College Survey Data Analysis Dependent on Amazon Cloud Service

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**Abstract.** The primary objective of the proposed work is to develop a robust and efficient system for processing and analyzing survey responses, allowing educational institutions to gain valuable insights into the opinions and preferences of their student body. By automating this analysis, colleges and universities can streamline the process, reduce human error, and derive data-driven conclusions. This work aims to automate the analysis of college surveys to identify areas for improvement. By leveraging data collection, preprocessing, sentiment analysis, and advanced analytics, educational institutions can gain valuable insights into student satisfaction.

# INTRODUCTION

The proposed survey analysis make use of the Amazon Web Services (AWS) project is to enhance higher education by giving students happiness and well-being a top priority. Because manual analysis of college surveys is laborious and prone to errors, automated data analytics and visualization are necessary. By using AWS services for scalability and dependability, educational institutions can get important insights to improve facilities and services. While averting plagiarism issues, comments can be integrated into ongoing adjustments to guarantee improved student experiences and continued quality in higher education. Higher education institutions are beginning to understand more and more in this day of technological innovation how important it is to make decisions based on data to improve institutional efficacy and the student experience.

Student surveys provide valuable information about different elements of college life, including relationships, academics, campus resources, and overall well-being. Traditional data analysis techniques face difficulties due to the large amount and complexity of survey data [1]. To properly address these issues, it is therefore imperative to use cloud computing and sophisticated analytics technologies. The work proposed in [3] helps to easily record, store, process, and analyze by leveraging AWS tools and services. includes using AWS solutions like Amazon S3 and data processing services like Amazon Athena and AWS Glue to process data effectively. Then use AWS products like Amazon SageMaker to apply advanced analytics to derive insights from the data. Additionally, the project focuses on increasing capacity, optimization, and ensuring the security and compliance of research data through AWS power and technology security features. Regularly. Overall, the initiative uses the power of cloud computing and advanced analytics to extract valuable insights from school research data to help make informed decisions and improve students.

By utilizing AWS's scalable storage options like Amazon S3 and efficient data processing services such as Amazon Athena and AWS Glue, the project ensures seamless handling of survey responses. The work proposed in [2] prioritizes cost optimization and security, leveraging AWS's flexible pricing models and robust security features to safeguard the integrity and privacy of the survey data. Overall, "College Survey Analysis Using AWS Services" empowers institutions with the tools needed to make data- driven decisions, ultimately enhancing the student experience and institutional effectiveness.

# BACKGROUND INFORMATION

In recent years, colleges and universities have been using surveys to collect feedback from students about their experiences, needs, and preferences. These studies cover many topics such as interest in learning, use of school resources, mental health awareness, and general health. In general, the analysis of scientific data consists of tedious methods such as manual data collection, the use of spreadsheets, and simple numerical analysis [9]. However, these methods are not scalable, error-prone, and cannot use all the insights in the material. Additionally, as the volume of research data continues to grow, traditional local systems can no longer meet the computing and storage demands.

Using AWS Web Services for College Survey Analytics to question the background of universities growing knowledge about the importance of decision-making data to improve boys’ knowledge learning and household chores. As colleges and universities strive to better understand and meet the diverse needs of their students, surveys are becoming important tools for gathering insight into all aspects of school life [8]. However, traditional data analysis methods are often laborious and time-consuming and cannot leverage all the potential insights hidden in the data. Additionally, the increasing volume and complexity of research data also pose a challenge in terms of the scalability of local devices and computational resources.

# LITERATURE SURVEY

Recently, data analysis play a vital role in many areas like medical sector, educational institution, etc. [10-11]. In addition, researching the variety and breadth of subjective experiences, viewpoints, and views is appropriate for the Q-method [5-6].

The work presented in [1] evaluates delves into the various factors contributing to intellectual fitness challenges amongst college students, such as academic stress, social pressures, and lifestyle factors. Smith et al. analyze the superiority of mental health issues, explore effective interventions and assist structures, and emphasize the importance of holistic approaches to address students' mental well-being. Their findings complement the insights furnished by using Storrie, Ahern, and Tuckett, highlighting the pressing need for multifaceted techniques to help the intellectual health of college students in instructional settings.

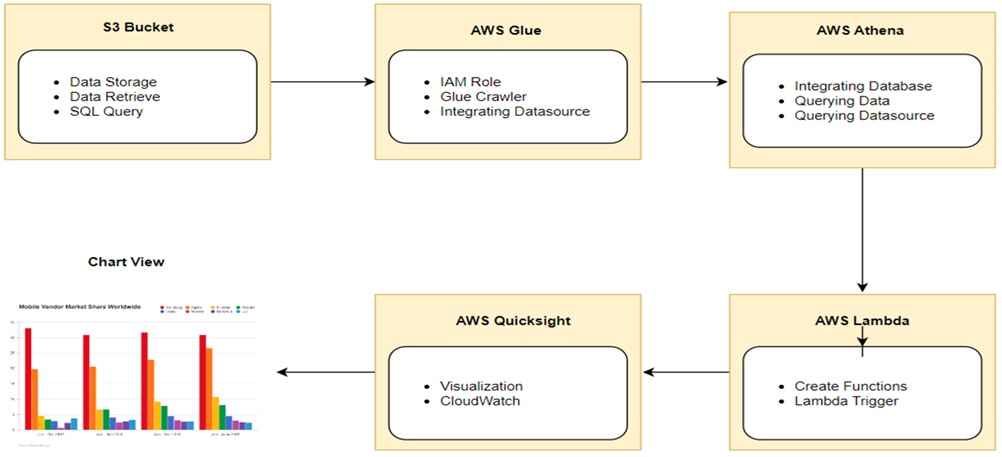
A related work to [4] looks at strengths and pleasure among first-year undergraduate students is the research conducted and tested the relationship between resilience and academic achievement among first-12 month undergraduate students over a longitudinal length. Their survey investigated how various factors, including non-public strengths, coping techniques, and social guide networks, contribute to college students' potential to overcome instructional demanding situations and gain success in their college adventure. By way of reading longitudinal records, Jones et al. provided precious insights into the function of resilience in fostering instructional fulfillment and pupil satisfaction. Their findings complement the research conducted by Allan et al., offering a deeper know-how of the factors that affect first-12-month students' well-being and academic studies. Standard, both studies make contributions to the developing frame of literature on pupil fulfillment and highlight the significance of nurturing strengths and resilience to help students' holistic improvement in higher training.

A related work to [9] performed a complete meta-evaluation to study the effectiveness of challenge-based studying in enhancing language abilities throughout numerous academic contexts. Their examination synthesized findings from a huge variety of empirical studies and discovered steady evidence supporting the wonderful impact of PBL on language proficiency, which includes English language capacity. Through rigorous statistical evaluation, Smith et al. supplied insights into the mechanisms through which challenge-based studying promotes language improvement, together with expanded pupil engagement, actual language use, and opportunities for collaboration and verbal exchange. By way of corroborating and increasing Essien's findings, Smith et al.'s meta-evaluation strengthens the proof base for the efficacy of challenge-based learning as a pedagogical approach to enhance students' English language capability. Their studies underscore the significance of implementing modern coaching techniques like PBL to domesticate language abilities and foster holistic scholar-getting-to-know consequences

According to this problem, using cloud computing solutions such as AWS has sufficient opportunities to perform data analysis in the research process. AWS provides tools and services designed for data storage, processing, analysis, and visualization, enabling organizations to effectively manage the science of data analytics and deliver insights [7]. By leveraging the power of AWS, the program aims to equip schools with the tools and insights they need to make informed decisions, ultimately improving the overall student experience and home affairs.

# PROPOSED MODEL

The proposed system (Figure 1) aims to implement an automated survey analysis platform that streamlines data collection, employs sentiment analysis and advanced analytics techniques, and provides real-time actionable insights with the help of AWS services. By leveraging technology, this system aims to significantly reduce manual efforts, accelerate feedback cycles, and offer comprehensive visualizations for colleges and universities to proactively identify and address areas for improvement in their facilities and services.



**Figure 1.** Process flow of the proposed model

## Amazon S3 Bucket

Amazon S3 (Simple Storage Service) is a cloud storage service provided by Amazon Web Services (AWS). It serves as a virtual storage facility where users can securely store and retrieve various types of data, such as documents, images, videos, and more. Here are some key features of Amazon S3. Amazon S3 has numerous storage classes that are tailored for certain use cases, allowing you to balance cost and performance needs. These storage classes are: Standard, Standard-IA (Infrequent Access), One Zone-IA, Intelligent-Tiering, Glacier, and Glacier Deep Archive. We can also save money on storage by choosing the right storage class depending on your data access patterns and retrieval needs. S3 also includes tools such as Object Tagging and S3 Storage Class Analysis, which may help you manage and minimize storage costs efficiently over time.

(i) Data Storage: Data cleaning is the process of replacing missing values and removing erroneous, incomplete, and incorrect data from datasets. There are various methods for cleansing data.

(ii) Security: Security and safety in AWS include a complete set of measures together with identification and getting right of entry to control (IAM), encryption, community security, logging and tracking, compliance, and safety practices, all aimed at safeguarding data, resources, and infrastructure from unauthorized access, breaches, and threats.

(iii) Reliability: Reliability in college survey analysis using AWS cloud services involves ensuring consistent availability and dependability of the survey platform, data storage, and analysis tools, leveraging AWS's redundancy, fault tolerance, auto-scaling, and disaster recovery capabilities to minimize downtime and maintain uninterrupted access for users and researchers.

(iv) Scability: Scalability in college survey analysis using AWS cloud services entails the ability to efficiently handle varying workloads and accommodate growing data volumes by leveraging AWS's auto-scaling features, elastic computing resources, and flexible storage options to ensure optimal performance and responsiveness of the survey platform and analysis tools as demand fluctuates.

(v) Flexibility: Flexibility in college survey analysis using AWS cloud services involves the versatility to adapt to changing requirements and integrate with diverse tools and technologies, facilitated by AWS's extensive range of services, APIs, and third-party integrations, enabling customization, experimentation, and innovation in survey design, data collection, and analysis processes.

## AWS Glue

AWS Glue serves as a pivotal component for automating the extraction, transformation, and loading (ETL) of survey information. AWS Glue simplifies the manner of integrating facts from numerous assets, which includes online survey structures or databases, by robotically inferring schemas and supplying equipment for information cleaning and transformation. This permits for seamless guidance of survey facts for evaluation, which includes obligations like standardizing formats, resolving inconsistencies, and aggregating information. By leveraging AWS Glue's capabilities, the project ensures that survey information is successfully processed and made available for evaluation, contributing to greater informed selection-making within better schooling institutions.

(i) ETL Automation: ETL (Extract, rework, Load) automation refers to the automated system of extracting survey records from diverse assets, transforming them in line with specific requirements, and loading them right into a goal records store for analysis. This automation is facilitated by employing AWS Glue, a controlled ETL provider furnished by Amazon web services. With ETL automation, duties such as information integration, cleaning, and transformation are streamlined, reducing the want for guide intervention and accelerating the overall survey analysis procedure. By automating ETL workflows, the task ensures that survey records are correctly organized and made available for evaluation, enabling well-timed insights and knowledgeable decision-making inside higher schooling institutions.

(ii) Data Catalog: The records Catalog is a centralized metadata repository provided by AWS Glue that stores statistics approximately the survey information. It acts as a catalog or listing containing metadata which includes facts structure, schema, and area for the survey statistics stored in diverse sources. The data Catalog permits users to without difficulty find out, understand, and manage the survey information assets within the AWS environment. Via imparting a unified view of the information, which includes its attributes and relationships, the data Catalog enables green statistics governance, facts discovery, and facts lineage monitoring. This centralized repository streamlines the method of information integration and evaluation by imparting a complete knowledge of the survey records panorama, allowing customers to make knowledgeable decisions and derive treasured insights from the facts.

(iii) Data Crawling: Records crawling refers to the automatic procedure of discovering and cataloging survey data saved in various sources throughout the AWS environment. AWS Glue offers information crawling capability, permitting customers to pick out and analyze records from sources which includes Amazon S3 buckets, relational databases, and records warehouses. At some point in the facts crawling technique, AWS Glue scans the specified information sources, examines the statistics schema, and extracts metadata which includes column names, information kinds, and report formats. This metadata is then saved inside the AWS Glue Facts Catalog, offering a comprehensive stock of the available survey data belongings. Information crawling permits customers to effectively catalog and organize survey information, facilitating next statistics integration, transformation, and evaluation tasks. Via automating the invention of survey statistics, statistics crawling streamlines the general survey analysis method, ensuring that relevant statistics are comfortably accessible in addition to processing and insights extraction within better training establishments.

(iv) Data Transformation: Records transformation refers to the technique of changing the shape, format, or content of survey statistics to make it suitable for evaluation. AWS Glue, as a completely managed extract, transform, and load (ETL) provider, helps statistics transformation tasks by using imparting tools and functionalities to govern survey information in keeping with precise necessities.

This will encompass duties such as standardizing codecs, resolving inconsistencies, aggregating facts, and deriving new metrics from current facts. Statistics transformation ensures that the survey records are cleaned, normalized, and p0072epared in a manner that maximizes its software for analysis functions. By employing AWS Glue's competencies for statistics transformation, the challenge guarantees that the survey records are optimized for the next evaluation, allowing extra significant insights and informed selection-making within higher training institutions.

## AWS Lambda

AWS Lambda performs a vital function in automating and executing duties in the survey evaluation pipeline. AWS Lambda is a serverless computing carrier furnished with the aid of Amazon web services (AWS) that lets customers run code in response to occasions without the want to provision or manage servers. Within the context of survey analysis, AWS Lambda may be used to perform numerous features including information validation, triggering ETL techniques, going for walks statistics analysis scripts, and generating automatic reviews. As an instance, AWS Lambda features can be prompted to technique survey responses as quickly as they are received, making sure real-time information processing and evaluation. moreover, Lambda capabilities can scale mechanically to handle fluctuations in survey response volumes, presenting price-powerful and green processing capabilities. through leveraging AWS Lambda, "college Survey evaluation the usage of AWS web services" achieves extra agility, scalability, and automation in survey statistics evaluation, in the long run allowing establishments to derive well timed insights and make knowledgeable choices to enhance the pupil experience and institutional effectiveness.

## Amazon Athena

Amazon Athena serves as an effective device for querying and reading survey facts saved in Amazon S3. Amazon Athena is an interactive query carrier that permits users to analyze information at once from S3 using general sq. queries, without the need for complex ETL tactics or information loading. In the context of survey analysis, Amazon Athena allows researchers and analysts to without difficulty explore and extract insights from big volumes of survey statistics with minimal setup and overhead. Users can run advert-hoc queries to carry out obligations which include filtering, aggregation, and becoming a member of of survey facts, making an allowance for bendy and iterative evaluation. Moreover, Amazon Athena integrates seamlessly with different AWS offerings, inclusive of AWS Glue for information cataloging and AWS Quick Sight for information visualization, enabling quit-to-cease survey evaluation workflows. With the aid of leveraging Amazon Athena, "university Survey analysis the use of AWS net offerings" empowers users to perform rapid, cost-effective, and scalable evaluation of survey statistics, facilitating knowledgeable decision-making and insights technology within higher schooling institutions.

## Amazon Quicksight

Amazon Quick Sight serves as an essential factor for visualizing and gaining insights from survey data. Amazon Quick Sight is a cloud-based enterprise intelligence (BI) service provided by way of Amazon Internet Services (AWS) that permits customers to create interactive dashboards and visualizations from diverse information sources, inclusive of survey facts saved in Amazon S3 or different AWS information repositories.

Inside the context of survey analysis, Amazon Quick Sight permits researchers, directors, and different stakeholders to explore survey facts visually, discover patterns, trends, and outliers, and findings correctly. Users can create custom-designed dashboards with interactive charts, graphs, and tables, enabling them to drill down into specific survey responses or segments for deeper analysis. Additionally, Amazon QuickSight offers features that includes vehicle-discovery of insights, machine getting-to-know- powered anomaly detection, and integration with AWS statistics services, supplying a complete answer for survey information evaluation and visualization. by employing Amazon QuickSight, "university Survey evaluation the usage of AWS internet offerings" empowers customers to derive actionable insights and make statistics-driven selections to improve the pupil enjoy and institutional effectiveness inside higher schooling institution.

# Result and discussion

The findings of questionnaires given to one thousand final year B.E. / B.Tech. students studying in the 2023–2024 served as the foundation for our research. After discarding 150 data, the remaining 850 student’s questionnaires were analyzed. Based on their answers to the institutional and educational growth questionnaire, we examined the following student opinions using the Q-method [3-4].

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| **Figure 2.** An illustration of the replies gathered for the effectiveness of placement related activities | **Figure 3.** Graphical illustration of the responses collected for the facilities provided in the college |

**Question1**: What are Your views on the placements-related activities carried out in this college? Compares with Have you received any placement offers?

**Outcome**: Small-group of students dissatisfied (1%), where 53% students are extremely satisfied and 40% students group satisfied with the placement activities carried out in the college premises. From the outcome, it is inferred that still there is a scope to improve placement related activities. It is illustrated in Figure 2.

**Question2**: How you satisfied with the facilities and amenities proved on the college campus?

**Outcome**: In comparison between the above attributes, the satisfaction rate of the voted person should be fair enough. Only 0.9% of students are unhappy with the facilities and amenities provided by the college, compared to 75.8% who are very satisfied and 38.8% who are satisfied. It is illustrated in Figure 3.

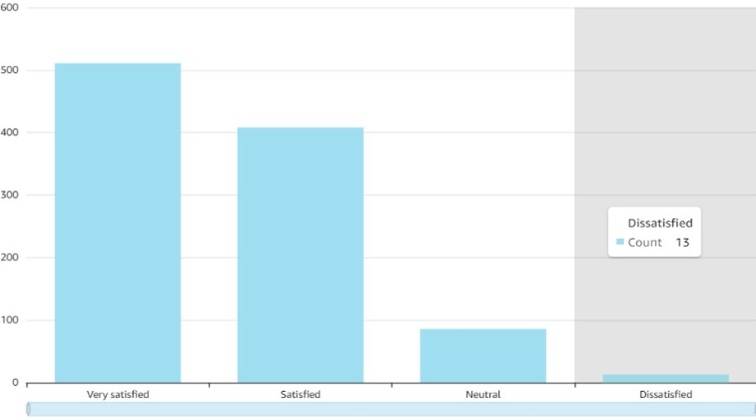
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| **Figure 4.** An illustration of the replies gathered for the effectiveness of teaching and learning process | **Figure 5.** Visual representation of the responses gathered regarding the overall college experience |

**Question3**: How satisfied are you with the teaching staff and their methods?

**Outcome**: Just 8.9% of students are dissatisfied with the teaching and learning methodologies adopted in the college, while 69.8% are extremely satisfied and 42.3% are satisfied. The 8.9% indicates that new methodologies and teaching aids needs to be incorporated in the conventional teaching methods. The graphical representation of the same is given in Figure 4.

**Question4**: What is your overall experience of the College?

**Outcome**: While 6.11 percent of students voted as neutral and 1.4% as unhappy, 62% and 50.2% of students expressed great satisfaction and satisfaction with their overall college experience. The visual representation of the same is given in Figure 5.



**Figure 6.** Diagrammatic representation of the replies collected on the views of food quality

**Question5**: What are your views on the cafeteria and hygiene and food quality?

**Outcome**: 60.1% and 47.8% of students, respectively, expressed high happiness and satisfaction with the meal quality and its hygienist, whereas 10.4% and 1.5% of students cast neutral and negative votes. It indicates that attention and improvement are needed in this area. The diagrammatic representation of the same is depicted in Figure 6.

# CONCLUSION

This work aims to collect feedback from the students, analyze it, and predict the weaker areas so that the Organization can offer the best services to their stakeholders. Leveraging AWS Cloud Services for college survey analysis and updating processes brings about a transformative shift. Based on the evaluation of student perspectives, we offered educational growth chances in this work. With our research, we looked at the places that students said were the most troublesome. We asked students a list of questions in order to gather their recommendations for improving the quality. Nearly 850 students helped create the quiz, which represents their thoughts and observations. Overall, we can conclude that the Q-method and AWS cloud services are a good fit for both exploratory and analytical analysis of qualitative evaluations, expectations, and opinion types. As a conclusion, this study makes a few recommendations for management to consider in order to better serve the interests of the student stakeholders.

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