Chapter 13
Machine Learning Approach in Human Resources Department

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ABSTRACT

Artificial intelligence is one of the essential innovations made by scientists to simplify people's life. It allows intelligent computers to imitate human behaviors to accomplish specific tasks. Machine learning is a branch of artificial intelligence in which devices can learn from existing data to predict new output values. Machine learning is used in different domains, including human resources management. This chapter presents an application of machine learning in the human resources department. Machine-learning techniques help select the most suitable candidate for a job vacancy during recruitment stages based on different factors. Factors could include educational level, age, and previous experience. Based on these factors, a decision system is built using the binary classification method. The results show the effectiveness of this method in selecting the best candidate for a job vacancy, revealing the flexibility of the approach in making appropriate decisions. In addition, obtained results are accurate and independent of the dataset imprecision.

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INTRODUCTION

Machine learning (ML) is an artificial intelligence type that allows an intelligent machine to learn from experience without being explicitly programmed (Haenlein & Kaplan, 2019). ML allows systems to learn from previous data, identify patterns, and make decisions with minimal human intervention. Many algorithms are used in ML, including decision trees, Regression, Support vector machines, and ensemble approaches (Bzdok, Krzywinski, & Altman, 2018).

Moreover, ML is widely used in business because it helps enterprises understand customer and employee behavior trends from one side and business processes from the other. In addition, it supports the decision of whether new products are worth being developed. Consequently, ML has become a significant competitor for many companies (Garg, Sinha, Kar, & Mani, 2021).

Hence, ML is often classified by tools that allow an artificial intelligence application to have more accuracy in its predictions. There are four main approaches in machine learning: supervised learning, unsupervised learning, semi-supervised learning, and reinforcement learning. Based on the type of the predicted date, an approach of machine learning can be selected (Bzdok, Krzywinski, & Altman, 2018).

In this chapter, supervised machine learning are investigated. This technique runs the developed application with sample data considered a training data set. Then, the accuracy of the supervised algorithm is tested with another sample of data, called testing data. The training and testing datasets should be entirely independent to achieve precise results. Supervised learning algorithms are usually composed of the following main techniques (Bzdok, Krzywinski, & Altman, 2018):

- Binary classification allows an application to choose one of two possible solutions.
- Multi-class classification helps the application in selecting one of many answers.
- Regression modeling predicts continuous values from historical data.

Therefore, one of the supervised machine learning techniques' goals is to build a consistent model that assigns class labels to the testing instances when the values of the predictor features are known. However, it is crucial to note that the value of the class label is unknown.

In developing countries, most companies suffer from enormous non-digitalization data that becomes difficult to manage with the company's scalability. For this reason, many organizations are using new technology tools and moving toward digital transformation to strengthen their business processes. Thus, decision-making problem is a necessary process that helps organizations solve their problems by choosing appropriate actions. However, the effort in this domain in these countries is still weak. Decision-making problems can significantly change the organizations' management by implementing advanced technological administration based on machine learning techniques.

For instance, selecting the proper candidate process is essential during the recruitment phases. However, the selection is very complex due to the massive number of applicants applying for a job. Thus, if the method used in the selection process is unsuitable, the result may be confused and irrelevant. For this reason, a clear description of the job should be available. Moreover, the criteria for selecting the best candidate must be convenient.

The human resources department in any company may request new employees for many reasons, including one of the below suggestions: