Class imbalance poses a significant challenge in machine learning, particularly affecting the performance of predictive models by biasing them towards the majority class. The purpose of this thesis, "Exploring Class Imbalance Solutions: Investigating the Effectiveness of Data Balancing Techniques on Model Performance," is to investigate the topic of class imbalance and provide insight into the efficacy of different data balancing strategies. This research aims to provide empirical evidence on how these methods affect model performance through a thorough analysis of several class imbalance solutions across various imbalance percentages. The study covers a wide range of methodologies, from algorithmic modifications to resampling strategies, and assesses how well they work to improve the performance of predictive models. The experimental design of the study makes use of a variety of datasets and imbalance scenarios to guarantee that the results are reliable and applicable in a range of situations. The ultimate goal of this thesis is to provide practitioners with useful advice on how to deal with the difficulties caused by class disparity, which will aid in the creation of machine learning models that are more precise and fair. The findings of this study support wise technique selection based on empirical results; it contributes to the machine learning community in addition to being a useful addition to the scholarly conversation on class disparity.