

Artificial Intelligence (AI): Bringing a New Revolution in Human Resource Management (HRM)

Dr. Saju Mathew¹, Dr. Nidhi Oswal² and Dr. Karamath Ateeq³

¹Freelance Research Consultant, Kerala, India

Email: sms2saju@gmail.com

²Al Khawarizmi International College/Business Department, Abu Dhabi, U.A.E

³Skyline University/ BSIT Department, Sharjah, U.A.E

Email: {nidhi.oswal@khawarizmi.com, karamath.ateeq@skylineuniversity.ac.ae}

Abstract—In the recent times of globalization and with the new trends and development in Information Technology (IT), every organization wants to keep them updated so that they can keep the competitive advantage continuously on the global level. One of the key departments in every organization is Human Resource (HR) department, which involves the crucial practice of sourcing, recruitment, selection, hiring, training and development of employees, and managing the employee relations within the organization. Among these activities the major job of HR is to recruit an effective and efficient employee who will be accomplishing the job objectives, so that organization can retain such employee for a longer term and who can play an important role in the development of the organization. The traditional ways of recruiting the employees is very time consuming and which needs lots of paper work to be done. But due to the development in the technology and good Internet speed organizations are now slowly moving towards online recruitment. Different organizations are using different technologies for recruiting process, as a result they can reduce the paper work and work load of the HR. In any recruiting process one of the important task that needs to be carried out is the data analysis, which plays very decisive role in making recruitment decisions. One such tool that can be used to make the data analysis and helps HR and the recruiters to make a good decision is to use “Artificial Intelligence (AI)”.

Though the Artificial Intelligence was introduced by John McCarthy in the year 1956, but it has gained its importance in the current generation. In a very simple language Artificial Intelligence can be termed as an intelligent machine that is developed by humans and which behaves like humans. The main objective of the paper is to (a) introduce Artificial Intelligence in HRM, so that through its intelligent methods it can help the HR in making good intelligent decisions during the recruitment process, (b) to bring out the reasons for choosing Artificial Intelligence in HR and (c) the challenges that the HR is facing with the introduction of Artificial Intelligence in recruitment process. The methodology used for this research is the literature review of various conceptual papers, peer-reviewed journals and articles.

Index Terms— Information Technology, Human Resource (HR), Recruitment Process, Data Analysis, Artificial Intelligence (AI).

I. INTRODUCTION

In this electronic era, every organization wants to prove themselves by introducing the creative ideas so that that

they can complete globally at the same time their main aim is to reduce the manpower and to increase the production and the profit. As a result the organization needs to train the old and the new employees in handling the new machines and software related to that machine, which is little time consuming and expensive as well. In the recent times one such developing and rising technology is “Artificial Intelligence (AI)”. John McCarthy’s published a paper entitled “Computing Machinery and Intelligence”, has laid the foundation for the introduction and the development of new technology termed as Artificial Intelligence (AI).

In many developing and developed organization, the Human Resource (HR) are using the technology of Artificial Intelligence to recruit, retain and inspire the proficient manpower which has helped in the growth of the organization and the employees. Due to the introduction and the implementation of this technology in the recruitment process has resulted in bringing down the cost of recruitment process, selection of the appropriate employee in the desired position and the most important it has reduced the time for all this process.

II. LITERATURE REVIEW

A. Recruitment Process

For every organization selection and recruitment is a continuous process. The traditional way of recruitment process does not focus or prepare any model as to how the recruitment should be done. The organization basically used low cost methods such as advertising in the local newspaper, employee referrals etc. It was basically focusing on two main aspects – a) organizational aspect and b) job seeker aspect. As a result the recruitment process will be sometimes successful or failure and the organization will not be able to recruit the correct person for the right position. According to Breugh (2008) [11], a recruitment model was proposed which consists of five incremental steps which are shown in figure 1.

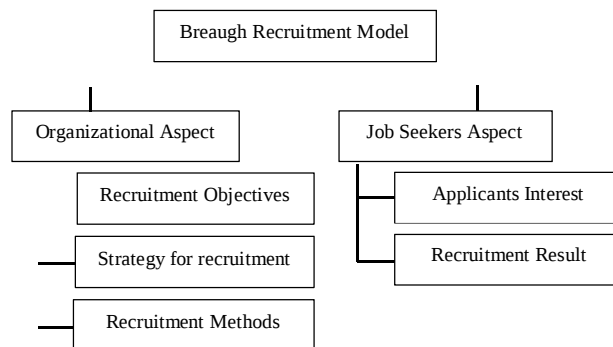


Figure 1: Breugh Recruitment Model

Organizational Aspect

- a. Organization establishing recruitment objectives.
- b. Organization developing a strategy to decide which kind of employee they want to recruit.
- c. Recruitment activities where the recruitment methods should be decided.

Job Seeker Aspect

- d. What is the interest of the applicant and what he thinks of the applied position?
- e. Recruitment result.

But as the time progressed and the technology was introduced in the recruitment process which resulted in better outcome in the selection and recruitment process. The recruitment process focuses on two important factors – a) selection is done by recruiting the candidate and b) selecting the right candidate. According to Sutherland (2011) [5], recruitment can be defined as the process of attracting and encouraging the potential employee to apply for a given position whereas the selection is defined as a process of making a fair and relevant assessment of the strengths and weaknesses of a candidate with an intention to hire them. Both the recruitment and selection process are directly related with the organizational growth, which plays a very crucial role for the organizational survival in this competitive business world.

In the recent years to carry out the recruitment process successfully the concept of Human Resource Management (HRM) was introduced. According to Scherhorn (2011) [6], HRM is how you are able to gain and develop a work force which is talented to help the company achieve its goal, its mission, vision and

different objectives at hand. According to Storey (2004) [7], HRM is an approach to employee management with the aim of retaining a workforce which is capable and committed by different techniques such as cultural, structural and personnel to bring the organization and competitive advantage. One of the dynamic departments of any organization is the HR department and hence the organization needs the right type of management to carry out all its activities efficiently and effectively. The major HRM practice includes recruiting new employees, managing employees, hiring employees and development Wall and Wood (2005) [12], and all the practices focuses on retaining the new employees and keeping up their acceptable level. In the modern times the role of the HRM in the organization has changed. Current researches and studies states that the recruitment and selection and the centrepiece of the HRM where the right candidate are found from the pools of candidates and hiring of the new employee is done.

B. Artificial Intelligence

In today's digital era most of the organizations had introduced a high level digital techniques in their business activities as compared to the traditional low cost methods. As a result the HRM or the recruitment process of an organization has benefited the most. With the introduction of IT in an organization's HR function two important issues were focused – a) how it's going to affect the nature of specific job and b) its impact on the employment level. According to Scott Morton (1991) [13], information technology has a great general purpose power to manipulate the symbols used in all the categories of work as it permits to manipulate the models of reality as compared to physical reality. Figure 2 shows recruitment process using information technology.

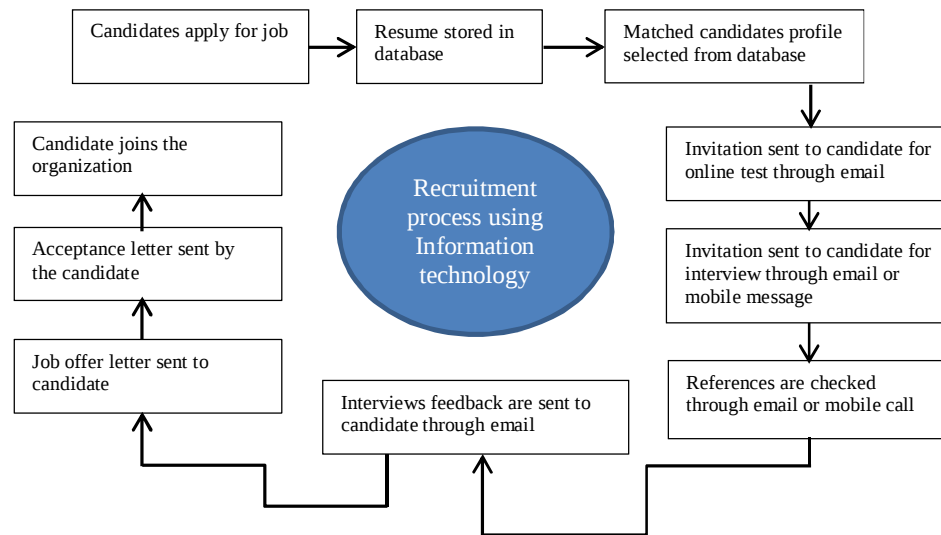


Figure 2: Recruitment process using Information Technology

Many IT techniques are used by the organizations to reduce the working cost, to improve the efficiency, to have better transactions and to provide the better services to the customer that has helped the recruitment and the HR teams to coordinate with one another and work synchronously. Recently one of the major development took place in IT is by the introduction of "Artificial Intelligence (AI)". Today the most debated technology is Artificial Intelligence which is now pepping in every field of science and business. The technology has already controlled many areas such as health care, finances, transportation, retails, business and HR adding a new dimension to all this fields.

John McCarthy who is called as the Father of Artificial Intelligence [15] defines AI as, science and emerging of making intelligent machines especially intelligent programs, which works similar to the human intelligence and which likes to learn new things, to identify the problems, to adapt to new situation and to take the correct decisions. According to Encyclopedia Britannica states, Artificial Intelligence has the ability of a digital computer or computer controlled robot to perform tasks commonly associated with intelligent beings.

III. MAJOR APPROACHES OF ARTIFICIAL INTELLIGENCE

Artificial Intelligenc can be classified into four major approaches and they are;

- a. Machine that can act like humans: Alan Turing proposed a game in which it checks the difference between humans and the machine working ability. The main focus was to find can the machine think and it resulted that the machine are programmed with intelligence and hence it can act like humans.
- b. Machine that can think like humans: By using Artificial Intelligence the machine activities can be automated which can be related to human thinking, seeing into the crucial problems and making correct decisions which can be achieved by using the cognitive science theory.
- c. Machine that can think rationally: According to Winston, artificial intelligence is a study of computation that can make it possible to perceive reasons and act and it all depends how the machine are intelligently programmed.
- d. Machine that can act rationally: According to Luger and Stubblefield, artificial intelligence is the branch of computer science that is concerned with the automation of intelligent behavior which can also be termed as an intelligent agent approach. So a rational agent is something that tries to perceive and act and which depends upon the architecture and the intelligent programme. Following figure 3 shows artificial intelligence major approaches.

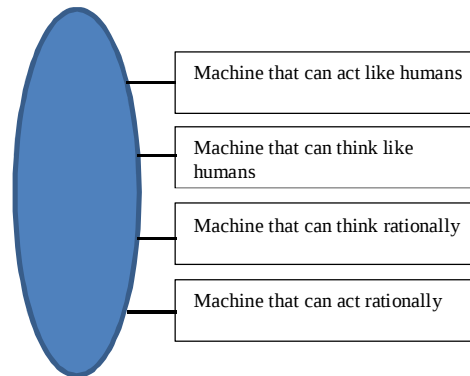


Figure 3: Artificial Intelligence Major Approaches

IV. ARTIFICIAL INTELLIGENCE IN HR

Artificial Intelligence which is one of the emerging technologies that is gaining tremendous attention from every field and currently it has taken the control over the most important function of business that is recruitment process and had given a great relief to HR department. By integrating artificial intelligence with Human Resource (HR), it helps Human Resource (HR) to focus more on the strategic work as compared to the repetitive low value added tasks. It has given a new dimension to the Human Resource (HR) to streamline and reshaped its original functions so that it can achieve the better efficiency, alertness and helped in the reduction of cost by automating the repetitive tasks.

The usage of technology in Human Resource (HR) has passed through several phases [10];

- a. First phase: During this phase Human Resource (HR) was using systems to maintain records either manually or with less usage of machines. The phase spanned from 1900 to 2000.
- b. Second phase: during this phase Human Resource (HR) was using automated system mostly softwares like database and excel. The phase spanned from 2000 to 2012.
- c. Third phase: It starts from 2013 to till today and during this phase Human Resource (HR) are using smart automated systems like cloud, artificial intelligence. Following table 1 shows the different phase of technology used in Human Resource (HR).

TABLE I. PHASES OF TECHNOLOGY USED IN HUMAN RESOURCE (HR)

Phase	Year	Technology used	Examples
First	1900 to 2000	Manual or less technology used	Nil
Second	2000 to 2012	Automated systems	Database, Excel
Third	2013 to till today	Smart automated system	Cloud, Artificial Intelligence

Introduction of artificial intelligence in Human Resource (HR) has proved more comfort in the areas of candidate screening and sourcing. The most important factor of using artificial intelligence in Human Resource (HR) is that it has reduced the time considerably from going through the candidates resume thereby bringing the efficiency, it has also reduced the error rates that are caused by humans and it is free from the bias nature of humans. Artificial Intelligence has also helped the organizations Human Resource (HR) team to solve all the human related critical issues, increased the performance which resulted in the organizations profit.

V. REASONS FOR CHOOSING ARTIFICIAL INTELLIGENCE IN HUMAN RESOURCE

By introducing artificial intelligence in business has given a great relief to the Human Resource (HR) department of all the organization as it organize all the instructed set of data and matches all the candidates job profile with the required job profile. It provides the Human Resource (HR) with the detail information of the candidate thereby making the system automated with reduced operational cost. Following are the reasons why the organizations want to choose Artificial Intelligence in Human Resource (HR).

- a. Displaying the correct candidate: When a candidate is trying to apply for a said position that is specified by the organization, the artificial intelligence tools help the candidate by interacting with them using some chat box and tries to answer all the doubts of the candidates.
- b. Better integration of Analytics: Based on the candidate's job profile and the organization's requirement the Human Resource (HR) tries to select the candidate. Artificial Intelligence tools helps in screening the candidates at a faster rate from the pool of available candidates profile increasing the recruiting efficiency, which results in the improved and increased productivity of the organization.
- c. Increased recruiting quality: Recruiting a correct candidate for the correct position from a big pool of applicants is a big task for Human Resource (HR) department. By using artificial tool the recruitment process can be divided into several rounds, so that more data can be collected from each candidate so that they can evaluate each applicant very closely and effectively.
- d. Candidate engagement: When a candidate applies for a job vacancy very few organization gives the acknowledgements to the candidate, but by using Artificial Intelligence tools as soon as the candidates email is received it acknowledges the candidate by sending the organizations automated email which can be used by the organization or the candidate for the further references.
- e. Candidate re-engagement: Even after the interview is over many organization may not acknowledge the candidate with the results of the interview. By using Artificial Intelligence tools it updates the candidate with the results and keeps a track if the same candidate has applied for the same or the other position in the same organization.
- f. Automation and impartial decision: As the proverb says "Time is money", for every organization time is a very crucial factor. By using Artificial Intelligence tools, it can search the correct candidate profile for the correct position from the pool of the applicants as a result it saves the organizations time, money and other resources as well. In many situation a partial decision can be made by the human interference, which is the most common that most of the organization is facing. Artificial Intelligence tools can be used to reduce the biased decision made by human interference and an unbiased decision can be made by viewing into candidate's curriculum vitae (CV) and the online data that he has entered while applying for the vacancy.
- g. Issue of offer letter and joining the organization: Once the offer letter is issued to the candidate and upon his acceptance of the offer letter, he may not be allowed to leave the organization for a certain period of time. Since many candidates do not join the organization even after the acceptance of the offer letter as they might have received some better opportunity. To avoid such dropouts Artificial Intelligence tools can be used to follow up the candidates on the regular basis between the gap of offer letter acceptance and joining the organization. Once the candidate joins the organization proper orientation is conducted, where the organizations profiles, culture, policies, rules and regulations are explained. Every time the authorities will not be available to answer the queries of the employees hence an Artificial Intelligence tools can be used to create the all the employees profile and all their queries and be answered by using this tool.
- h. Employee development and motivation: On a regular basis the organization should arrange some quality learning and training programs which will help the employees to get motivation to do their work as a result they can focus more towards their career and the organizational development. Since learning is a continuous process employee need to spend an extra time from their work time which is always not possible. Using Artificial Intelligence tool all the learning and training programs can be customized and the employee can undertake these programs in their convenient time with reduced human

intervention. Regular feedback or reviews need to be given by the employees so that new quality programs can be organized.

- i. Fair treatment to all employees: For the growth and the development of the organization it is very necessary that all the employees are treated fairly so that they can be pleased and gratified in their working. The organizations on a regular basis should update their employees with the organizations policies, promotion and salary increment criteria's, benefits, vacations; health related issues, grievance redressal and should address all the queries of the employees. Using Artificial Intelligence tool all the policies and other things can be customized at the same time employee's queries and grievances can be conveyed to the authorities of the organization through the chat-box or through virtual meeting conversation. With the help of Artificial Intelligence tool the Human Resource (HR) can also develop a set of quantifiable goals for each employee and it also helps them to manage the feedback of the employees and the surveys carried out by the organization.
- j. Organizational benefit: Using Artificial Intelligence tools, organization can understand their employees more meticulously; can monitor their emotions and performance during their working periods. As a result the organization can take all sorts of corrective measures for their employees and try to make the organization-employee bond stronger which results in greater commitment and engagement from the employees.

VI. CHALLENGES FACED BY HUMAN RESOURCE IN CHOOSING ARTIFICIAL INTELLIGENCE

With the introduction of Artificial Intelligence has made the Human Resource (HR) more accurate, efficient, optimized the recruitment process, shows the transparency, reduces the cost and improved the quality of the recruitment, but at the same time it presents different types of challenges to Human Resource (HR). Following are the challenges that are faced by Human Resource (HR) with the introduction of Artificial Intelligence.

- a. Intricacy in Human Resource (HR) results: What are the different dimensions that the Human Resource (HR) is looking into to declare the candidate as a good or bad the employee? The team work and the individual work cannot be differentiated as in all the work there is some level of interdependencies. So what type of metric Human Resource (HR) and Artificial Intelligence tool are using to justify it.
- b. Limited data set: Most of the organizations are having limited number of employees and hence they will have limited amount of data available with them. Hence it's difficult to apply Artificial Intelligence tool for analysis purpose.
- c. Fairness approach: Human Resource (HR) needs to be very fair in their approach in both the areas of recruiting or terminating an employee. Proper justification should be provided in both the cases. If the system is not programmed properly then it can show some sort of partiality. For example – Amazon had to put down Artificial Intelligence recruiting tool since the algorithm showed bias on the basis of genders.
- d. Ethical issues: All the employment decisions taken by the Human Resource (HR) should be ethically justified and should be always look for the socio-psychological aspect.
- e. High computing power: To develop a good Artificial Intelligence tool good algorithm needs to be developed which requires super computer's computing processing power and super computers are very expensive, so every organization may not be able to afford the huge amount for the technology and for the rapidly increasing complicated algorithm.
- f. Insufficient trust: It's difficult to predict how the Artificial Intelligence tool will behave for a specific set of inputs.
- g. No human trace: It is one of the important challenges that the candidates are facing. Candidates like to have one-to-one communication rather than receiving the automated replies from the organization or talking through chat-box. From the candidates point of view it puts a negative impact on the hiring process.
- h. No incorporation with current ATS: Depending upon the selection of Artificial Intelligence tools it may or may not incorporate with the organizations current ATS (Application Tracking System).
- i. Teaching algorithm to interpret: The organization may have number of candidates profile stored in their database so it's difficult to teach the algorithm or the Artificial Intelligence tool to execute according to the Human Resource (HR) and organizations requirements. Sometimes the received information may not be interpreted properly by the Artificial Intelligence tool which provides an erroneous results.
- j. Worried about the existing recruitment process: Since Artificial Intelligence is an emerging technology many organization and Human Resource (HR) are worried in the implementation and adaption of the

new Artificial Intelligence technology as it can spoil the current recruitment process or the available recruitment software.

- k. Reliability: In many organizations the Artificial Intelligence based recruiting tools are still in their early stages and still have many inconsistencies and issues in it. Since these Artificial Intelligence tools develop their results based on the recognized patterns, they need huge amount of data for it as sometimes the organization fail to supply such huge amount of data.
- l. Sometimes can be bias: One of the advantages of Artificial Intelligence tool is that it shows no bias or reduce the bias due to no human interference. But the tool needs to be trained based on the data that the organization has, as its results are based on the analysis and the recognition of pattern of data. So if good significant data are collected by the organization then good results can be given by the Artificial Intelligence tool.
- m. Data security and privacy: One of the important factors to develop a good Artificial Intelligence tool depends upon the availability of data and the required resources to train them. Currently the data that are used for training purpose are of the different users round the globe and which can be used with the bad intentions also. Hence it is not clear that how far the data used by the tool is secure and proper privacy is maintained.

Though the above mention challenges are little discouraging and shocking for the organization and the Human Resource (HR), but in coming days many more alterations and development will happen and the Artificial Intelligence tools can be used more effectively.

VII. IMPLICATION OF THE RESEARCH

The research carried out in this paper is a qualitative research and tries to explain how AI can be beneficial and effective to the HR if it is integrated properly and systematically. The research also explains the various reasons why AI should be integrated in HR, it also explains the different challenges that HR are facing by the introduction of AI.

VIII. CONCLUSIONS AND FUTURE SCOPE

Artificial Intelligence which is one of the emerging technologies in the recent years, which works similar to the human brains, is gaining advantage and has taken the control over all the sectors of science and business, especially in Human Resource (HR). Recruitment which is the centerpiece of all the organization and with the introduction of Artificial Intelligence in Human Resource (HR) has gained a high importance and attention due to many reasons that it provides as compared to traditional recruitment process. Due to its increased recruiting quality, quick screening of candidates, better integration and analytics, good automation and impartial decision has put a tremendous impact on the recruiting process. Though Artificial Intelligence is taking control over all the functions of Human Resource (HR) does not mean that Human Resource (HR) will be totally replaced by Artificial Intelligence. The growth of Artificial Intelligence is offering a favorable solution and has a promising future in Human Resource (HR). Though there are number of reasons for choosing this emerging technology in Human Resource (HR), it's facing lot of challenges as well. Regardless of number of challenges faced by Artificial Intelligence, many organizations are coming forward and making a good effort to integrate Artificial Intelligence with Human Resource (HR) because of number of benefits its provides which surpasses all its challenges.

The improvement in Artificial Intelligence technologies will definitely provide a promising solution to both the Human Resource (HR) and the other recruiters in carrying out the recruitment process effectively and efficiently by increasing the deeper level of intelligence. By developing a new machine learning algorithms, pattern recognition, smart and user friendly platforms which can be within the budget of all the types of organizations and making system more secure can address all the challenges and issues that Human Resource (HR) are facing with the introduction of Artificial Intelligence. Definitely in coming years "Artificial Intelligence is going to be the future of Human Resource (HR)".

REFERENCES

- [1] Geetha R, Bhanu Sree Reddy D, "Recruitment through Artificial Intelligence: A Conceptual Study", International Journal of Mechanical Engineering and Technology (IJMET), Volume 9, Issue 7, July 2018, pp 63-70.
- [2] Kaur,P, "E-recruitment: A conceptual study", International Journal of Applied Research, 1(8), 78-82

- [3] Acikgozy Y, "Employee recruitment and Job search: Towards a multilevel integration", *Human Resource Management review*, 29, 1-13, 2019.
- [4] Chapman.D.S, & Webster J, "The use of technologies in the recruiting, screening, & selection processes for job candidates", *International Journal of Selection and Assessment*, 11(2-3), 113-120, 2003.
- [5] Sudherland. M and Wocke .A, "The symptoms of and consequence to selection errors in recruitment decision", *South African Journal of Business Management*, 42(4), pp. 23-32, 2011.
- [6] Schermerhorn J. R, *Management updated*, New York: John Wiley and Sons Inc., 2001.
- [7] Storey D. J, "Exploring the link among small firms, between management training and firm performance: a comparison between the UK and other OECD countries", *The International Journal of Human Resource Management*, 15(1).
- [8] Peter Cappelli, Prasanna Tambe, Valery Yakubovich, "Artificial Intelligence in Human Resource Management: Challenges and a Path Forward", an article in *SSRN Electronic Journal*, January 2018.
- [9] Ginu George, Mary Rani Thomas, "Integration of Artificial Intelligence in Human Resource", *International Journal of Innovative Technology and Exploring Engineering (IJITEE)*, Volume 9, Issue 2, December 2019.
- [10] Suruchi Pandey, Priyadarshini Khaskel, "Application of Artificial Intelligence in Human Resource Management and Gen Y's Reaction", *International Journal of Recent Technology and Engineering (IJRTE)*, Volume 8, Issue 4, November 2019.
- [11] Breaugh A.J, "Employee recruitment: Current knowledge and important areas for future research", *Human Resource Management Review*, 18, 103-118.
- [12] Wall T.D, & Wood S.J, "The romance of human resource management and business performance and the case for by science", *Human relations*, 58(4), 429-462, 2005.
- [13] Scott Morton, Michael, "Introduction", In Michael Scott Morton ed. *The corporation of 1990's: Information Technology and Organizational Transformation*, New York University Press, 1991, pp. 3-26.
- [14] Ernst & Young LLP, "The new age: artificial intelligence for human resource opportunities and functions", 2018
- [15] McCarthy J, "What is artificial intelligence?", 1998
- [16] Murgai A, "Role of Artificial Intelligence in Transforming Human Resource Management", (*IJTSRD*), 2(3), pp 877-881.
- [17] Artificial Intelligence in Human Resource (HR) is no Brainer, PWC report 2017, <https://www.pwc.at/de/publikationen/verschiedenes/artificial-intelligence-in-hr-a-no-brainer.pdf>, Oct 2019.
- [18] <http://techrseries.com/others/ai-in-recruitment-benefits-and-challenges/>
- [19] Evolution of Artificial Intelligence in Human Resource (HR) : Innovations & Unmet Challenges, <https://www.entrepreneur.com/article/320555>
- [20] The Organizational Challenges of Artificial Intelligence in your Recruitment Process, <https://www.Yoh.com/blog/The-Organizational-Challenges-of-implementing-ai-for-recruitment>, January 2020.
- [21] Top 7 Challenges in Artificial Intelligence in 2020, <https://www.upgrad.com/blog/top-challenges-in-artificial-intelligence/>, an article by Pavan Vadapalli, July 27, 2020.