Faculty Evaluation and Qualification Analysis System Using Naïve Bayes Algorithm

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Educational Institutions continue to seek excellence in their hiring practices given the vast spectrum of applicants ready to pursue a profession. Considering the degree to which student achievement is impacted by teacher effectiveness, this is significant. This prime perception makes it clear that there is an increasing requirement to investigate and comprehend how we may enhance the hiring procedure at educational institutions. In this study, the researchers developed a system that utilizes the Naïve Bayes Algorithm to predict which of the applicants has a resume that qualifies as faculty in a few top private universities in the Philippines namely Centro Escolar University (CEU) and De La Salle – College of Saint Benilde. This will significantly apply analytics in faculty hiring decision-making and help hasten the traditional process used by Human Resource Departments when determining whether or not applicants meet the requirements for open positions inside their institution, the list of qualified applicants will be integrated into the system with filtering and sorting feature to help the Human Resource Department of the educational institution locate applicants in particular categories or fields of specialization where they intend to hire. Utilizing the ISO 25010 evaluation, the web-based system shows excellent Functional Suitability, Performance Efficiency, Usability, and Reliability, with respective means of 3.41, 3.26, 3.42, and 3.42.

Keywords: Faculty Qualification, Naive Bayes Algorithm, Prediction.

1. Introduction

The pursuit of academic achievement in highly competitive, educational institutions has grown more challenging in an era marked by rapid technological breakthroughs and changing educational environments. The proficiency and efficacy of the teaching staff are fundamentally related to the quality of education. Selection of the best applicants to enter the ranks of

educators is therefore of utmost significance. The traditional techniques of assessing faculty applicants have, however, run into new difficulties in the context of a rapidly developing digital world.

A thorough reevaluation of the hiring process is necessary, especially at educational institutions working to uphold and improve their academic standards. The conventional methods of evaluating applicants' qualifications, such as resumes and interviews, have become tedious, and time-consuming, thereby increasing the risk of overlooking exceptionally qualified individuals or admitting those who may be less suited to the educational task. [38]

These data and perceptions make it clear that there is an increasing requirement to investigate and comprehend how we may enhance the hiring procedure at educational institutions. Businesses across all industries devote a significant amount of effort and money to finding, developing, and educating the people who will best match their organizational strategy. It is important to look into current worldwide studies and programs that entail this kind of decision-making. Therefore, the project's researchers plan to create a machine-learning mechanism that can assess an applicant's suitability to work for a competitive educational institution. With the help of the Naive Bayes algorithm, the system will be able to automatically weigh every component of an applicant's profile and provide an unbiased evaluation of their overall suitability. By automating this procedure, the system seeks to expedite applicant selection while making sure that the best prospects are accurately identified. To determine whether an applicant is qualified for an academic position, the algorithm will take into account a wide range of hired faculty credentials, accomplishments, certifications, and other relevant data points.[16][50]

1.1 Statement of the Problem

The main problem that this study tries to address is the absence of analytics and the time-consuming process of the conventional preliminary hiring procedure in universities and colleges. Specifically, the study aims to solve the following problems:

1. Lack of a qualification system that provides applicants with self-assessment that predicts if their credentials are enough to qualify in Top Ranked Educational Institutions – It might be challenging for candidates to know whether they are eligible or have met the standards of top-ranked educational institutions before submitting an application. The lack of a thorough qualification process might make applicants hesitant, which could demotivate them from pursuing their applications. [2]

2. Lack of analytics in deciding an applicant's qualifications and the fact that HR departments must spend time examining resumés one by one when hiring faculty members - When universities, colleges, and schools hire faculty members, they don't usually use analytics to know whether someone is qualified for a specific field. The traditional way is to subjectively review all the applicant's curriculum vitae, pick, and proceed to interview and assessment. This process doesn't follow a specific standard of analysis regarding applicants' qualifications. Also, it will take time to narrow down applications of those who meet the institution's qualifying criteria since the HR department must carefully and manually review each document and credential submitted by the applicants.[1]

3. There is a pressing concern regarding the seamless transition from manual to automated system processes- Automated processes, advancement, and innovations provide a variety of advantages when applied in specific situations, particularly in terms of speeding tasks at hand, but there may also be disadvantages that sometimes make manual methods still the best choice to utilize. The fact that faulty automated and AI products are on the market today makes this problem particularly urgent to address, and adequate assessment and communication of functionality should be a minimum requirement for the mass deployment of algorithmic systems (Raji et al. 2022). During the transition from manual to automated procedures, there is always a chance that the integrity of data and decision-making may be compromised by unforeseen errors, anomalies, or deviations from the expected results. [59]

1.2 Objectives

The major objective of the study is to create a system that will quickly and readily determine whether faculty applicants are competent for the position for which they are applying.

1. To allow applicants to independently evaluate if their credentials are sufficient to apply as faculty in top private universities in the Philippines. The prediction will utilize the Naive Bayes Algorithm and the result will be based on hired, qualified, and unqualified faculty members who were evaluated using the criteria that was given by a few Top Private Universities in the Philippines based on EduRank 2023 rankings. EduRank evaluated alumni impact, non-academic prominence, and research outputs to determine the rankings of Philippine universities. They will be able to make guided decisions and have a preliminary understanding of their chances and the likelihood that they will be accepted into these reputable universities.

2. To design a Web-Based Faculty Qualification Analysis System that uses analytics, utilizing the Naive Bayes Algorithm to standardize and hasten the process of HR Departments in assessing whether individuals are on their shortlist for a position in their respective institutions. A filtering and sorting system will be incorporated into the system that will assist HR departments of educational institutions in finding applicants in specific categories/fields that they plan to recruit.

3. To ensure that the transition from the manual process to the automated process in Faculty Evaluation, Qualification, and Preliminary Screening of applicants will be effective and efficient. To demonstrate this, the researcher's objective seeks to achieve a decent F1 score prediction and average to test how efficient the system can be, utilizing the PHP ML library and its Naïve Bayes Classifier Tool. The researchers intend to have an idea if this approach ensures the balance between manual and automated system processes.

1.3 Significance of the Study

The researchers will conduct this study to develop a Faculty Evaluation and Qualification Analysis System. The majority of educational institutions frequently employ a traditional hiring procedure, which is less effective and does not process qualifications precisely because it mostly relies on the subjective judgment of a talent acquisition specialist.

The results of this study may also be helpful for the following:

1. To Educational Institutions, the development of the Faculty Qualification

Analysis System could help each Educational Institution in terms of attaining the best and most competent applicants that they'll need for their institution. It is beneficial for them, notably their hiring department, whose job it is to find applicants with the best qualities for the job. By using an analytical system, this task might be shortened and made more efficient. Additionally, because they are known for choosing instructors who manage their students in an effective manner, this will encourage additional students to study in their institutions.

2. To Faculty Applicants, the study will be significant to those who intend to apply to an institution as a professor or as any faculty position since they could assess themselves analytically with the use of the system. It's advantageous for individuals who are qualified because their selection was based on actual evidence, not just intuition or a subjective judgment, to ensure that they were a good fit for the position. Additionally, it would save the time of individuals who are rejected from pursuing a position that does not match their qualifications and expertise.

3. To Students, the study will be advantageous, especially for students. This is very crucial for them because their professors are evaluated heavily based on the type of subject matter that they will teach, so students can be certain that the instructor who is assigned to teach every class has extensive knowledge, skill, and experience in the subject matter that they will be educating. Because their teacher is unquestionably an authority on the topic, this will considerably assist the students in becoming more knowledgeable about that particular subject and excelling at it.

4. To Developers, and Future Researchers, researchers and developers that are inclined toward technology and software development will benefit from the study. The project can be utilized for the technology's future development. The study's results can also be used as a reference to provide background information or an overview of topics in this field to upcoming researchers.

1.4 Scope and Delimitation

This study's focus is to develop a Faculty Evaluation and Qualification Analysis System using the Naive Bayes Algorithm, and determine if it complies with the software quality model specified in ISO 25010:2011. The prediction will focus on collecting the criteria of qualification employed by some Top Private Universities in the Philippines that are based on the EduRank 2023 rankings and will then go through several data preparation steps. The data that will be gathered from hired, qualified, and unqualified faculty applicants based on the criteria given will serve as training data for the pre-processing phase and for the overall prediction score.[47]

The project's researchers cited a number of restrictions. First off, it was not determined in the study if Naive Bayes is the most effective and efficient prediction method for job qualification. The system solely focuses on the qualification of college faculty members of the Universities that willingly participated in the data collection of the project. [Centro Escolar University, De La Salle College of Saint Benilde]; that gave their criteria for their preliminary screening. Other variables not included or not mentioned in the scope, are delimited.

2. Methodology

2.1 Requirements

The methods of this research will require the data/credentials of hired college faculty employees of a specific university, or random college faculty members/applicants who have a resume that qualifies for the set of standards that was given by a specific university, utilizing this data, the system will be able to use the Naïve Bayes algorithm to analytically determine whether an applicant is qualified or if they would be a good fit for a particular Educational Institution. The gathered data contains the credential records (such as their educational attainment, seminars, certifications, years of experience, training, licensure, field of study, and specific course), making it possible for the algorithm to determine whether the applicant's credentials are sufficient or exceed those of the faculty members who meet the specified criteria, this will analytically determine if the applicant qualifies for the preliminary screening in that specific Institution.

2.2 Data Collection

To achieve the objectives of this project, the project's researchers must employ research tools that will allow them to gather the data that the system or project needs. The researchers of the project conducted interviews with a few private colleges that are interested in taking part. Interviews with each university's human resources department of [Centro Escolar University, and De La Salle – College of Saint Benilde], to be precise; are necessary for the researchers to gather information on how the university uses particular criteria when deciding whether to consider the application when hiring faculty members. When reviewing resumes as part of their manual preliminary screening, the researchers enquire specifically about how they rate each accomplishment, such as the educational attainment, licensure, certifications, training, years of experience, seminars in a specific field of study of an applicant. This greatly aids the project's researchers in matching the project's or system's operation to the current manual procedure used by the university. After the interview, the researchers gathered data and found random faculty members/applicants who had a resume that qualified for the set of standards that was given by the university. This data is crucial in the project since it will serve as the main basis of the system whether the applicant qualifies in the preliminary screening and is on the short list of the university, the qualifications of the applicant were analytically compared to the qualifications of individuals who willingly took part in data collection.

2.3 Development

To enable the system to analyze each accomplishment of the faculty members from the data that was gathered, the criteria given by each participating private college will then be transformed into a grading system based on the responses provided by the HR Department during the interview that was held. These evaluations will be crucial in calculating each accomplishment, certification, training, and experience determining whether the applicant qualifies in the system's preliminary screening, and determining whether they are deserving of being on the short list of the Human Resources Department of that particular University.[56]

$$P(c|x) = \frac{P\ (x|c)P(c)}{P(x)}$$

Equation 1: Naïve Bayes Algorithm Formula

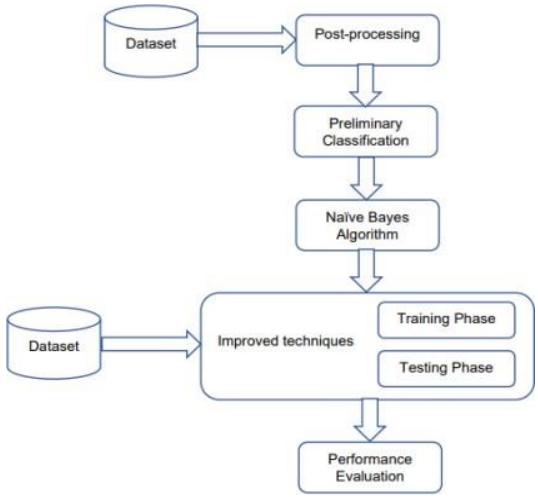

Figure 1: Process Flow Diagram Using the Naïve Bayes Algorithm

There are a total of 60 collected data from random faculty members/applicants that undergo post-processing and preliminary classification to determine which are labeled to be qualified for the set of criteria that was given by the universities that participated. The implementation of the Naive Bayes algorithm then begins and goes through training and testing. Improvements in the machine learning technique are shown as the dataset grows by collecting new data.

$$F1 = \frac{2\ x\ precision\ x\ recall}{precision + recall}$$

Equation 2: F1 Score Formula

The model was tested to determine its efficiency using the F1 score/formula. It is employed because there was an imbalance in the datasets collected for qualified and non- qualified applicants. In imbalanced datasets, where one class significantly outnumbers the other, accuracy alone can be misleading. For instance, if you have a dataset where 95% of the samples belong to one class and only 5% to another, a model that predicts everything as the majority class will achieve 95% accuracy, yet it fails to correctly predict the minority class, which might be more important. The F1 score combines precision (the number of true positives divided by the sum of true positives and false positives) and recall (the number of true positives divided by the sum of true positives and false negatives). This harmonic mean of precision and recall provides a single metric that balances both correctly identifying the positive cases and not misclassifying negative cases as positives. By considering both false positives and false negatives in its calculation, the F1 score provides a more informative evaluation metric for imbalanced datasets.[64]

2.4 Project Design

Faculty Qualification System is a web application for educational institutions that will be using the Naive Bayes Algorithm to predict if an applicant is qualified or not. PHP Programming is the base language that will be used to develop the system.

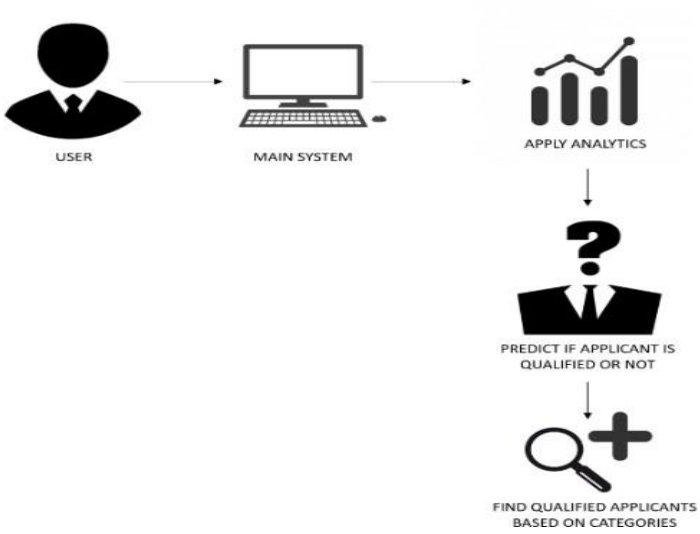

Figure 2: Block Diagram of Faculty Qualification System using Naive Bayes Algorithm

Figure 2 shows the block diagram of the Faculty Qualification System using Naive Bayes Algorithm. It shows the major structures and functions of the system. The process consists of the end-users, the main system, the application of analytics, the main function where the applicant could predict if they are qualified or not, and the search or filter feature which HR users can use to hasten to search for applicants based on specific categories that they look for.

The end-user, specifically those who are seeking a job as a faculty in an institution will be the ones who can input their own CV descriptions that they want the system to process. They can make the system work and use the feature that determines if they do qualify and if their credentials are enough to the criteria that are employed by the top private universities who participated in the project. They will be given the option after the process of whether to post their processed data and list their name in the listings where HR of the participating universities could find them. Then, HR from the participating universities could search the list of qualified applicants under the find qualified applicants tab to find candidates who meet the requirements of their respective institutions. This task will be made simpler for them by the filtering and sorting features. This will speed up the preliminary hiring process by allowing HR and the applicants to both determine whether a candidate is qualified for the position. This project will use a Quantitative Method and a descriptive research design to determine if the system is useful, efficiently analyze the results, and know whether the usefulness, intention, and ease of use have a significant impact on its target users.

2.5 Sampling Techniques

In this study, the researchers used purposive sampling to gather data from the set of populations that the study needs. Due to the requirement to choose respondents who will heavily rely on the developed system, the researchers used purposive sampling. The primary respondents to this study are aspiring college faculty applicants and current faculty members in order to determine whether the approach is truly productive and efficient for them and for their area of work.

2.6 Evaluation

A comprehensive specification and assessment of software product quality must be carried out in order to ensure that the created system complies with the given requirements. Using a tried-and-true evaluation method, we can determine whether a system is of high quality. In this view, a system's superiority in terms of a variety of characteristics is determined by how well it satisfies the needs of its users and whether it is suitable for the application for which it is designed.

These standards categorize the elements of a system and list each element that needs to be evaluated before it can be made available to the general public. The software quality model specified in ISO 25010:2011 will be used by the study's developers. This study aims to evaluate the system in terms of the following attributes: Functional Suitability, Performance Efficiency, Usability, and Reliability.

Table 1. Rating Scale for Interpreting the Evaluation Result

Scale	Weighted Mean Range	Verbal Interpretation
4	3.50 to 4.00	Strongly Agree
3	2.50 to 3.49	Agree
2	1.50 to 2.49	Disagree
1	1.00 to 1.49	Strongly Disagree

The results were interpreted using the Four-point Likert Scale for the Level of Agreement for interpreting the evaluation result shown in Table 1.

3. Results and Discussions

3.1 Objective Results

The questions that were asked in the survey form are discussed below. The system's effectiveness is used to categorize these questions, whether the system is really useful for respondents in independently evaluating if their credentials are sufficient to apply as faculty, in expediting applicant selection and ensuring the efficient and effective transition of manual process to an automated process. On the survey and assessment forms that were provided, 52 people replied.

Table 2. 4-point Likert scale of Agreement

Numerical Rating	Interpretation
1	Strongly Disagree
2	Disagree
3	Agree
4	Strongly Agree

Using this 4-point Likert scale of agreement, the respondents were able to answer the following questions:

Respondents' Familiarity with the Research Problem

The respondents were first asked about their familiarity with the research problem. The first survey question of whether or not the respondents think that having a preliminary idea of their chances of qualification in a university will be helpful for them shows that out of the 52 total

respondents, all 52 of them, or 100%, believe that it is true. This unanimity of response shows that the respondents are in complete agreement on the potential advantages of getting such early insights.

Furthermore, the next question of whether the respondents think that there is a lack of a system for predicting qualified applicants for specific universities suggests that the majority of the 52 respondents, specifically 40 of them (or 76.9% of the total respondents), believe that there is indeed a lack of a system that allows them to predict if they are qualified for specific universities. On the other hand, a smaller group of 12 respondents (or 23.1% of the total respondents) expressed the opposite view, indicating that they do not perceive a lack of such a predictive system.

Lastly, the results on whether or not the respondents find it difficult to locate universities where they might get hired suggest that the majority of the 52 respondents, specifically 38 of them (or 73.1% of the total respondents), find it challenging to locate universities where they might be hired. On the other hand, a smaller group of 14 respondents (or 26.9% % of the total respondents) expressed the opposite view, indicating that they do not find it difficult to identify universities where they could potentially be hired.

Respondents' System Efficiency Feedback

Moving on to the efficiency feedback of the system, on the fourth survey question, respondents were asked whether they think that the prediction is helpful because it gives the applicants a decent preliminary understanding of their qualifications in the institutions that participated in the study. The results suggest that out of the 52 respondents, 29 of them (or 55.8% of the total respondents) strongly agree that the prediction is beneficial for offering applicants insights into their qualifications in the participating institutions, while 20 people or 38.5% of the total respondents said that they agree. On the other hand, 3 people, which is 5.8% of the total respondents, strongly disagree.

In the fifth survey question, the results of whether the respondents think that using the system for predicting faculty applicants' qualifications will improve the overall quality of preliminary screening (shortlisting) in an institution suggests that out of the 52 respondents, 28 of them (or 53.8% of the total respondents) strongly agree that using the system for predicting faculty applicants' qualifications will enhance the overall quality of hires in an institution, while 21 people, or 40.4% of the total respondents, said they agree. On the other hand, 2 people, which is 3.8% of the total respondents, disagree, and 1 person, or 1.9% of the total respondents, strongly disagrees.

The respondents were also asked whether they think that the system's evaluation of the qualifications of faculty applicants improved the conventional preliminary screening process in terms of convenience for applicants and HR suggests that out of the 52 respondents, 30 of them (or 57.7% of the total respondents) strongly agree that the system's evaluation improved the preliminary screening process, while 20 people, or 38.5% of the total respondents, said they agree. On the other hand, 2 people, which is 3.8% of the total respondents, strongly disagree.

The next question assesses the UI of the system, it was asked whether the respondents think that the process of the application is simple enough to be easily understood by users ages 18

and up, out of the 52 respondents, 25 of them (or 48.1% of the total respondents) strongly agree, while 22 people, or 42.3% of the total respondents, said they agree. On the other hand, 3 people, which is 5.8% of the total respondents, disagree, and 2 or 3.8% of the respondents strongly disagree.

Lastly, the eighth survey question of whether the respondents think that the approach will be beneficial in terms of efficiency for college faculty applicants and HR Departments of an institution and will continue to be so in the future showed that out of the 52 respondents, 25 of them (or 48.1% of the total respondents) strongly agree, while 25 people, or 48.1% of the total respondents, said they agree. On the other hand, 2 or 3.8% of the respondents strongly disagree.

3.2 Evaluation Results

The software quality model specified in ISO 25010:2011 was used by the study's developers. This study aims to evaluate the system in terms of the following attributes: Functional Suitability, Performance Efficiency, Usability, and Reliability.

Functional Suitability:

Functional Completeness: The system gives the user everything they require: to predict their qualification for applicants, and find qualified applicants for HR.

The results show that out of 52 respondents: 27 (51.9%) of the users Strongly Agreed, and 22 (42.3%) agreed. On the other hand, there is 1 (1.9%) who disagreed and 2 (3.8%) who strongly disagreed with whether the system gives the user everything they require to predict the faculty qualification of applicants and find qualified applicants for HR. This attribute has received a mean of 3.42.

Functional Correctness: The predictions have a decent accuracy rating, we can say that the variables used are based on standards employed by institutions, and the system offers the exact information that the applicant provided.

The results show that out of 52 respondents: 26 (50.0%) of the users Strongly Agreed, and 22 (42.3%) agreed. On the other hand, there are 3 (5.8%) who disagree, and 1 (1.9%) strongly disagree with whether the system gives accurate predictions and can say that it is based on specific standards employed by institutions, and whether the system offers the exact information that the applicant provided. This attribute has received a mean of 3.42. The Functional Suitability of the system based on the survey has received a total mean of 3.41.

Performance Efficiency:

Capacity: When the applicant posted their information for qualification and customization of the account, there were no restrictions.

The results show that out of 52 respondents: 16 (30.8%) of the users Strongly Agreed, and 29 (55.80%) agreed. On the other hand, there are 4 (7.7%) who disagreed, and 3 (5.8%) strongly disagreed whether the system has no restrictions when the applicant posted their information for qualification and customization of the account. This attribute has received a mean of 3.19.

Time Behavior: The prediction, input of data and search for applicants are all processed quickly and without any delays.

The results show that out of 52 respondents: 25 (48.1%) of the users Strongly Agreed, and 23 (44.2%) agreed. On the other hand, there are 2 (3.8%) who disagreed, and 2 (3.8%) strongly disagreed with whether the prediction, input of data and search for applicants are all processed quickly and without any delays. This attribute has received a mean of 3.36. The Performance Efficiency of the system based on the survey has received a total mean of 3.26.

Usability:

Learnability: The system's user-friendly interface makes it accessible to a wide range of users. The system would be accessible to users aged 18 and up who want to perform an assessment of their qualifications or look for specific applicants (for HR).

The results show that out of 52 respondents: 31 (59.6%) of the users Strongly Agreed, and 18 (34.6%) agreed. On the other hand, there are 2 (3.8%) who disagreed, and 1 (1.9%) strongly disagreed with whether the system has a user- friendly interface that makes it accessible to a wide range of users and if the system would be accessible to users of all ages who want to assess their qualifications. This attribute has received a mean of 3.56.

User interface aesthetics: The design is not complex. Users experience pleasant and satisfying interactions with the system.

The results show that out of 52 respondents: 19 (36.5%) of the users Strongly Agreed, and 28 (53.8%) agreed. On the other hand, there are 3 (5.8%) who disagreed, and 2 (3.8%) strongly disagreed with whether the system's design is not complex and whether users experience pleasant and satisfying interactions with it. This attribute has received a mean of 3.23.

Operability: When performing particular tasks and features, the system is simple to operate and has simple controls.

The results show that out of 52 respondents: 28 (53.8%) of the users Strongly Agreed, and 21 (40.4%) agreed. On the other hand, there are 2 (3.8%) who disagreed, and 1 (1.9%) strongly disagreed with whether the system is easy to operate and has simple controls when performing particular tasks and features. This attribute has received a mean of 3.46. The Usability of the system based on the survey has received a total mean of 3.42.

Reliability:

Maturity: Based on its features and functionality, the system may be relied upon to meet users' needs. For the applicant and HR employees.

The results show that out of 52 respondents: 27 (51.9%) of the users Strongly Agreed, and 23 (44.2%) agreed. On the other hand, there is only 1 (3.8%) who strongly disagreed with whether the system can be relied upon to meet the needs of applicants and HR employees based on its features and functionality. The Reliability of the system based on the survey has received a total mean of 3.42.

4. Conclusions and Recommendations

4.1 Summary of Findings

The developed system used the Naive Bayes algorithm to determine whether or not an

applicant would be qualified for employment shortlisted in the educational institutions included in this project. The evaluation of the users was based on an interview with Centro Escolar University and De La Salle – College of Saint Benilde, in which they were questioned about the criteria they use to assess college faculty applicants. After conducting the survey, the researchers discovered that it is truly significant for applicants (100% of the respondents) to have a preliminary idea of their chances of qualification in a university that they intend to apply. The majority of the respondents (76.9%) believe that a system for it is something they can greatly utilize to easily locate universities for which they qualify.

The researchers also found that the Naive Bayes Algorithm has been effective when it comes to predicting the qualification of the applicants. The model classified a total of 13 (65%) credentials correctly, to belong in the class of qualified or not qualified applicants, and a total of 7 (35%) credentials were misclassified, the predictions received an average F1 Score of 0.77. [65] However, the researchers also discovered that there are still limitations in the prediction, which results in an average F1 score rating. The researchers understand that this is because there were not enough data sets provided in the system, it is clear that hundreds to thousands of data sets are required for the prediction in order for the system to be more accurate and effective across the spectrum of applicants who will eventually use the system and this kind of approach.

4.2 Conclusions

1. The researchers were successful in developing a system that will allow applicants to independently evaluate if their credentials are sufficient to apply as faculty at a few top private universities in the Philippines, it is with the restriction of the standards of Centro Escolar University and De La Salle College of Saint Benilde, as it was the only university to date to permit this project. The prediction successfully utilized the Naive Bayes Algorithm and the result was based on hired, qualified, and unqualified faculty members who were evaluated using the criteria that were given by Centro Escolar University and De La Salle College of Saint Benilde. Applicants were able to have a preliminary understanding of their chances and the likelihood that they will be accepted into these reputable universities. Although the prediction was not as precise as anticipated, there is still a possibility for improvement if more data sets are incorporated into the system.

2. The researchers were successful in designing a Web- Based Faculty Qualification Analysis System that uses analytics, utilizing the Naive Bayes Algorithm to standardize and hasten the process of HR Departments in assessing whether individuals are on their shortlist for a position in their respective institutions and in finding applicants in specific categories/fields that they plan to recruit.

3. The researchers were successful in achieving a decent F1 score to ensure that the transition from the manual process to the automated process in Faculty Evaluation, Qualification, and Preliminary Screening of applicants will be effective and efficient. The model classified a total of 13 credentials correctly (65%), to belong in the class of qualified or not qualified applicants, and a total of 7 credentials were misclassified (35%), the predictions received an average F1 Score of 0.77. However, the prediction is not that accurate and presumably not yet effective across the spectrum of applicants who will eventually use the system, though it has room for improvement once the number of datasets gathered is increased.

The study's objectives were fully implemented and analyzed, which also produced an excellent response, and with all of these findings in the final survey, this will considerably aid future researchers in determining which aspects of the system need more attention for it to progress.

4.3 Recommendations

Following the findings, testing, and evaluation procedures conducted by the researchers, the following recommendations were proposed to future researchers and researchers who will take on a similar project:

1. In machine learning algorithms, the quantity of datasets—both training and testing—is highly significant because it serves as the basis and primary variable for a precise and accurate model. It is advised to incorporate additional data into the system in order to increase the prediction's efficiency and accuracy. Utilizing TF-IDF (Term Frequency-Inverse Document Frequency) is also recommended when datasets are improved for the system to evaluate the significance of a word in the certifications, seminars, and research engagements of a specific field of an applicant.

2. Participating Universities and Colleges in this study were limited due to the short time given for data collection. Predicting faculty qualifications across a broad spectrum of Universities and Colleges will be extremely beneficial in initiating the trend of automating the preliminary screening in hiring processes at Philippine educational institutions. Future researchers are urged to incorporate at least a handful of the preliminary screening criteria, if not all of them, from Philippine universities and colleges.

3. Enhance the general security of all data and system operations to avert breaches and intrusions, particularly when the system is intended to be rolled out online and utilized by a diverse user base.

4. Although the system's user interface and experience are already rather well-designed, the researchers think that there is still potential for enhancement, particularly with regard to the prediction page and the applicant's account customization.

4.4 Acknowledgement

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