

JOBS VISUALIZATION AND SALARY PREDICTION SYSTEM BASED ON JOBSTREET MALAYSIA

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ABSTRACT

Jobs are solemnly proclaimed as a crucial factor that can determine an individual's future and the most precise way of securing one's financial stability, especially towards the populace of new graduates. This study discusses explicitly and dives deeper into helping the graduates with their future careers. Obtaining this application is an ideal website used to discover the wonders of jobs all over the country mentioned above, Malaysia, but identifying the jobs in an organized manner by dividing them into their respective and specific courses is challenging. Therefore, using the modified waterfall consisting of four phases and applying the linear regression and visualization techniques help overcome the problem. It does not merely offer the jobs for the graduates, but they are also provided with the aid of foreseeable salary to make it easier for them to choose based on their expectation towards the wage. The extracted Jobstreet's data runs the pre-processing, develops the model, and runs on real-world data. Linear Regression algorithm was used to predict the salary and tested using mean absolute error to validate the prediction. The system also applies the dashboard in presenting visualization of the data. As a result, it is of significant help to the specific populace of graduates to offer them a thorough overview of their desired work and the companies that bear the same job but juxtapose wages. The functionality of the system has been tested to ensure the system meets the objectives set.

Keywords: Linear Regression, Data Visualization, Web-based Visualization

1. INTRODUCTION

Using the internet to search for a job to resume as an employer or worker is called Internet job searching. Nowadays, the internet searches for their desired job, especially teenagers (Heaven, 1995). Job seekers feel easier than traditional search jobs in newspapers, flyers, and advertisements. Therefore, searching for a job on the internet is a faster and more option. Moreover, Internet job searching offers an empirical setting to explore the trade-off between quality and quantity of information. Most of them optimize that getting a job after graduation is a major discipline. The fresh graduate had enough reason to move away from home and be independent of their parents after getting a job (Bakri, 2017).

One of the leading information providers in Asia is Jobstreet. In Malaysia, the Philippines, Singapore, Indonesia, and Vietnam, Jobstreet serves as a facilitator of matching and employment communication between job seekers and companies. This study aims to visualize a vast horizon of jobs all over the country, according to Jobstreet Malaysia. An abundance of jobs is available for all graduates from any universities or faculties in Malaysia to browse through. Wide ranges from the courses of any universities are offered with no strict limitations being the constraint, from the most major course to the minor course. This study provides ample visualization of the jobs offered for everyone of any desired course, as long as specified in Malaysia. Therefore, the system comprises two main modules, which are data extraction and data visualization. This system is designed to help users for analyzing a large amount of data with multiple attributes. Hence, this system allows graduate students to analyze the job from Jobstreet in an easier way.

2. MATERIALS AND METHODS

2.1: Linear Regression

Linear Regression is a supervised learning-based machine learning method. It is frequently employed in mathematical research approaches where the expected effects may be measured and modelled against numerous input variables (Lives & Careers, 2011). A prediction is a forecast for a future event. As the Internet grows by the day, data is created at an astonishing rate; for example, Twitter creates data at a volume of 12 Terabytes (TB) per day, and Facebook produces data at a volume of 4 Petabytes (PB) per day in recent years. As a result, it is critical to collect, examine, and model this massive amount of data in order to predict future events in a variety of fields. In this study, simple linear regression approaches from supervised machine learning algorithms were employed to predict the salary for each job based on years of experience. The most fundamental and widely used predictive analysis is linear regression. Regression estimates describe data and illustrate the relationship between one dependent variable and one or more independent variables. The task of fitting a single line through a scatter plot is at the regression analysis's core.

2.2: Web-based Visualization Application

A web application is a web-based program designed to operate on devices, including smartphones, tablets, and laptops, through a web browser (Ali & Sari, 2015). It is easy to access and too complicated to be used by all ages in our generation today. Due to standardized technologies, mobile users can access the website on all devices, similar to mobile browsers (Heitkötter, Hanschke & Majchrzak, 2012). Once someone has made use of the website, many will follow suit due to its effectiveness. The main difference between these approaches in performance is that the web application relies primarily on the browser and the network connection (Erkkilä, 2013). Hence, the web application approach was chosen for this study after analyzing several criteria and considering all aspects of constraints such as time constraints and the study's scope to be a fully functioning application. The time taken to develop a web approach is lesser. To summarize, it concluded that the web approach is the best way to develop and would work way better in serving the users.

3. RESULTS AND DISCUSSION

This section presents and discusses the analysis results performed on real-world data and the testing carried out on functionality testing. Functionality testing is performed to assess the system's functionality and ensure that the system's functionality performs appropriately.

3.1: Error Metric for Linear Regression Model

The quality of a regression model is determined by how well its predictions match actual values. These metrics are concise and practical summaries of the data's quality. This project uses the mean absolute error (MAE) to know the quality of the model. Linear regression does not suitable for accuracy tests because this project is to predict the salary based on the years of experience. Hence, it is suitable to know the quality of the data and the difference between the actual and predicts data. A small MAE indicates that the model is excellent at prediction, whereas a large MAE indicates that the model may struggle in certain areas.

3.2: Functionality Testing

It is critical to test features to ensure that all application features work correctly and that any detected errors are corrected. Functionality testing aims to put each function of the visualization application through its paces to see how closely the specifications match up by providing appropriate input and comparing the output to the functional requirements outlined. The Visualization page interface for Education job is shown in Figure 1, Figure 2, Figure 3, Figure 4, Figure 5, Figure 6 and Figure 7.

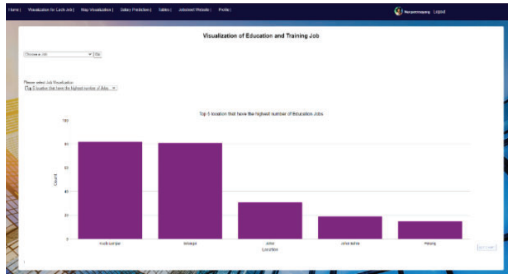


Figure 1. Bar Chart Visualization for Education Job

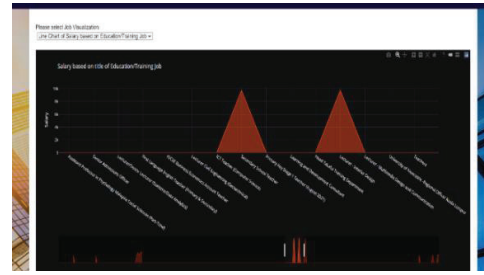


Figure 2. Line Chart Visualization for Education Job

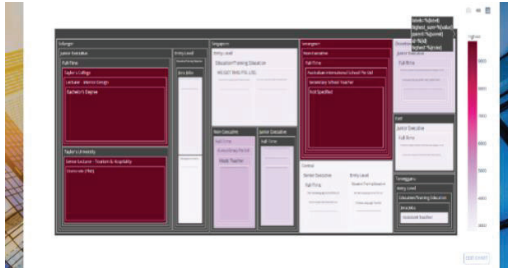


Figure 3. Treemap Visualization for Education Job

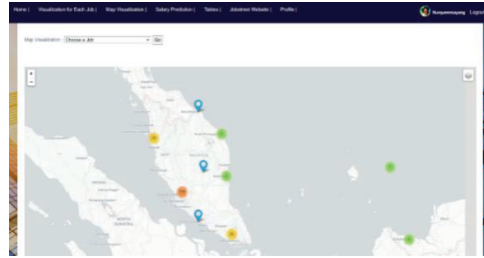


Figure 4. Map Visualization



Figure 5. Word Cloud of Job Title for Education Job



Figure 6. Word Cloud of Qualification for Education Job

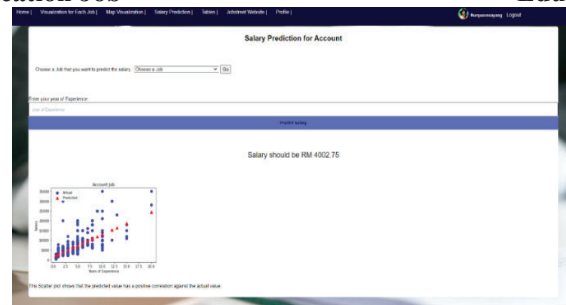


Figure 7. Salary Prediction Page of the Application

4. CONTRIBUTION AND USEFULNESS/COMMERCIALISATION

The flexibility of the system to provide reliable prediction data within a set year of a timeline, it is also possible to consider its potential in commercialization as it is a trustworthy source of solution to an everyday problem.

5. CONCLUSION

The visualization application developed is ought to assist the job seeker in overviewing the jobs offered on the Jobstreet website. This visualization is to change large and complex data from Jobstreet into understandable and usable data. The drawbacks of limited information on the Jobstreet website as single-source data are addressed. The linear regression used to predict salary has been incorporated into the application, permitting the user to use the model to predict the salary based on years of experience or the paths alike. The results are visualized in a dashboard to make the analysis outcomes legible and comprehended by job seekers. By focusing on graphic representations of data, the application's interactive visualization has changed how users interact with data. This application can help the job seekers view which state has the most offered jobs. It allows the users to overview the visualization of jobs on the Jobstreet website and predict the salary according to years of experience.

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