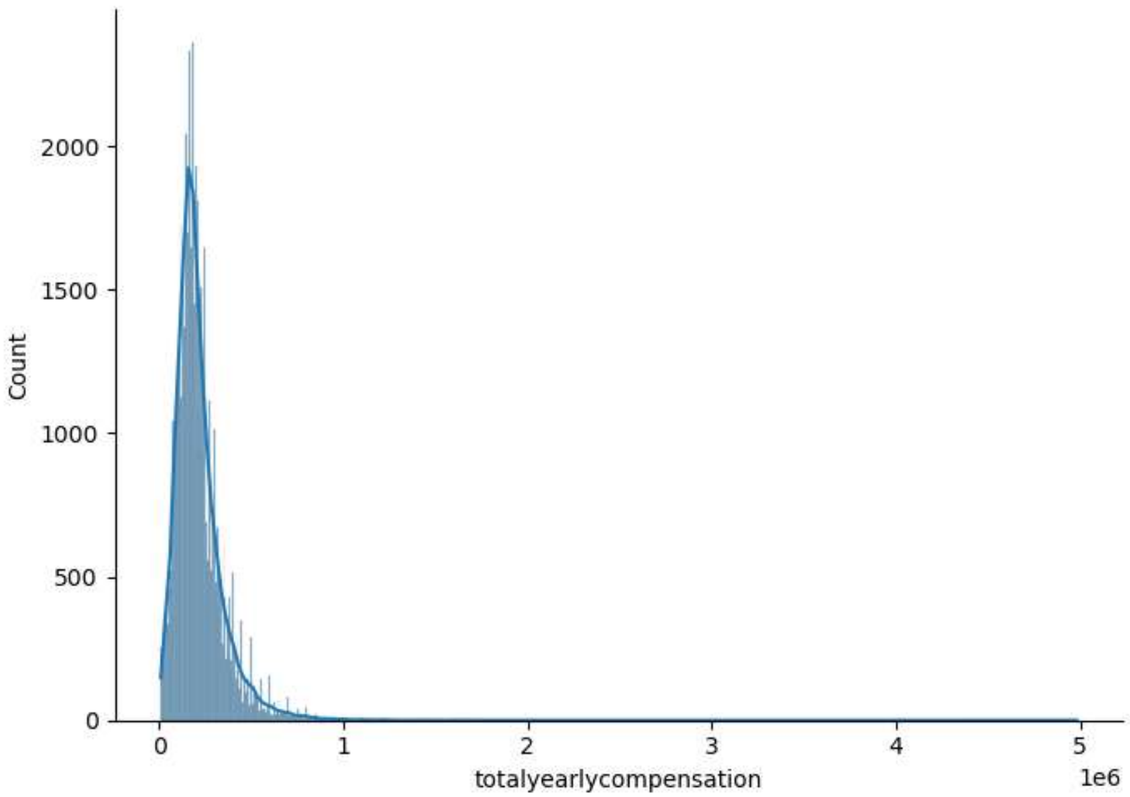
Economics AI-ML Case Study

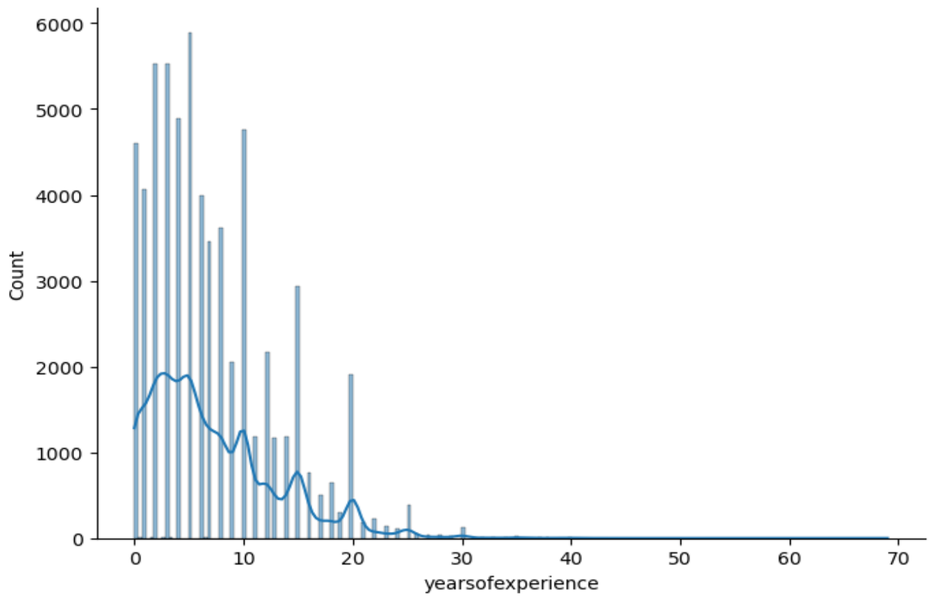
In the field of economics, companies need to ensure they offer competitive salaries to attract and retain top talent. Predicting total yearly compensation can help companies determine appropriate compensation packages for their employees based on factors such as years of experience, base salary, stock grants, and bonuses.

This problem requires developing a Auto-ML model that can accurately predict the total yearly compensation for employees in the economics industry. The model will take into account various features such as the employee's years of experience, base salary, stock grant value, and bonus. Accurately predicting total yearly compensation will help companies ensure that they are offering competitive compensation packages to attract and retain top talent in the industry, ultimately improving their overall performance and success.

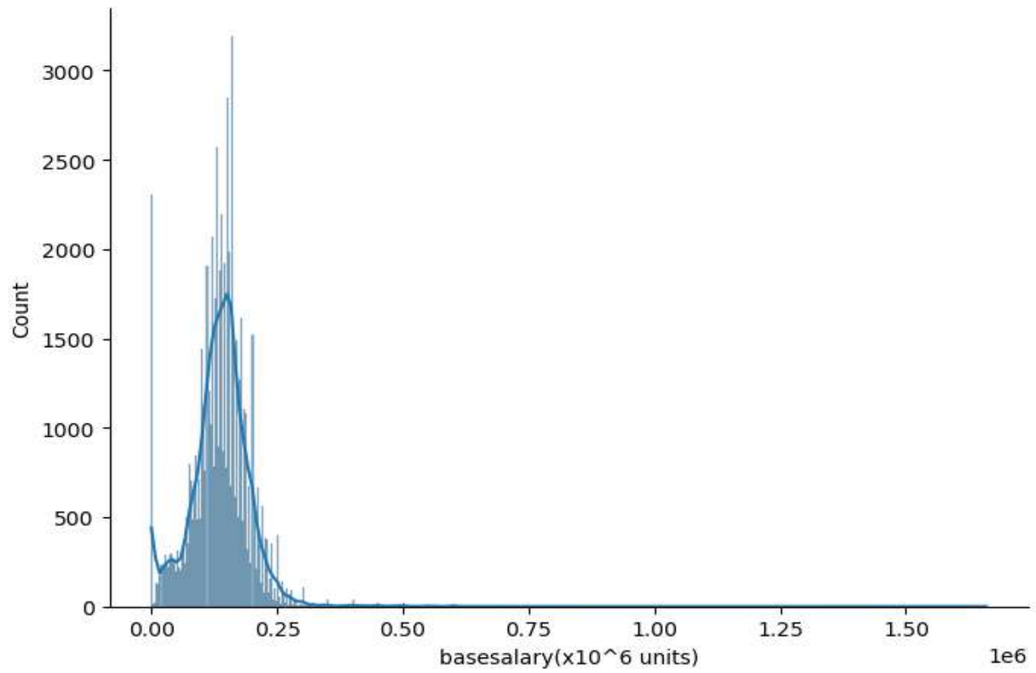


Total yearly compensation refers to the total amount of money an employee receives from their employer in a year, including their base salary, bonuses, stock options or grants, and any other forms of compensation. This is an important metric for both employees and employers, as it determines the employee's overall earning potential and the cost of employing that individual for the employer. Accurately predicting total yearly compensation can help both employees and employers make informed decisions about salaries, benefits, and other compensation-related matters.

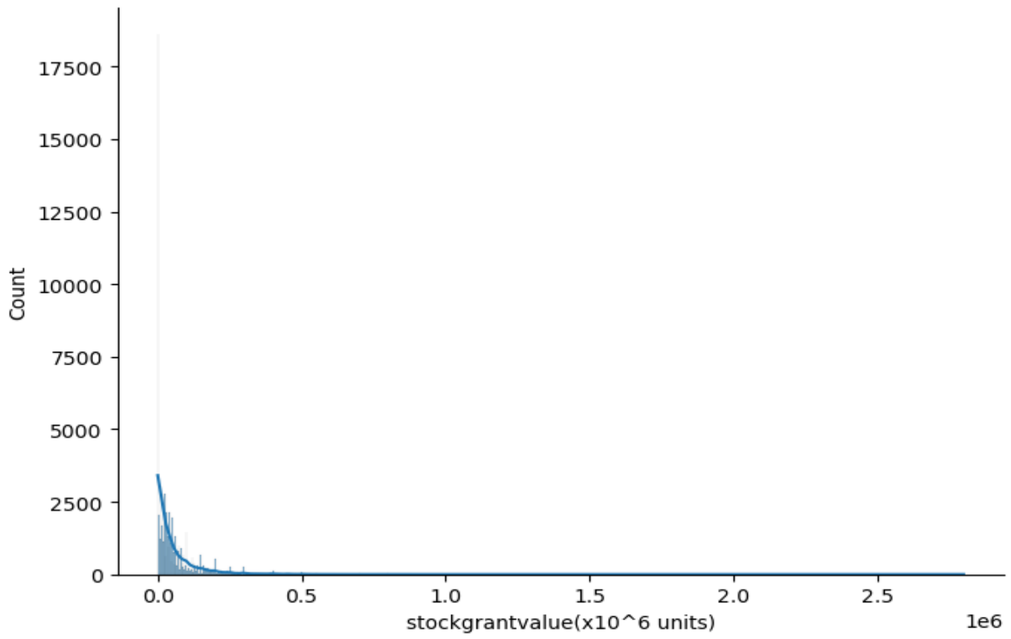
Features Responsible



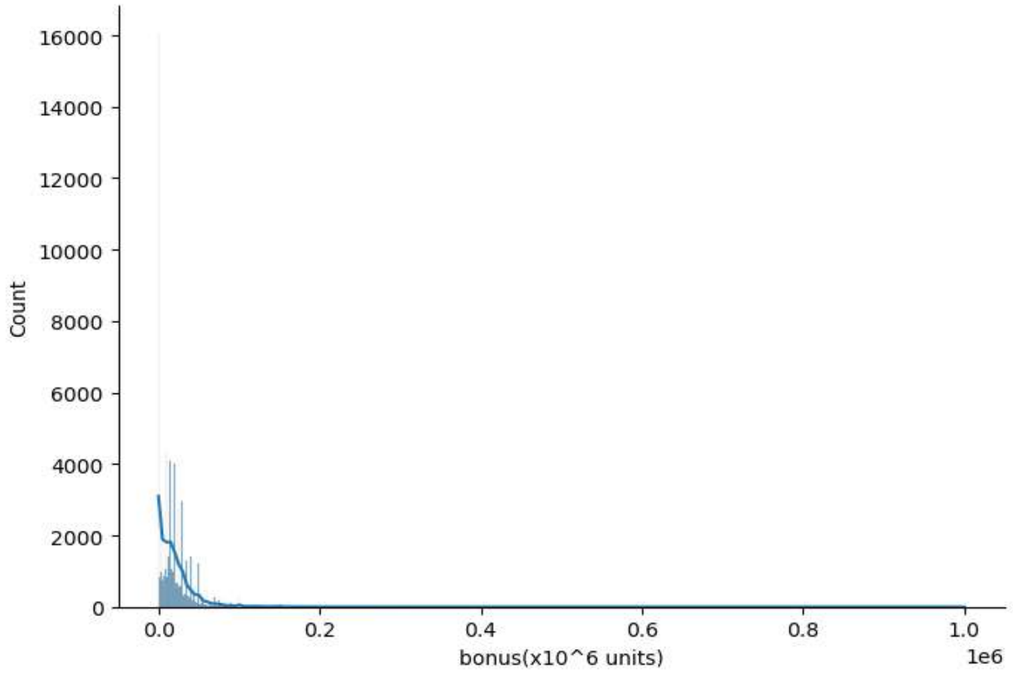
Individuals who have more **years of experience** in the industry are likely to command higher salaries and more extensive benefits packages than those who are just starting out in their career



The **base salary** is the fixed amount of money that an employee earns annually, regardless of the performance or productivity level.



Stock grant value are a type of compensation that gives employees a certain number of shares of the company's stock, typically as part of their overall compensation package. The value of these shares can vary greatly, depending on the current market price of the company's stock.



Bonuses are often used as a way to incentivize employees to work harder and achieve specific goals or targets. Typically, bonuses are tied to individual or team performance and are paid out in addition to an employee's base salary.

Auto-ML Methodology Results

Case	Percentile	No. of Features	Random Forest	XGBoost	RNN	Lasso	Avg. Accuracy
Case 1	25	4	83.7	94.3	77.3	79.7	83.75
Case 2	50	8	82.7	94.8	76.9	79.3	83.42
Case 3	75	11	83.7	94.3	77.3	79.7	83.75
Case 4	90	14	83.8	94.3	45	79.7	75.7

- Based on our observation , XGBoost was the best performing algorithm with 94.8% accuracy in 50^{th} percentile.
- 25^{th} and 75^{th} percentile is the best percentile with an average accuracy of 83.75%.

Conclusion

In conclusion, predicting total yearly compensation for the economics industry can help companies in this field make better-informed decisions regarding their employees' salaries and bonuses. The dataset has 62642 records with 9 Categorical Features and 6 Numerical Features.

For regression, models were created with algorithms using Auto-ML techniques like Lasso, Recurrent Neural Network, Random forest and XGBoost . With these models, performance measurement values were obtained for feature sets of 4, 8, 11 and 14. The Auto-ML algorithms were able to predict the total yearly compensation with an average accuracy between 75% – 85% and helped to identify factors that determine the total yearly compensation . The major factors include Year of experience, Base salary, Stock grant value and Bonuses. The Random forest with 83.8 % accuracy in 90th percentile where tree showed a threshold of stock grant value>= 99500 units which can lead to higher total yearly compensation. Based on the performance measurement values obtained, it is possible to say that the study achieved success in predicting in total yearly compensation.

By analyzing the impact of factors such as years of experience, base salary, stock grant value, and bonus, Auto-ML models can accurately predict an employee's total yearly compensation, allowing companies to make fair and competitive offers to attract and retain top talent.