

E-Verification: The Missing component in E-Recruitment Systems

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Abstract--- In a recruitment system the process of verifying academic papers is manual and does not employ any of the computing capabilities. The manual process allows fake certificates to pass on. In an attempt to curb the issues, a technique for electronic verification is proposed. It's a technique that employs the web and database programming, XML data sharing as well as message passing via a very simple web service to share academic data between employers and the schools. In evaluating the technique over twenty respondents were surveyed and academic info subjected to verification. It is found that the average verification time was reduced from weeks to seconds.

Keywords--- E-Verification, E-recruitment, Web Application, Web service, CRON, DMZ, XML

I. INTRODUCTION

Information and Communication Technology (ICT) has not only become vital, but have changed the way business is done. Every business that has to remain relevant and be profitable must employ ICT in their business models. E-recruitment or online recruitment which can be defined as a “*practice that uses technology and in particular Web-based resources for tasks involved with finding, attracting, assessing, interviewing and hiring new personnel*”, [8] becomes one of the business models. This is an efficient method that not only saves time and monetary resources but also extends the reach to a diverse set of applicants. Being a vital process on business growth and continuity, then it must have the qualities of transparency and verifiability.

Electronic recruitment methods have been employed in the recruitment process. These include general purpose jobs, niche job boards, e-recruitment application service providers, and recruitment consortium as well as job postings on company websites or jobs blog posts [1]. These all, posts job requirements, collect applications and inform on other stages of the recruitment process. These lack a verification method to verify the authenticity and validity of the academic testimonials presented. The Process of verification is done manually either via visiting the document issuer or certified true copies method by a jury or an authorized agent.

The process of verification then delays the fast paced recruitment process owing to use of e-recruitment systems. Sometimes the process is rushed over or avoided creating a chance for fake certificates to ‘chip’ in and unqualified candidates pass on to other stages of recruitment. This impacts heavily on the organizations.

Over half of the graduates from Kenyan universities and colleges are half baked and are not ready for the available job posts without further training [2]. The sale and ‘cleaning’ [2] of certificates exists as a vice in the community and must be discouraged and curbed completely.

In an information age where every process is in the process of automation there is a need to provide a reliable system that will provide a method of verifying academic papers in a real time or semi real time.

II. PREVIOUS EFFORTS IN VERIFICATION

Owing to crime reports all over the world there have been concerns in verification of the statuses of the applicants in various sectors of the economy. The United states of America employs the E-Verify system to verify employees' data against millions of United states government records and provides results within as little as three to five seconds.

The Central bank of Kenya introduced the credit reference bureau in which it's able to share loan and repayment history of all loan holders to financial institutions in a bid to verify the credit worthiness of a given customer. The reference bureau collects and merges all into one pool for easier reference.

The success of the above electronic methods provides an example into which other fields can borrow from. The process of document verification is normally done via manual methods even at stage where electronic recruitment systems are the order of the day. The manual methods include certified true copy of the original, confidential methods as well as trusting the document via security attachments such as holograms and institutional seals it holds.

III. E - RECRUITMENT LANDSCAPE

In a typical recruitment system a candidate interacts with the system by posting his/her resume. The human resource team in consultation with the line manager selects a set of suitable resumes and subjects them to scrutiny. Where recruitment agents are involved they communicate with the Human resource department or specific line managers who in turn can communicate with the candidate. This all happens before any candidate is invited for an interview.

A decision is made based on the resume and other testimonials sent to the system. The system is error prone at this stage as no formal verification is done. Most of the documents submitted are either attachments or self-description notes. These are however not fully verifiable. [3] Warns “... So next time you hire someone be sure to screen their papers thoroughly, lest you earn yourself another fake

friend, wearing a fake smile to impress you” in the story of Kenya the land of Fake goods, Fake leaders and Fake smiles.

The e-recruitment system at this step will have achieved the main goals of a cheap, fast and far reaching system but have not provided the full accuracy needed to enable the company hire the best available staff.

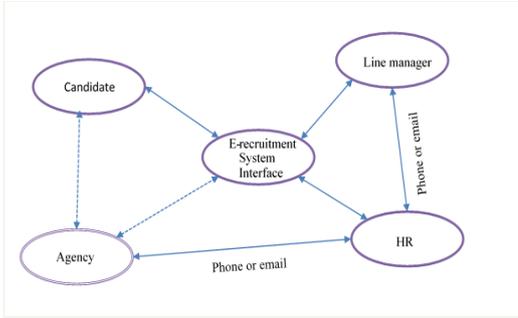


Fig 1. E-recruitment Landscape[7]

A. Challenges of E-recruitment

The major challenge of e-recruitment is the trade-off between quantity and quality of the candidates. The number of applicants increase as the number of unqualified ones increases [4]. This then creates an extra overhead in terms of cost of selection and time taken, though not comparable to the traditional methods.

E-recruitment modifies the social interactions and thus makes the job seeker not to effectively represent a number of personal qualifications for the job [9]. Attentiveness and the look cannot be full represented via this method of recruitment. This method is further accused of ‘lacking a human touch’ [6], and thus will likely to be acceptable by the set of population who prefer relationship-based interactions.

E-recruitment systems provides a broad access and thus makes matching to the job position a big issue. The consequence of this is ‘having less qualified applicants with the cost of losing qualified ones’[6].

This then calls for a solution to filter the large pool of applicants and match them to the job position – a loud call to fill up the missing components in the existing systems.

IV. METHODOLOGY

The goal is then to come up with a prototype of a solution for academic testimonials verification an important aspect in every recruitment process. It’s an addition to existing e-recruitment systems and interfaces in a general recruitment landscape. The conceptual model is represented in the block diagram below (Fig 2). It’s an insert that tiers up the document issuer with the employer or other personnel’s requiring to verify certificates presented to them. The solution works around on existing platforms and does not introduce any new concept other than implementation of the web services concept on academic papers verification.

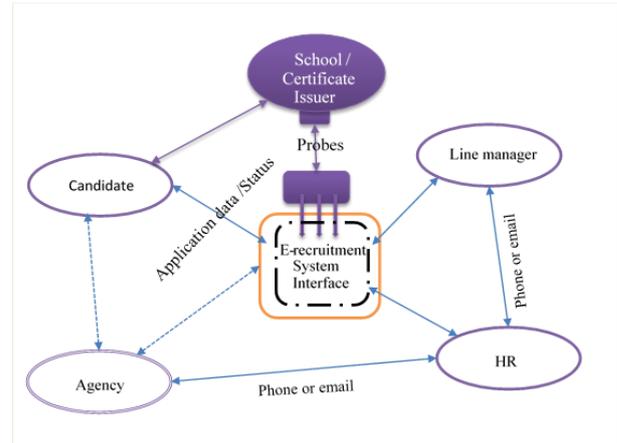


Fig2. The Conceptual model

An E-recruitment system that does not have a verification system includes only the candidate and the recruiting panel, sometimes it includes the agents. The HR team posts a job that is publicly viewed by a candidate in consultation with the line manager or an expert in the field. The candidate then applies through the e-recruitment system or through his agent and the human resource team begins the process of selecting the most suited candidate based on the qualifications submitted.

This system lacks a verification system that bridges between the student and the employer who is in this diagram represented by the HR (Human Resources) team. An introduction of a verification system filters and connects to the school via a web service with probes to verify the validity of the data submitted by an applicant. The service can be integrated to the e-recruitment or used separately for the purposes of bulk or single verifications.

A. System Architecture

The system runs on a client – server architecture, PHP will interface between xml and data caches stored into the database. The connection between the user and the server will be driven by user events but the interface between PHP and xml interfaces on the institution data will be via timed cron jobs.

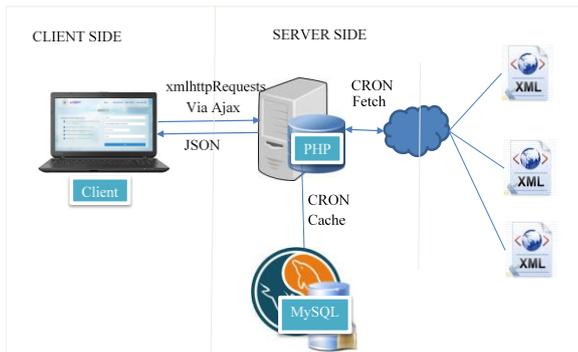


Fig3. System Architecture

In a typical operation environment, the client will be the person or the system that needs to verify the certificate info. The system requires the certificate serial number, year of award, the institution and the country.

The Cron scheduler fetches data from host institutions and caches the same on a MySQL database. This is to improve response time and avail data at all times.

The host institution shares its graduate's data in an xml format. The system caches the same and one is able to search and validate certificate info via a web interface.

The system is programmed via PHP and utilizes AJAX to load data fast and with very little pages load.

B. Implementation Variations

The system can be implemented on two variations depending on factors related to the country, the institution and sharing service level agreements.

B.1 Variation one (Managed by a central authority)

In this variation the system will run as a middle agent and will hold data or read data from host institutions and display it to the prospective employer once searched. The host institutions will share data through cloud and via published xml interfaces. The system will periodically via a CRON scheduler fetch xml data from host institution and cache the same in the system databases or file.

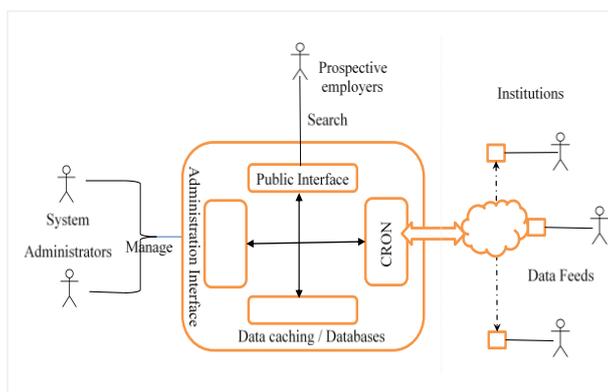


Fig4. Implementation variation 1

The prospective employer who seeks to verify a certificate will access the system via a browser front-end and supply required data. The system will in turn query its cache based on the input parameters and return the data to the user on validity.

B.2 Variation two (Managed by the institution)

In this variation the application is hosted by the institution. This normally will reside in the university cloud or website and can be accessed directly by visiting the institution official website or subdomain.

The host institution avails a link for all certificates verification. The link allows a prospective employer to verify the certificate information by keying in some input data. This variation is important when there is no central authority or the university/institution is not willing to share its data to a central authority, a concern raised in the feasibility study.

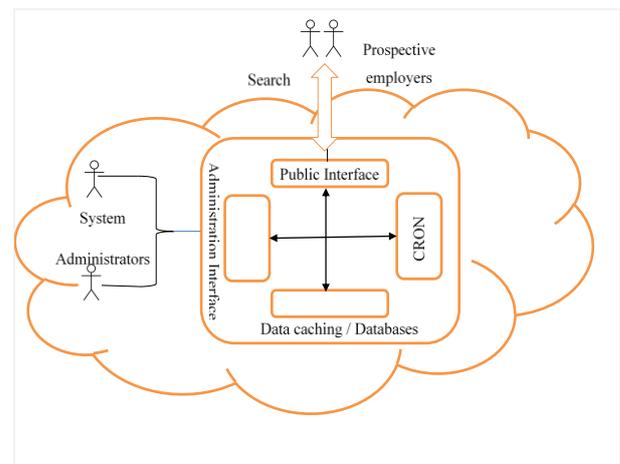


Fig5. Implementation variation two

C. Integration Considerations.

The prototype is best implemented on a PHP/MySQL(i) Workbench with very minimal server requirements. This is not however cast to live by that and can be implemented on other platforms such as Active Server pages or Java Server pages with MSSQL or any other SQL support.

The use of XML primarily as the data sharing mechanism makes every system to share data with ease with any of the implementations of the prototype. What is required is only to observe the XML data format on the institution side.

For a successful operation of the system the following requirements are required.

- Apache 2.2 and above installed
- PHP 5.3 and Above installed
- MySQLi (MySQL Improved version)
- PHP/MYSQL/PDO support
- Modern Browsers (Any browser with html5 and css3 support)

V. GENERAL PROCEDURE

Every time during verification, some input data must be entered these include the country, the institution, the serial number

and the year of award. Whenever each of these is not available the system cannot proceed further.

In a typical search a user selects the country info and the system loads institutions from the country. The user then supplies the certificate serial number normally on each academic certificate as well as the year of award. If there is a match the certificate info is displayed. If otherwise a notification that the certificate is missing is echoed. This could be a confirmation that wrong data was entered or the certificate is not available thus a forgery can be thought of.

The process is illustrated in the below flowchart.

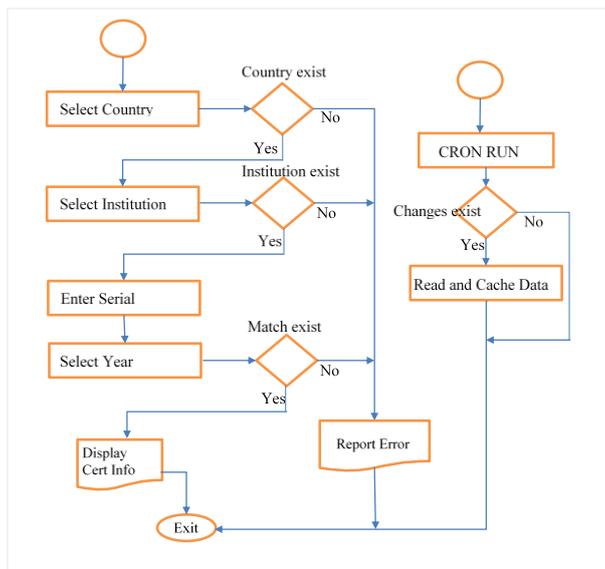


Fig 6. Flowchart of the general procedure

VI. RESULTS

The system was designed and its search phase was subjected to test to determine if it delivered the expected results. At the heart of the system is the search module and capability. This was developed and several parameters were subjected to scrutiny. These are the measures set in the feasibility study of the project, which are in line with the project objectives and requirements.

A. The Acceptability

To ascertain the acceptability of the solution, a questionnaire was administered to twenty respondents with an interest in the area. The respondents were to answer on the effectiveness of the system in verification.

The system was poised to be a solution or one of the major improvements into the e-recruitment systems. Three interest groups were subjected to the survey. These are the institutions side that offer the certificates, the employers and the graduates who are awarded with the certificates. The solution with the sample data showed a positive response on the employers' side – all noted a major boost into their process of certificate verification and an addition to the existing recruitment systems. The graduates who receive certificates had no objection whatsoever. Negative response was on the institution side objecting to sharing data to a

central authority. This gave rise and strengthened variation two of the prototype.

B. Towards a Non-Result-Checking Platform

With much discretion, the display of one's certificate info could have resulted into another method of checking ones performance while at the university or another institution of higher learning.

A serial number was used to search for the certificate info. The serial number is only known and inscribed in the certificate. Thus, whoever has the certificate knows the results or performances of the owner – the only thing in contention is the validity of the results in the paper he or she holds.

C. Output Data

Key to every other system is the set of data produced as the output. The prototype on a match on certificate search produced all fields that concerns the graduate. This included all his academic records. Non-academic or personal life was not presented. The choice of this was as determined in the feasibility study.

D. Response time

The solution was meant to be an insert to existing systems or what's commonly known as a module. The module was not meant to add any overheads to existing system but improve their efficiency by making them all round in all phases of recruitment.

This did not go however with issues as the success of it depends on other parameters or resources available. The application was hosted on a shared server and response time was less than a second. This is however not the final response time but only an indication the script can run even faster with extra resources.

E. Security Considerations.

Any academic award awarded to an individual on completion of studies is normally a key aspect in acquisition of the dream Job. This then enforces that any data through the system must be secure and must not be subject to manipulations or false representations. The data comes from the host institution and thus is assumed the right one. The queried data set must remain as fetched. The concept of data caching via cron job is important for this.

The proposed system from the prototype separates the data interfaces. The client side as well as the PHP server is recommended to be hosted in a DMZ (De-militarized Zone). This forms the access skeleton of the whole application and any attempt to hack or break into the system will not have any impact on data rather than rendering it unusable. Any attempt to modify the data if successful will be overwritten in the next cron fetch. The cron job runs from the protected zone and caches the data in the DMZ.

VII. CONCLUSION

With the advancements in technology and having e-recruitment as the convenient and preferred recruitment method, the next big thing is to sustain the process and continuously add value to it as well. E-verification is the ultimate consideration at this time when information uptake and integration into all aspects and sectors of the economy. Electronic recruitment procedures cannot withstand the validity test without an electronic verification method in use.

The e-verification project can also not stand on its own as the system will require some legislation and service level agreements between host institution and the implementers. This requires support, resources and further training and seamless hosting

capability to avail the search capability to all at all times. This cannot be achieved without your support.

The prototype only reveals an academic exposure but there is potential and implementation in other sectors. These sectors may include others where other kind of certificates or business registration documents need validation or verification.

The prototype also calls for some standards in certificates for the academic field. Other methods proposed include attaching self-read QR-Codes or bar codes when scanned can verify or return certificates data with little effort. We value all efforts towards this.

The success of the implementation cannot be thus without you and all host institutions. We call you to participate in adoption of the system to improve the confidence and trust in our school award system already under question due to fake certificates all over [2].

A. Further work and Recommendations

In view of the findings and prototype conclusions, the following recommendations are made in a bid to fight the fake testimonials in circulation.

- The commissions of higher education or education authorities should standardize the certificates layout, structure and components. The Certificate should hold the country of award, the course, the names of the student, year of graduation, certificate serial number (Unique into the year) and should also include the graduation lot, among other information. The country of award is commonly missing though can be known via other methods
- Universities and other institution should host separate verify systems that can be used to verify any certificate they have issued since inception. They should also publish open data interfaces that can allow seamless integrations into recruitment systems for verification.
- Enough awareness should be done and a collective Joint effort on fake certificates war should be declared. This should clearly portray the verification procedures using the proposed System.
- Enough legislation procedures should be done to mitigate the uptake of the system owing to legal battles that may arise on individuals who may not like their certificate information from being shared for one reason or the other.

Further research can be undertaken in the following areas:

- The disparate systems used or in use by various institutions in the world and how these can integrate seamlessly on the existing and modified versions of the system.
- Security overheads arising from use of the system in other systems.
- The need to include a data integrity check on any system integrating with the system.
- The impact of academic testimonials verification during recruitment.

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