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**Job Recruitment With Intelligent Recommender Engine**

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# **Abstract**

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# **Chapter I**

# **Introduction**

E-recruitment, also known as online recruitment, represents the modern equivalent of finding various job candidates using web-based technology, in order to enhance its efficiency compared to the classic method of face-to-face/in-person encounters.

Nowadays, due to the exceptional and spontaneous growth of technology in the last decade, almost every company out there broke in the area of online recruitment. This doesn’t mean that the new approach needs to replace the old, but to work alongside each other to extend the growth and standards of a company.

Some of the most important reasons that propelled investors and entrepreneurs in taking another step towards the future of their businesses are the minimized hiring costs (less HR-human resources required during the process), broader scope of audience (enables targeting far wider, locally or abroad without paying extra taxes) and the accessibility (job ads and campaigns can be published through various social media sites, 3rd party websites, in order to reach the target group). It is also good practice to take into consideration that disadvantages also exist, such as a much larger number of unsuitable candidates applying to the offer versus the standard method, the lack of knowledge about the personality traits of the applicants (as these online elements tend to focus more on the technical side) and complications regarding the senior positions that are not very accustomed with technology.

The paper is centered around the concept of finding a job, both from the perspective of people on the lookout for new opportunities and from the perspective of a company wanting to recruit/expand.

The first chapter summarizes the main theme of the thesis and how it is structured.

The second chapter dwells in the domain of E-Recruitment, as the title suggests.

The third chapter enters the world of A.I. (Artificial Intelligence) and describes how intelligent agents can improve and shape the interaction with online recruitment in order to achieve more realistic results related to each individual’s personal preferences.

The fourth chapter breaks down the technologies used in the application.

The last chapter contains conclusions after completing the thesis.

# **Chapter II**

# **The Domain of E-Recruitment**

# **2.1 Introduction**

Recruitment is mainly composed of practices and activities carried out by the firms with the primary purposes of identifying/attracting potential employees, sorting through the applicants, making contact with the potential fits and closing the deal with the best candidates. (Breaugh & Starke, 2000).

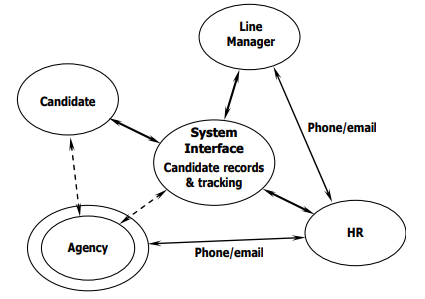
E-recruitment has grown exponentially in the last decade, as the Internet became the most popular tool in hiring and is now widely used by both recruiters and job seekers across the world (Cober & Brown, 2006). In order to draw human capital, the process is split in mainly two categories: corporate websites and commercial job boards. Corporate websites are private web pages that belong to companies where users can browse for current openings, while job boards are third party websites that contain offers from multiple recruiters that paid a certain fee for publicity. (Kapse & Patil, 2012). Lately, social networks are increasingly being used because of their efficiency as a middle agent between the other two. (involving a free third party website where each company can create a personal page with all the information needing to attract human resources).

Technology can ease the selection of employees over the traditional method, and so every website evolved into a complex interactive engine that tries to automate every aspect of cyber recruitment, making it accessible to a wider audience over longer distances. ( Galanaki, 2005; Joe Dysart, 2006). The world wide web became a powerful tool for recruiting in the mid-1990s and was advertised by the media as a handler behind a “recruiting revolution” caused by all the potential improvements that it could bring to the table over the more traditional method. Easier access to information and reduced costs in human resources resulted in more sophisticated and interactive methods of finding the right person for a specific opening.(Boydell,2002; Freeman & Autor, 2002).

# **2.2 Definition**

Recruitment is a process that implies looking for potential candidates to fill available vacancies in organizations. With the help of effective human capital work and following a linear process composed of multiple steps, the services of the most suitable and capable personnel are being secured. The rapid growth of technology suddenly changed the way companies are conducting business and lured almost all of them to more non-traditional forms of enrolling practices, precisely “e-recruitment”.(Erica, 2007).

Edwin B. Flippo stated that “Recruitment is the process of searching the candidates for employment and stimulating them to apply for jobs in the organization”, meaning that recruitment stands as a link between employers and job seekers, as Figure 1 shows. The candidate interacts with the System Interface, a website in our case, and the application information is processed by the HR ( Human Resources) department, either directly or through phone/email, then finally reaching the organization.



**Figure 1**. Landscape of e-recruitment (*Source*: IES, 2003).

Vidot (2000) suggested that “e-recruitment is the use of internet to attract high quality candidates, screening of suitable profiles, streamlining the application and selection process.”

Galanaki (2002) said that “The words e-recruitment, online recruitment, cyber-recruiting, or internet recruiting are synonymous. They imply formal sourcing of jobs online.”

To put it shortly, web-based recruitment means the use of technology in supplementing and improving the classic method, without trying to eliminate it. To show how dominant this trend became, Taleo conducted a research in 2003, finding out that over 93% of the Global (that operate and distribute in many countries around the world) 500 companies were already using online recruitment. Another investigation, also by Taleo, showed that a large number of firms are only allowing the job seekers to apply in an online environment ( from 27% in 2000 to 77% in 2005).

# **2.3 Advantages**

More and more companies started to invest in their own websites or using 3rd party services because of the various benefits the online environment could bring to their businesses. The most important feature would be the availability, as the Internet provides unlimited and continuous access to the possible future employees at any time and almost anywhere and by doing so it broadens the timetables that would be provided by the HR (Human Resources) workers.

Another important facility are the reduced costs that come hand in hand with going online. First of all, posting a new job vacancy on your own website is free, relatively cheap on an external service compared to a recruitment agency or getting a headline in a newspaper. Second of all, as processing applications online means that an automated algorithm/system is doing all the work for you, this implies that the administration burden of the HR department can be greatly reduced as well. (Kerrin M 2005).

Wider access results in a higher chance of finding the most suitable candidates in a fair and efficient way. Online advertising provides a larger pool of local, national and international offers. Having people from all around the world encourages diversity, different opinions and various knowledge on a common subject. (Kerrin M 2005). By using an online recruiting tool, information about all the applications is stored in a database and can be used later for future openings and thus giving a second chance to the people that didn’t manage to close the deal in the first place.

An additional very important feature is time saving. Completing online quizzes, surveys, forms and attaching your CVs (Curriculum vitae) can now be processed by engines in a matter of minutes, saving valuable time. This is particularly useful in larger companies where some vacancies can attract a large volume of job seekers. All the steps from preparing the job description and specification to the pre-selection of candidates to the interviews and the decision making can be tailored to fit the best interests of both the user and the organization. Receiving quick responses to questions and information on certain subjects are easily achieved, as a lot of companies often have forums where anyone can post their concerns and get an answer from a qualified worker. (Elkington T 2005; IDS Study Plus 2000).

The reputation and brand can also be a deciding factor when done properly. Lots of websites have sections where they describe the organizations accomplishments, the most impressive and large projects, the most skilled and renown employees that walked through their door, the culture and maybe the future goals. Lately, it is common for “virtual tours”, “employee of the month” and “a day in the life of ” videos to be presented in order to immerse in the feeling of how it would be like to work there and how you would be treated by others. Having more features and putting work to describe your firm can greatly increase how an outsider is viewing and formulating his first opinion about you, resulting in a better image. (Kerrin M 2005).

Some other smaller advantages of e-recruitment are the attraction of passive jobseekers, as having a very attractive job post can stimulate even someone who is not necessarily on the hunt to take a peek, the reduction of unqualified candidates, as the offers can be very precisely tailored to very specific needs, more opportunities for smaller firms, as any application can become popular overnight due to recommendation systems and it can often be less intrusive than the traditional method, as some people are more comfortable in front of a screen rather than in front of a committee.

# **2.4 Disadvantages/Challenges**

As any other domain, E-recruitment has its own share of challenges and shortcomings, but they are not written in stone and can always take a turn for the better.

The main problem is related to the number of applications and their authenticity that need to be processed. Even though an online platform generates a high amount of suitable candidates and also reduces the number of unsuitable candidates, their number can still be quite large, especially for a popular job post. However, automation can only take you so far and afterwards it turns into a time costly operation of sorting out unwanted offers. Another difficulty is keeping a clean record of both online and offline offers, which can lead to a chaotic internal organization and can affect the state of the company. In some cases, overloading of the website’s capacity due to high traffic can create some technical, IT-related problems, which again need time and resources to solve.(IRS 2005).

A really important issue is the lack of Internet in a lot of underdeveloped countries around the world, which affects the chances of their inhabitants to get an equal chance of obtaining a job as someone in a more thriving place. Also, companies need to take into consideration the population that is not accustomed to technology and usually encounter technical difficulties when interacting with an online environment, thus firms shouldn’t solely depend on online recruitment methods. Various disabilities can often limit or even negate the use of a website and a lot of employers are unaware of this implications and are not providing an accessible environment or an alternative medium depending on the situation. (IRS 2005).

Smaller complications also exist, like the preference of individuals for face-to-face traditional recruitment in the case of a company where only online applications are allowed and the absence of “personal touch” of a website. To elaborate, the online platforms provide a more technical resume of a candidate, often neglecting their personality, temper and emotions thus obtaining a robotic environment that cannot learn how a possible future employee will behave.

# **2.5 Players in E-Recruitment**

1.Job Seeker

# **2.6 The Hiring Process**

# **2.7 Traditional recruitment vs E-Recruitment**

# **Chapter III**

# **Machine Learning in E-Recruitment**

# **Chapter IV**

# **Application Description**

# **Chapter V**

# **Conclusions**

# **Bibliography:**

[1] Dhamija, Pavitra. "E-recruitment: a roadmap towards e-human resource management." *Researchers World* 3.3 (2012): 33.

[2] Holm, Anna B. "E-recruitment: towards an ubiquitous recruitment process and candidate relationship management." *German Journal of Human Resource Management* 26.3 (2012): 241-259.

[3] Barber, Linda. "E-recruitment Developments.", Technical Report (2006), https://www.employment-studies.co.uk/system/files/resources/files/mp63.pdf.

[4] Kapse, Avinash S., Vishal S. Patil, and Nickil V. Patil. "E-recruitment." *International Journal of Engineering and Advanced Technology* 1.4 (2012): 82-86.