market

The System validate the results that whether this is actually affecting or not. it identified the positive and negative event results with the original data set, then counted the events and extracted their cross-ponding date. Then map this date with stock and find out the positive and negative value and calculate the accuracy of each event. At last we calculated the overall accuracy by counting all events and their cross ponding effect on stock volume and calculate the accuracy of their positive and negative value.

Algorithm: Rule-Based Event Validation (RB-EV) algorithm

1. BEGIN
2. OPEN NegativeEvents.csv, PositiveEvents.csv
3. SET threshold_neg = -100, threshold_pos = 100
4. FOR each news_file IN News_Cat DO

5. FOR each event_record IN news_file DO
6. event_date \leftarrow extract_date(event_record)
7. DEFINE window = [event_date-7, event_date+6]
8. INIT count_neg = 0, count_pos = 0, neg = \emptyset , pos = \emptyset
9. FOR each day IN window DO
10. FOR each stock_record IN Stock_Data DO
11. stock_value \leftarrow value(stock_record), stock_date \leftarrow date(stock_record)
12. IF stock_date = day THEN
13. IF stock_value < threshold_neg THEN count_neg++; APPEND stock_value TO neg
14. ELSE IF stock_value > threshold_pos THEN count_pos++; APPEND stock_value TO pos
15. ENDIF
16. END FOR
17. END FOR

18. IF count_neg \geq 6 THEN WRITE (event_record, max(neg), min(neg), avg(neg), count_neg) TO NegativeEvents.csv
 19. IF count_pos \geq 6 THEN WRITE (event_record, max(pos), min(pos), avg(pos), count_pos) TO PositiveEvents.csv
 20. END FOR
 21. END FOR
 22. CLOSE all files
 23. END BEGIN

5 Results and Discussions

The results of this study show positive events that have positive effect on the stock market 100 index, as shown in Table 1. Similarly, results of negative events that have negative effect on stock market 100 index as shown in Table 2. The proposed result helps the investors to check the stock market condition and take a decision whether to invest or not.

Table 1: Positive Events Affect On Pakistan 100 Index Stock Market

News	Category	Date	Day Affect points	Max Affect points	Min Affect points	Ave Affect points	Stock Up
FBR collects Rs 1722bn revenue	Business & Finance	January 2 2018	775.83	775.83	100.17	441.12	8
Investors shrug Trumps tweet index gains 776 points	Business & Finance	January 4 2018	364.44	816.4	100.17	465.55	8
US seeks smooth trade relations with China talks	Business & Finance	July 21 2017	234.46	1113.15	185.77	451.8	6
Traders SBI team up to boost investment	Business & Finance	September 15 2017	103.62	1030.82	103.62	419.1	6
Nisar invites British businessmen invest CPEC related projects	Cpec	April 29 2016	215.65	623.91	163.18	322.01	8
Rs 8.48 per litre cut petrol prices Rs 4.67 diesel	Oil & Gas	March 1 2016	139.6	580.86	139.6	338.11	7

Table 2: Negative Events Affect On Pakistan 100 Index Stock Market

News	Category	Date	Day Affect points	Min Affect points	Max Affect points	Ave Affect points	Stock Up
1.238m tax returns filed as of Feb 15 Senate told	Business & Finance	February 21 2018	-375.17	-261.3	-410.69	-336.4	7

Asia markets lower euro hit Draghi comment	Business & Finance	May 31 2017	-861.59	-225.5	-1810.7	-648.46	7
Dollar edged lower value versus rupee	Business & Finance	October 10 2017	-489.27	-107	-903.12	-431.96	6
Lower exports weaken Sweden growth first quarter	Business & Finance	May 31 2017	-861.59	-225.5	-1810.7	-648.46	8
Provinces reservations on CPEC removed Imran	Cpec	January 13 2016	-111.48	-111.4	-713.15	-326.49	6
Protests in Quetta against target killing of Hazara community	Crime	May 1 2018	-757.77	-158.36	-449.74	-254.36	6
Energy firms rise with oil prices but Asia markets sink again	Oil & Gas	June 29 2018	-86.95	-106.87	-1218.74	-508.75	6
Pathankot airbase attack case registered Pakistan	Terror	February 19 2016	-270.67	-187.26	-356.38	-277.28	7

5.1 VALIDATION OF EVENTS

These results show the validity of positive events that have positive effect on the stock market 100 index, as shown in Table 3. Similarly, results show the validity of negative events that have negative effect on stock market 100 index as shown in Table 4.

Algorithm: Events Validation

1. Initialize counters: $\text{total_events} \leftarrow 0$, $\text{positive_events} \leftarrow 0$
2. For each event $e \in E$:
3. Extract keyword k and event_date d_e from e
4. For each record $r \in S$:

5. Extract stock_date d_s and stock_return v_s from r

6. If $(d_e == d_s)$ then:

7. $\text{total_events} \leftarrow \text{total_events} + 1$

8. If $(v_s > 0)$ then:

9. $\text{positive_events} \leftarrow \text{positive_events} + 1$

10. End If

11. End If

12. End For

13. End For

14. Compute $\text{Accuracy} \leftarrow (\text{positive_events} / \text{total_events}) \times 100$

15. Return Accuracy

Table 3: Validation Of Postivie Events Affect On 100 Index Stock Market

Positive events	Category	Date	Accuracy
FBR collects Rs 1722bn revenue	Business & Finance	January 2 2018	100
Investors shrug off Trumps tweet index gains 776 points	Business & Finance	January 4 2018	100
US seeks to smooth trade relations with China in talks	Business & Finance	July 21 2017	100
Traders SBI team up boost investment	Business & Finance	September 15 2017	100
Nisar invites British businessmen to invest in CPEC related projects	Cpec	April 29 2016	100
Rs 8.48 per litre cut in petrol prices Rs 4.67 in diesel	Business & Finance	March 1 2016	100
NAB recovers assets worth Rs 1.3bn from Mushtaq Raisani	Political	July 12 2018	100
Zarb e Azb to continue till elimination of last terrorist	Terror	April 29 2016	100

Table 4: Alidation Of Negative Events Affect On 100 Index Stock Market

Negative events	Category	Date	Accuracy
1.238m tax returns filed as of Feb 15 Senate told	Business & Finance	February 21 2018	100
Asia markets lower euro hit by Draghi comment	Business & Finance	May 31 2017	100
Dollar edged lower value versus rupee	Business & Finance	October 10 2017	100
Lower exports weaken Sweden growth in first quarter	Business & Finance	May 31 2017	100
Provinces reservations on CPEC be removed Imran	Cpec	January 13 2016	100
Protests in Quetta against target killing of Hazara community	Crime	May 1 2018	100
Energy firms rise with oil prices but Asia markets sink again	Oil & Gas	June 29 2018	100
Pathankot airbase attack case registered in Pakistan	Terror	February 19 2016	100

5.2 Overall accuracy of affected events

The results of this study show positive events accuracy on 100 indexes is 66.71 % or negative

events accuracy on 100 indexes is 67.02 % as shown in Table 5 as well as graphical representation of results in Figure 7.

Table 5: Overall Accuracy Of Affected Events On 100 Index

Sr #	100 stock index volume	Overall Accuracy
1	Positive events effect on 100 index stock market	66.71 %
2	Negative events effect on 100 index stock market	67.02 %

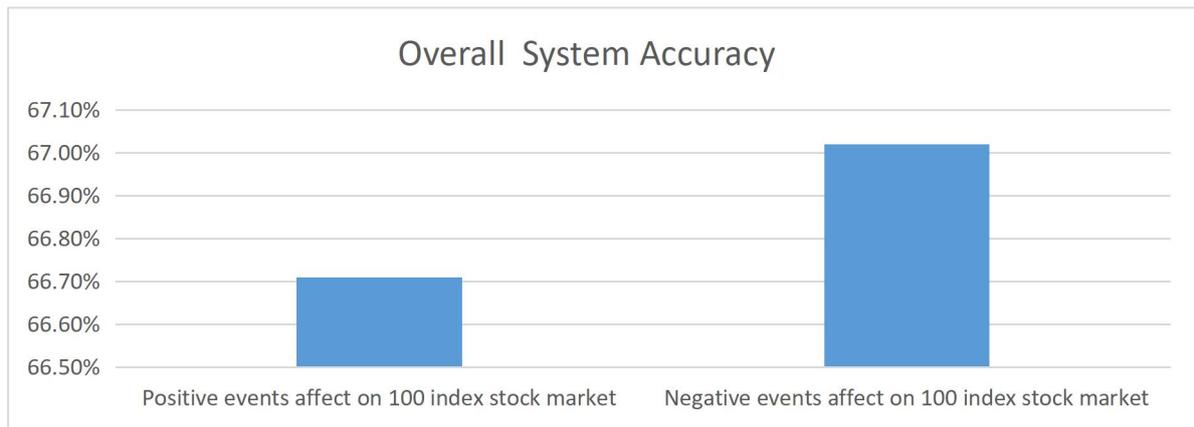


Figure 3 Overall System Accuracy

5.3 SUPOORT AND CONFIDENCE OF EVENTS

These results show the support and confidence of positive events that have positive effect on the stock market 100 index, as shown in Table 6.

Similarly, results show the validity of negative events that have negative effect on stock market 100 index as shown in Table 7. Support and confidence calculate by using Eq 1 and Eq 2.

$$\frac{\sum \text{event}(X_i, Y_j)}{\sum \text{event}(N)} \dots\dots\dots(1)$$

Support of events =

$$\frac{\sum \text{event}(X_i, Y_j)}{\sum \text{event}(X)} \dots\dots\dots(2)$$

Confidence of events =

Table 6: SUPPORT AND CONFIDENCE OF POSITIVE EVENTS ON 100 INDEX STOCK MARKET

Positive events	Category	Date	Support	Confidence
FBR collects Rs 1722bn revenue in 2017-18	Business & Finance	January 2 2018	0.0898	1
Investors shrug off Trumps tweet index gains 776 points	Business & Finance	January 4 2018	0.0898	1
US seeks to smooth trade relations with China talks	Business & Finance	July 21 2017	0.0898	1

Traders SBI team up to boost investment	Business & Finance	September 15 2017	0.0898	1
Nisar invites British businessmen to invest in CPEC related projects	Cpec	April 29 2016	0.0898	1
Rs 8.48 per litre cut in petrol prices Rs 4.67 in diesel s	Business & Finance	March 1 2016	0.0898	1
NAB recovers assets worth Rs 1.3bn from Mushtaq Raisani	Political	July 12 2018	0.0898	1
Zarb e Azb to continue till elimination of last terrorist Mamnoon	Terror	April 29 2016	0.0898	1

Table 7: Support And Confidence Of Negative Events On 100 Index Stock Market

Negative events	Category	Date	Support	Confidence
1.238m tax returns filed as of Feb 15 Senate told	Business & Finance	February 21 2018	0.0631	1
Asia markets lower euro hit by Draghi comment	Business & Finance	May 31 2017	0.0421	1
Dollar edged lower in value versus rupee	Business & Finance	October 10 2017	0.1261	1
Lower exports weaken Sweden growth in first quarter	Business & Finance	May 31 2017	0.0631	1
Provinces reservations on CPEC be removed Imran	Cpec	January 13 2016	0.0631	1
Protests in Quetta against target killing of Hazara community	Crime	May 1 2018	0.0421	1
Energy firms rise with oil prices but Asia markets sink again	Oil & Gas	June 29 2018	0.0631	1
Pathankot airbase attack case registered in Pakistan	Terror	February 19 2016	0.0631	1

Summary

This research presented a rule-based event validation (RB-EV) algorithm to analyze the impact of financial news on the Pakistan Stock Market, specifically focusing on the textile sector. By integrating event-driven data mining techniques with historical stock fluctuations, the study demonstrated how validated events can

provide more accurate insights compared to traditional sentiment analysis approaches. The results highlight that news events aligned with actual market responses yield higher prediction accuracy and serve as a reliable tool for investment decision-making. This contribution not only strengthens the link between data mining and financial forecasting but also offers

practical support for investors in identifying genuine market-moving information. This study discovers the effect of news events on stock returns. This investigation has finished with the assistance of broad literature on stock returns. The stock market has a very important part in companies' growth and because it directly influences the economy of a nation. The properties of textile and clothing are most important for the country because these things are the hub of economy. Investor feels hesitation for investment because he does not know about the current situation of the stock market. Moreover, the current situation of the textile stability. Generally, the news affects the stock exchange situation and it changes the circumstances of the company. The impacts of the news are more crucial for the investor because he invests their capital according to correct time to gain profits. In broker's daily decisions monetary events such as, stock parts, profit declaration, union and acquisition play an important role. Machines not only process news faster but also deal with larger volumes of developing news and machines can approach more data than humans and thus make better informed decisions [46].

In this research, we proposed methods to extract the news events which affect the Pakistan stock exchange and particular impact of textile companies. To accomplish this task, we have collected data from news sites such as Daily Times, Daily Pakistan based on English linguistic. We have taken news Headlines that are published on daily base on these websites. We have extracted only that news which is date wise and categories wise such as Business & Finance News, Economy News, and Political news, Textile News, Crime News, Terror News, Oil & Gas News and CPEC News. The news are read from database and taken published date of this news. We have created the date sliding window to check the effect of news on stock values by mapping the date sliding window with stock volume index date and stock index values are taken according to the stock volume index date. System does count how much is negative values and how much are positive values [43, 45]. We set a Threshold to decide the importance of news which affect positively and negatively on stock market. Then we validate the results that whether

this is actually affecting or not. We identified the positive and negative event results with the original data set, then counted the events and extracted their cross-ponding date. Then map this date with stock and find out the positive and negative value and calculate the accuracy of each event. At last we calculated the overall accuracy by counting all events and their cross ponding effect on stock volume and calculate the accuracy of their positive and negative value [47]. The objective of this study is to develop a method that can extract news events affecting the stock market. Moreover, develop method that can extract news events affecting the textile activities. The purpose of this research is to help the investors to check the stock market condition and take a decision whether to invest or not.

Conclusion

This research investigated the role of financial news in influencing stock market behavior using the proposed Rule-Based Event Validation (RB-EV) algorithm. By aligning extracted events with historical stock data, the study demonstrated that validated news events provide stronger evidence of market impact compared to unverified sentiment-based methods. The results confirm that event-driven data mining can serve as a valuable tool for supporting investors' decision-making by distinguishing between impactful and non-impactful news. In this study, we took the data from the news website and develop a method that can extract news events affecting the stock market. . The impacts of the news are more crucial for the investor because he invests their capital according to correct time to gain profits. This research helps the investor for a better understanding of the market situation and ups downs of Pakistan stock exchange. In this research we identify that multiple factors when the stock goes up for instance FBR collects Rs 1722bn revenue, FBR decrease the taxes, Govt cuts petrol prices, Asian builders aim sustain sky high growth, Govt decrease the price of gas, Foreign investor invest in Pakistan, CPEC building projects, growth companies, Gold prices inch down dollar, HBL declares consolidated profit of Rs 9.9 billion, Pakistan economy have to united, LNG pipeline finance etc. Similarly, we identify that multiple events when the stock goes down for instance FBR increase taxes, Govt increase the petrol or fuel price, effect on CPEC

projects, terrorism, foreign investor not invest in Pakistan, stock goes down multiple times, \$96.7 bln external debt liabilities, Asia markets lower euro, Dollar edged lower in value, Foreign debt is risky, Lower exports weaken, Gas price increase, Oil edges up on falling US crude stocks, Oil prices rise on decline in US fuel, range-bound trading, RAW trying to sabotage CPEC, Zardari condemns arrest of Khawaja brothers, Protests in Quetta against target killing of Hazara, NAB arrests Sindh Assembly Speaker etc. There are the many factors that put the impact on the stock market. Moreover these results also depict that news events also put impact on the stock market positively and negatively. Some of the positive events are like 15 Pakistani companies grow up, Excess liquidity in international market good for Pakistan, Pakistan can enhance floral export, Cotton price remains stable, Cotton trading remains quality focused, Government urged look beyond textile leather sectors, Table of two textile cities one in China and one in Pakistan, Intl investors reposing full confidence in Pakistan economy, Foreign investor interested to invest in Pakistan, High input costs hitting viability of textile industry, Oil prices hit lowest, Energy price disparity etc. Similarly, Some of the negative events are like Banking sector continues its steady expansion, Pakistan unable to improve cotton quality, Oil steady as talk of new OPEC, Oil or petrol prices increase, Textile industry to observe black day, energy crisis, Textile exports continue weaken, APTMA rejects federal budget, IMF lauds Pakistan s economy, Nab arrests the political person, Pakistan economy lower etc. Then we validate the results that whether this is actually affecting or not. We identified the positive and negative event results with the original data set, then counted the events and extracted their cross-ponding date. Then map this date with stock and find out the positive and negative value and calculate the accuracy of each event. At last we calculated the overall accuracy by counting all events and their cross ponding effect on stock volume and calculate the accuracy of their positive and negative value. The results of this study show positive events accuracy on 100 indexes is 66.71 % or negative events accuracy on 100 indexes is 67.02 %. After check the accuracy of events we calculate the support and confidence to ensure the impact of events on

stock market. The proposed result helps the investors to check the stock market condition and take a decision whether to invest or not.

LIMITATION AND FUTURE SCOPE

The span and number of textile mills can be extended to extract deeper insights and long-term impact. The framework can be used to check the impact of the news events on the economy, which could be a future work.

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