**1. Introduction**

In today's fast-paced, rapidly growing, and highly competitive business world, human capital is perhaps one of the most valuable assets a company might have. Workers directly influence productivity, culture, and overall success of a company. Even with that, numerous businesses find it challenging to retain their workers. When a worker leaves, not only is workflow dynamics disrupted, but it also results in substantial costs associated with replacing them, training, and bringing them onboard. Due to this, predicting employee turnover that is, the likelihood an employee will depart from the company has emerged as a leading priority for firms of all sizes.

Previously, companies have relied on manual methods like exit interviews and surveys to establish why employees leave. Though these can provide some information, they are too late to prevent turnover and are limited in scope. A silver lining to this issue is that the advent of data science and machine learning offers a new way to solve this issue. By analyzing past data about employees, we can search for patterns to forecast whether an existing employee will be prone to leave. Therefore, organizations can actively try to improve the happiness of employees, their engagement, and retention.

This project revolves around using machine learning models to research a dataset which contains information regarding employees. The dataset contains fields such as the level of education, gender, age, city, number of years in current field, and whether or not the employee was ever benched (i.e., not placed on a project for a stretch of time). All of that information helps us build a more solid concept of what could potentially make someone leave.

The general goal of this project is to create accurate and reliable predictive models from this employee data. These models will enable us to estimate the value of a target variable called LeaveOrNot. This column in the data indicates whether an employee has left the company (value 1) or not (value 0). We want to create models that can analyze all the other features of an employee and predict this outcome as accurately as possible.

By properly predicting employee attrition, firms can cut costs, ease turnover, and create a healthful working environment. Moreover, the identification of reasons underlying employee attrition helps management in decision-making for workplace policies, employee engagement, and career advancement opportunities. With this, evidence-based decisions may not only prove to be advantageous to individual employees but can also aid towards organizational long-term success.

Over the course of this report, I will walk you through each phase of the machine learning process, from understanding datasets to model creation and comparison. By the final page, we will have a good sense of how well machine learning can help predict employee attrition and how this can be applied in the real world to improve HR decision-making.