

PREDICTIVE HR ANALYTICS - A GAME CHANGER

Abstract

Predictive Analytics is a new trend in HR. It is HR's new normal. In the present scenario Business organizations are facing some issues and challenges such as gross margin falls, Employee turnover, rise in turnover, increased absenteeism, etc., Organisations can collect the employee's data to forecast their future behavior to take different decisions regarding the employees to increase the performance of the company. Predictive Analytics helps to forecast the future by estimating current and historical data. The future events and behavior of employees can be predicted by various techniques and models of Predictive analytics. The Predictive Analytics model gives a score for every event. The highest score implies the higher likelihood of occurrence of an event and the lowest score implies the lower likelihood of occurrence of an event. Transactional and historical data are considered by these models to estimate the solutions for various issues in business related to human resources. These models help identify the opportunities and risk of each employee and helps concern individual customer, or manager of a company. The Predictive Analytics models have dominated in the field of HR due to increased attention toward decision support solutions.

Keywords: Predictive Analytics, Employee Performance, Future of Organizations, Decision Support

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I. INTRODUCTION

Predictive Analytics is a new trend in HR. It is HR's new normal. In the present scenario Business organizations are facing some issues and challenges such as gross margin falls, Employee turnover, rise in turnover, increased absenteeism, etc., Organisations can collect the employee's data to forecast their future behavior to take different decisions regarding the employees to increase the performance of the company. Predictive Analytics helps to forecast the future by estimating current and historical data. The future events and behavior of employees can be predicted by various techniques and models of Predictive analytics. The Predictive Analytics model gives a score for every event. The highest score implies the higher likelihood of occurrence of an event and the lowest score implies the lower likelihood of occurrence of an event. Transactional and historical data are considered by these models to estimate the solutions for various issues in business related to human resources. These models help identify the opportunities and risk of each employee and helps concern individual customer, or manager of a company. The Predictive Analytics models have dominated in the field of HR due to increased attention toward decision support solutions.

However, only a few companies have succeeded to use Predictive analytics models for HR. Statistics according to Deloitte's 2018 People Analytics Maturity Model show that only 17% of companies all over the world have accessible and utilized HR data. This has increased from 8% in 2015 and 4% in 2014. This chapter highlights the importance of using Predictive Analytics in different domains and HR in specific.

II. PREDICTIVE ANALYTICS

Predictive analytics is a branch of advanced analytics that makes predictions about future outcomes using historical data combined with statistical modeling, data mining techniques, and machine learning. Companies use predictive analytics to estimate patterns in this data to identify risks and opportunities.

Predictive analytics is associated with big data and data science. Today organizations have information that resides across transactional databases, equipment log files, images, video, sensors, or other data sources. To know insights from this data, data scientists use deep learning and machine learning algorithms to estimate different patterns and make predictions on future events. These include linear and nonlinear regression, neural networks, support vector machines, and decision trees. Learnings that happened through predictive analytics can then be used further within prescriptive analytics to drive actions based on predictive insights.

Predictive Analytics helps to predict what will happen in the future by using historical data, machine learning, and artificial intelligence. The historical data is converted into a mathematical model that considers key trends and patterns in the data. The model is then applied to current data to forecast what will happen in the future.

The information from predictive analytics will help organizations- business applications- suggest actions that affect positive operational changes. Predictive Analytics

can be used by Analysts to determine if a change will help them to lower risks, improve operations, and increases profit.

Predictive Analytics promptly provides the solution to the question, what is most likely to happen in the future based on current data, and what can be done to change the result?

III. PREDICTIVE HR ANALYTICS

Predictive HR analytics is a tech device that HR utilizes to examine historical and current data to estimate future results.

Predictive HR analytics helps to extract, dissect, and categorize data and then recognize patterns, irregularities, and correlations. Numerical assessment and analytical modeling allow data-driven decisions considering the functions of HR.

Predictive HR analytics systems are like an earthworm. The earthworm intakes natural waste and deposits and expels nutrient-rich, fertile soil material. Likewise, Predictive HR analytics also intakes unused, fresh information to convert it into appropriate and meaningful information that helps to make clever decisions in business.

IV. NEED FOR PREDICTIVE HR ANALYTICS FOR HR LEADERS

Predictive HR analytics supports companies in foreseeing challenges so they can:

1. Avoid risk factor
2. Decrease human error
3. Estimate the distinctive employee profile that will bloom in the organization
4. Improve recruitment practices
5. Encourage ideal work performance

Finally, predictive HR analytics helps HR leaders to make clear decisions to enhance overall profit and increased employee motivation, retention, engagement, and higher productivity.

V. PREDICTIVE ANALYTICS: BENEFITS TO HUMAN RESOURCE DEPARTMENTS

When Predictive Analytics is used constantly and in the right way there can be various benefits to HR Department and Organisations.

- 1. Appointing the right people:** Employees in an organization make a successful business. It's not only the talented, qualified, or experienced employees who are the best for the company. The employees who can fit into the culture matter a lot for the business. Predictive Analytics helps the HR leaders to complete the workforce outlook. Advanced analytics helps to identify these employees, checks backgrounds, and even the first few days in the office for a more effective candidate.

2. **Improved productivity:** After appointing the right candidate, the HR manager must maximize the role of the employee in the company. HR managers can focus on the Performance and growth of an employee, as well as the mistakes or errors they make through Predictive Analytics. HR Professionals can use technology that helps identify the interruptions in the workflow, which will help to enhance productivity and generate cost savings for employees.
3. **Upskill the employees:** HR Planning to find skill gaps that are present currently can be done by using Predictive Analytics. The Mexican government Ministry of Energy presently applies this type of model to find out gaps in the oil and gas industry. To get a solution considers various things including adjustable macroeconomic variables which correlate to the supply and demand for a skilled worker in the industry.
4. **Promote greater engagement:** The satisfaction of employees is always an important factor in ensuring workforce happiness, but it cannot be measured. Though there are some non-numeric data like survey feedback and facts and figures to suggest that can ensure engagement among the workers. Some tools that can help to identify and understand employee needs, motivation, morale levels, and culture. These thoughts can be used to change how HR leaders engage their employees and communicate
5. **Retain best talent:** Predictive Analytics helps to retain talent and helps in many ways. Companies may incur expenses for finding, recruiting, and training the workers, and losing the most talented employees also it may affect the employer's brand negatively. Predictive Analytics will help in analysing the historical data to reveal possible attrition before the event happens. It also helps in identifying the factors which influence employees to leave the organization. HR Managers can then utilize this information and look at these issues before they cause an employee to leave the company.

VI. PREDICTIVE ANALYTICS PROCESS

(Kumar, 2019) (Mishra & Silakari, 2012)

Predictive Analytics consists of various steps by which data analysts can forecast the future by considering the current and historical data

1. **Collecting the requirement:** A clear intention of prediction is very necessary to construct a Predictive model The kind of knowledge and amount of knowledge that is gained in the whole process of prediction must be well defined. There should be a discussion between the data analysts and the clients to understand the requirements of predictive models the clients and the analyst must display the benefits of these predictions to the client's organization.
2. **Collecting the data:** After obtaining the requirement from the client the analyst will start collecting the data from various sources that are needed to construct the predictive model. The data may be related to customers, goods, products or services, etc. and this information will then be organized if it is unorganized. The analyst will later confirm the data obtained for its correctness with the client.

3. **Analyzing and messaging the data:** After obtaining the corrections in the dataset from the clients, the unorganized data will be converted into organized data while testing its quality. A careful analysis will be done for the missing values against the attributes. The quality of data plays a role in the effectiveness of the model. Final data is ready to be used for analytics at the end of this step.
4. **Statistics and Machine Learning techniques:** Some of the statistical tools that are commonly used are probability theory and Regression Analysis. Machine Learning tools like artificial neural networks, decision trees, and support vector analysis are commonly used in predictive analytics. Most of the predictive analytics models use these statistical and /or machine learning tools. Therefore, knowledge of Statistics and machine learning is very necessary for an analyst.
5. **Developing a predictive model:** Predictive model is developed and tested for data validity. Once the model, is valid and is fitted to the test dataset, it is then applied in real-time to the new data that is fed onto the software. Multi-model solutions are also proposed by the analyst depending on the complexity of the problem.
6. **Monitoring the predictions:** Once the models are tested it is then put into real-time predictions at the clients' place to run daily. The reports that are created by the model confirm whether it is giving accurate results and are making precise predictions.

VII. PREDICTIVE ANALYTICS TECHNIQUES

(Mishra & Silakari, 2012)

1. **Decision tree:** The main objective of the Decision Tree is to create a training model that can use to predict the class or value of the target variable by learning simple decision rules with the help of historical or actual data. It uses a tree-like flowchart of different decisions/scenarios and their possible consequences, including chances of event outcomes. It helps us to analyze different scenarios with a detailed tree-like flowchart to help make actionable business decisions.
2. **Regression model:** The regression model mainly identifies the Strength of association or relationship between variables (Dependent/Independent). It looks at dependent variables (outcomes) and an independent variable (the action) while also assessing the strength of the association between them. For example, The regression model can help us identify that the ease of product search has a stronger positive relationship with the purchase and as a recommendation, there should be a high focus on improving that variable over delivery cost.
3. **Time series:** Time Series is the way of analyzing the characteristics of the response variable concerning time, as the independent variable. To estimate the target variable in the name of predicting or forecasting, use the time variable as the point of reference. As a result of which, forecasting occurs when we make predictions based on historical data and involves building models to make observations and drive future strategic business decisions. Some of the other tools used are artificial neural networks, Bayesian statistics, ensemble learning, Gradient Boost Models, and support vector machines.

VIII. CASES OF APPLICATION OF PREDICTIVE ANALYTICS IN HR

(Predictive Analytics in Human Resources - AIHR, n.d.)

- 1. Predicting and preventing turnover at HP:** HP is one of the first developers of HR predictive analytics. HP faced a high level of employee attrition. The turnover rate was more than 20%, especially in the sales departments. The average stay of an employee in HP was just 4 to 5 years. High turnover in return increased the hiring costs, increased production costs, loss of tacit knowledge, loss of network, and even customers.

After using the predictive analytics model, a flight risk score was predicted which indicated the employee's likelihood of leaving HP out of their 300,000 employees. Good pay, promotions, and other incentives, good performance ratings were not affecting these flight risk employees.

Key Managers with the support of the decision support systems could identify the risk factors of employee attrition and accordingly, construct strategies to retain the employees. The Flight Risk scores acted as an early warning system. It provoked managers to intervene before it is too late. Or, when it was inevitable for an employee to quit it helped the managers to react accordingly. HP saved more than \$300 million by applying attrition and retention predictive analytics to calculate this flight risk.

- 2. Case of predicting hire success at Google:** Laszlo Bock, Senior Vice President of People Operations (HRM) at Google, writes in his book *Work Rules!*, that the most important instrument of Google's People Operations is statistics. The whole recruitment is highly advanced with fully automated, computer-generated, and fine-tuned questions to find the best candidate.

Above this, Google evaluates the probability of employees leaving the company by applying HR predictive analysis. One of Google's findings in the Sales Department is that the sales executives, who do not get a promotion within four years, are more prone to leave the company.

- 3. Case of predicting revenue using employee engagement as a key factor:** Employee engagement is an important factor in HR. Engaged employees work hard, ensure superior quality, have fewer absences, and are less likely to leave the organization. Best Buy, which is an electronics retailer, used predictive analytics to check if employee engagement would impact sales in the stores. The company wanted to know if employee engagement impacted sales in their stores. Scores of Predictive analytics revealed that a 0.1 percentage point increase in employee engagement would increase the revenue by \$100,000 in each store.

This amazing effect made Best Buy decide to measure employee engagement multiple times around the year. This also aided them to identify the trigger factors of engagement. This helped to develop many HR strategies to increase employee engagement and, in turn, increase revenue.

- 4. Case of Predicting attrition of employees:** In a data analytics firm- Nielsen, retention of employees was a big challenge. After applying predictive analytics- financial impact analysis it was understood that a small percent reduction of employee attrition saved more than \$5 million. The Predictive analytics team could identify that 120 key individuals were at risk of leaving the organization. A most important finding was nil attrition in the first six months of lateral moves of 40% of the employees. Thereafter it was concluded that with several retention initiatives, for every one percent decrease in attrition, there was a decreased cost of \$ 5 million. This was later implemented in seven other countries.
- 5. Case of toxic people in the organization :** This case is of Cornerstone company about its noxious employees. Noxious employees are those who engage in fraud, alcoholic drinks, drugs, and sexual harassment. Such employees damage the company, spoil the general work environment, and decrease team productivity. Previous research says that team productivity reduces by 30% to 40% by these noxious employees. More alarming is that good employees quit the organization if they have noxious employees in their teams.

The company picked a database of 63000 employees of cornerstone and identified the employees who were terminated from the work for their toxic behaviors. This constituted around 4 % of the employees. The key toxic behaviors were self-proclaimed rule-following, low attendance, and decreased service orientation. Though a high level, of productivity loss, was not identified, they were found to be contagious. Non-toxic employees eventually quit their job if they had to work with these toxic employees. Additionally, it was noticed that these employees create long-standing stress and exhaustion among employees. The company witnessed that hiring the noxious employees costs \$12800 on an average Against \$4000 for non-toxic employees excluding the continuing productivity loss, stress, and other undesirable effects.

The company finetuned its recruitment process to prevent hiring toxic candidates so that a healthier work environment can be created.

IX. CONCLUSION

The application of predictive analytics in HR shows surprising results. The HR department can proactively save a great amount for the company. Predictive analytics helps executives and top management officials to take better decisions based on the results of predictive analytics and using the various HR matrices.

The scope of predictive analytics as explained in the above cases proves its significance in the field of business. Predictive Analytics is a game changer that enables HR to evaluate employees and their behavior. HR can revise or form people policies for both the employees and the employer.

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