Big Data Analytics: A Key success to Software Project

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Abstract:

The process of evaluating large and complicated data and turning it into a form that is accurate, comprehensible, and actionable is known as big data analytics. The success rate of software projects is increased through the application of big data analytics in project management. It can reveal the project schedule, make the appropriate decisions, and keep the project moving forward. It lessens problems with privacy, data quality, and project manager training. Big data analytics makes it simple to identify and manage risk by tracking its occurrence, unlike traditional risk management, which relies on historical data and periodic reporting that can lead to abrupt and unanticipated changes in the market environment. Project managers can better manage project risk with the aid of big data analytics. Advanced analytics methods that businesses can use include text analysis, machine learning, predictive analytics and data mining.

Introduction:

In the rapidly evolving and data-centric world of today, businesses in a wide range of industries rely on data analytics to run their operations [1]. Big data is defined by three Ps: volume, variety, and velocity [1]. It helps businesses to handle and examine massive, complicated data sets in order to find insights, correlations, and patterns that would not have been possible to find using more conventional analytics methods [2]. There are a lot of opportunities in project management with big data analytics [2]. Successful project delivery is a result of effective project management, and successful projects are typically defined by stakeholder satisfaction, on-time completion, and budgetary control. Outdated project management methods suffer even in some challenging and uncertain project environments [2]. Big data analytics provides an alternative method through the use of analytics tools such as MongoDB, Cassandra, and Hadoop. [1].

2. Concepts:

2.1 Big Data Analytics:

Because of the volume, variety, and velocity of the data, big data analytics differs from traditional data analysis [1]. Here, volume refers to the total amount of data, velocity to the speed at which it is processed, and variety to the kind of data [1]. Big data analytics is carried out by using following phases [1].
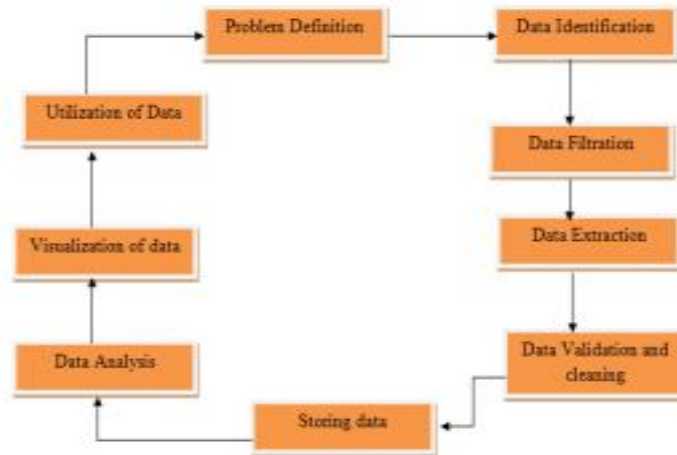

Figure 1: Life Cycle of Big Data Analytics

2.2 Project Management

Project management is crucial for organizing and planning a project's resources [3]. It Plans, actions, and a monitoring and control strategy are all included [3]. The best results may not always come from traditional project management techniques, which usually rely on intuition and experience. [4].

3. Utilizing big data analytics for project management:

Data analytics can be very helpful in project management by using business studies to analyze and develop project processes. [4]. It demonstrates how effective it is at raising stakeholder participation, risk mitigation, allocating resources, and evaluating performance. [3]. Tableau by Microsoft Power BI is the best big data analytics software. [4].

3.1 Decision making in project management:

Making good decisions early in a project's lifecycle leads to better project outcomes, which makes decision-making a crucial component of project management [3]. Expert opinions, gut feelings, and subjective judgments are used in traditional decision making processes, which can result in errors [4]. Big data analytics can help project managers make more precise, data-driven decisions by giving them real-time insights into the status and performance of their projects. By offering pattern recognition and predictive analysis in complex projects, big data analytics improves decision making [2].

3.2 Risk Management in Project:

Management:

In order to identify risks and uncertainties that may have an impact on project outcomes, risk management is crucial to the success of the

project [3]. Big data analytics creates a series of analyses and predictive models to make risk management simpler. By looking at past data and using contemporary statistical and machine learning techniques, financial organizations can create predictive models that estimate future risks and their potential impact [2] [4].

3.3 Resource Allocation in Project Management:

The process of allocating and scheduling available resources in the most efficient and cost-effective manner is known as resource allocation [3]. Big data analytics examines past data while accounting for a number of variables, including consumer preferences and market trends [2].

3.4 Stakeholder Engagement in Project Management

The goal of stakeholder engagement is to better understand the diverse interests of all the people and groups that will be impacted by the proposed change by taking into account their perspectives [3]. Throughout the course of a project, you can track and evaluate stakeholders' engagement, satisfaction, and feedback thanks to big data analytics [1]. Additionally, we can monitor and assess the views, feelings, and behaviors of stakeholders by using tools like dashboards, analytics, and reports [1].

3.5 Performance Measurement and Benchmarking in Project Management:

Through the efficient use of large internal and external data sets and the application of multivariate statistical analysis, big data analytics can help identify how past actions can affect future performance and can improve the effectiveness and efficiency of the decision-making process [2]. Comparing an organization's performance, procedures, or practices to industry leaders or established standards is known as benchmarking [3].

4. Future trends and applications of Big Data Analytics in Project Management:

4.1 Data Challenge:

The process of organizing, storing, and managing the data gathered by any organization is recognized by big data experts. A significant amount of unstructured data, such as audio, video, and image files, presents another data challenge [5]. In the near future, artificial intelligence and machine learning will also pose significant challenges because they primarily rely on data management [7]. For these technologies to function well and produce excellent results, high-quality data is necessary [4].

4.2 Process Challenges:

Large volumes of heterogeneous data are quickly gathered from many sources and must be processed in a meaningful way right away [1]. Big data collects data in real-time in a variety of

formats and quality levels from multiple sources [7]. Thus, it necessitates integrating the data after eliminating inconsistencies and storing it in scalable data warehouses [6].

4.3 Management Challenges:

It Concerns about data rights, operational costs, data sharing, security, and governance are all involved [6]. Achieving rapid collection of the vast quantity of data generated from multiple sources while ensuring high bandwidth sharing of said data is a problem [6].

4.4 Personalized project management:

Big data analytics can enhance a team member's performance in terms of skill and experience, which raises interest in the workplace and increases job satisfaction [7].

4.5 Predictive and Prescriptive Analytics:

Project managers will value predictive and prescriptive analytics more as they help organizations identify opportunities and risks [6]. This supports the project manager in making the best choice at the appropriate moment to prevent delays in the project's budget and timeline [6].

Conclusion:

There are numerous advantages to using big data analytics in project management, including better project performance, better risk management, and increased adaptability to shifting project conditions. It enhances the project's outcomes by assisting project managers in identifying possible risks, allocating resources as efficiently as possible, obtaining useful information about the project's status, making educated decisions, and measuring key performance indicators (KPIs) with ease. Executives and project managers can quickly identify early warning indicators of time, money, and expense issues and take appropriate action. Additionally, managers can easily predict when a project will be completed on schedule by using analytics to determine work velocity.

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