

Automated Recruitment System Using Resume Ranking and Audio-Visual Interview

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ABSTRACT- Human Resource Management is supported by and provided with more opportunities by the development of the Automated Recruitment System (ARS) using resume ranking and audio-visual interviews, which is based on the concept of modern job design. In all recruitment exercises, the human resource department is faced with a pool of applications to go through and select the preferred candidate for the job. However, the process is always tedious and rigorous which might lead to fatigue and some other factors. Fatigue leads to inefficiency, thereby, selecting the wrong candidate for the job, aside from personal recommendations given to applicants. The proposed system will enable a more effective way to shortlist submitted candidate CVs from a large number of applicants providing a consistent and fair CV ranking policy. This can be legally justified. The system will rank the experience and key skills required for a particular job position then the system will rank the CV based on the experience and other key skills which are required for the particular job profile. This new system will help the HR department to easily shortlist the candidate based on the CV ranking policy. The system is designed using the waterfall model, and implemented using (SQL, Html, c#), programming languages. The new system can help both employer and employee in fulfilling their duties and responsibilities. It can help an organization leverage modern technology to save time and cost. Organization can improve their management system from a traditional approach to a modern approach that is technology-based. Therefore, it has about 80% advantage compared to the traditional process.

Keywords—Audio-visual interview, resume, neural network, ranking, water fall, c-sharp (C#), recruitment.

INTRODUCTION

With the rise in unemployment and underemployment, organizations undergo a rigorous and demanding procedure in a bid to select high-quality personnel for a particular job. Selecting the desired application for the task from a pool of candidates has been an essential issue (Almalis, Tsihrintzis, Karagiannis, & Strati, 2015). The traditional approach consists of carrying out technical eligibility assessments and interviews. However, social media sites like LinkedIn have uncovered employers to information about employees and job seekers (Menon, & Rahulnath, 2016). The employment procedure entails candidates filling applications with attached curriculum vitae, while the recruitment procedure is achieved through the human resource department (popularly referred to as HR) in organizations.

The curriculum vita is the Latin word for 'course of life. It is a written overview of someone's life's work (educational qualifications, skills, experience, etc.). The HR assesses the curriculum vitae and resumes from candidates and picks the high-quality applicant for the task. The human resource personnel is skilled for such purposes. However, they use the conventional process of assessment followed by an oral interview in making decisions about employee selection, which may be very time-consuming and will not give the best result. This conventional practice has caused lapses in different organizations as they have failed to predict workers' behavior over time. These lapses result from the HR inability to detect forged curriculum vitae/resumes and corruption during the recruitment procedure. The lapses can also be a result of the large number of CVs from candidates being treated by HR. These lapses can be covered with the use of contemporary-day technology in recruitment processes.

In recent years, there has been a tremendous increase in the

recruitment exercises of companies using the latest technologies. These new technologies use the most recent technology for recruitment exercises. The recent technologies include but are not limited to bridging the gap in human error. One of such gaps includes perusing large amounts of curriculum vitae in a few seconds and giving the result in ranking order. The technology uses the personality of the applicant as stated in the CV to predict the level of seriousness of the applicants for the job.

It is referred to as the most important factor which reflects an individual; however, it does vary (Ombhase, Gogate, Patil, et al., 2017). Thus, tackling them involves a rigorous process. The big-five personality test Extraversion, Agreeableness, Conscientiousness, Openness, and Neuroticism (EACON) is regarded as a generally accepted personality theory.

The information from the big-five personality theory assessment can be used in advertisements, marketing campaigns, job applications, and assisting bloggers in narrowing down their target audiences based on pre-detected personality traits (Tareaf, Berger, Hennig, Jung & Meinel 2017; Farnadi, Sitaraman, Sushmita, et al, 2016). However, the application of the big-five personality theory assessment is not limited to the above-mentioned applications.

Predicting a user's personality thru the use of social networks such as LinkedIn is not an easy task. Personality detection is a key factor for predictive accuracy, and one of LinkedIn's advantages is its easy access to large amounts of personal data and this results in ethical challenges that are yet to be addressed in line with relevant legal and moral guidelines, (Farnadi et al, 2016; Gasling, Augustine, Vazire, Holtzman & Gaddis, 2011).

Several authors have checked out the Big Five persona on predicting personality on a CV. Others analyzed semantical capabilities instead of syntactical capabilities to decide a

human's persona (Zhao, Grasmuck, & Martin, 2008). It suggests that several other factors can be used to evaluate one's personality. User browser history helps in gathering additional information on a user's personality. However, no work analyses the combination of CV, aptitude test, personality test, and audio-visual presentation to predict personality on cv.

This study proposes a machine learning-based method for checking personality scores and conducting audio-visual tests. Two main metrics are used to identify a candidate's personality and these include conducting aptitude tests and analyzing curriculum vitae. The aptitude test consists of quantitative, verbal, and logical questions. After the aptitude test, the personality test is carried out so that candidate's personality would be tested (Ahmed, Anannya, Rahman, & Khan, 2015). Next is the audio-visual interview that is independent of place and time. The decision is made on the test results. Then, the score of the text is displayed and the decision of the candidate is made.

LITERATURE REVIEW

Deepak and Das (2017), in their work, E-Recruitment Process with Use of Business Process Modelling, designed an e-recruitment system, that a recruiter uses to post job positions, manage applicants who applied for jobs and upload their cv, schedule interview and shortlist the applicant. In this system, we are building an automated recruitment model. For implementing this system, the E-Recruitment Process with Use of Business Process Modelling was particularly studied as the closest to our model amongst other related work.

Palshikar et al (2018) designed a system called talent evaluation and assessment of candidates (TEAC) developed for the automatic selection of candidates at the time of recruitment, ranking candidates and their respective scores. The resume grading feature is hierarchical by hand and uses the domain knowledge of our recruiting experts.

Jyothis et al (2020) examined automated resuming screening software using NLP and machine learning. They found that the software goes beyond keywords scanning but also ranks candidates based on specified requirements. The system also has the capability of rejecting applicants based on specified factors. Also, it goes further to make a recommendation to non-shortlisted candidates stating that the system only provides a helping hand for the recruitment process.

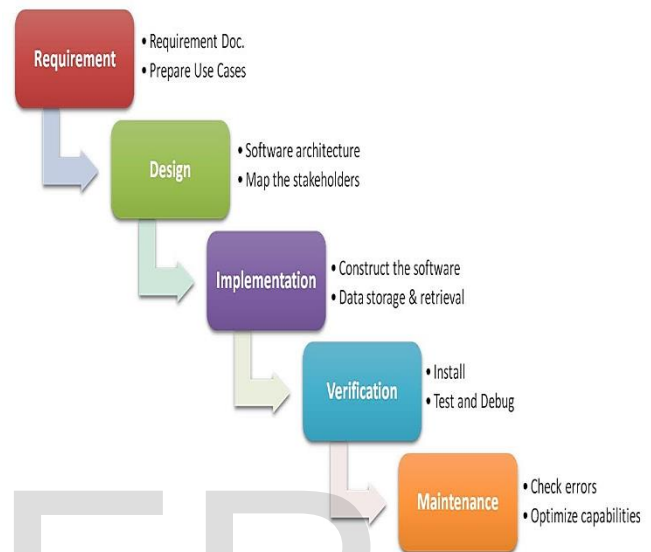
There are different research works on recruitment processes and systems. Based on a neuro-fuzzy, business model, resume screening, etc. (Deepak & Das 2017, Jyothis et al 2020, Palshikar et al 2018, Smriti 2019, Price 2007, Korsten 2003, Jones et al. 2006) used curriculum vitae ranking, aptitude test, and personality test, etc. to enhance recruitment processes, that is based on modern technology.

In job application processes, after selecting an applicant through a personality test, aptitude-test, and CV, the applicant is often invited to a physical or online visual interview which requires the applicant and the interviewer to be present at the same time. This study bridges this gap by developing an

automated recruitment system that incorporates all variables which include, data from the curriculum vitae, aptitude test, personality test, and an audio-visual interview that is independent of time and place.

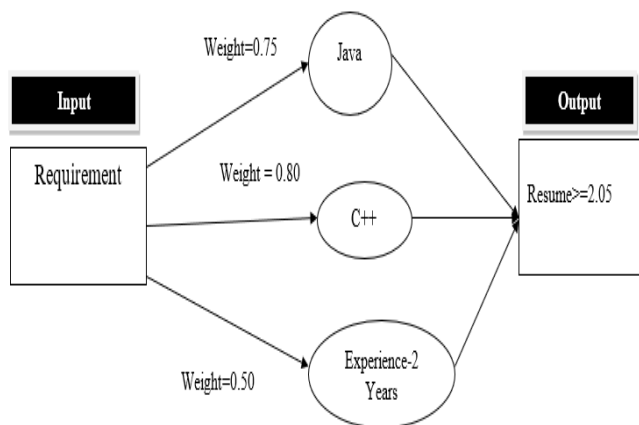
METHODOLOGY

The system is designed using the waterfall model which is a linear sequential flow.



NEURAL NETWORK

using neural-fuzzy logic which is implemented in c#, weights are assigned to skills and experience and only the resume with the requirement that has weightage equal to or above the expected weightage are shortlisted.



$$\text{Formula} = W_0 * I_0 + W_1 * I_1$$

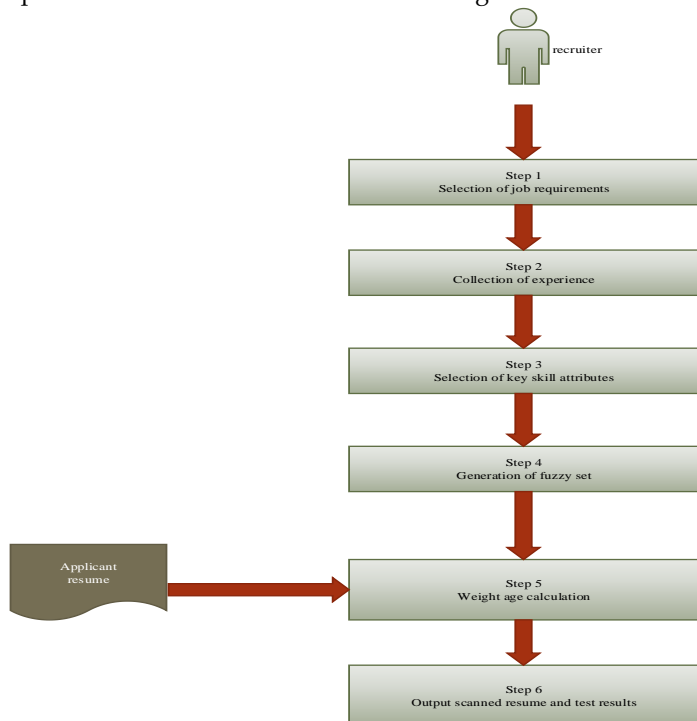
Weight age (0-1)

Where $l=k=1$

$$\text{Therefore, expected weightage} = 0.75 * 1 + 0.80 * 1 + 0.50 * 1 = 2.05$$

RESUME RANKING PROCESSES

The Resume ranking process consists of six steps of operation as shown in fig. 3.3 below



Step 1: The recruiter selects a subset of occupation characteristics to form the job requirements.

Step 2: Applicant CVs are submitted, assessed, and ranked based on the characteristics specified in step 1.

Step 3: Applicant's experience is analyzed to see if it matches job requirements

Step 4: Applicants' attributes are characterized and used to generate fuzzy sets that are used to rank the sample CVs.

Step 5: Extracted skills from resumes are rated with job requirements.

Step 6: The ranked resume is displayed with the test result of the personality and aptitude test.

Resume parser using c# iTextSharp

As shown in fig.3.4 below, skills and experience are extracted from an uploaded resume, based on job requirements. Parsing extracts desired information from the resume and generates attribute-value pairs for standardization represented as experience, technical skills, etc. The resume parser converts the original resume into the standard format with classifying attributes.

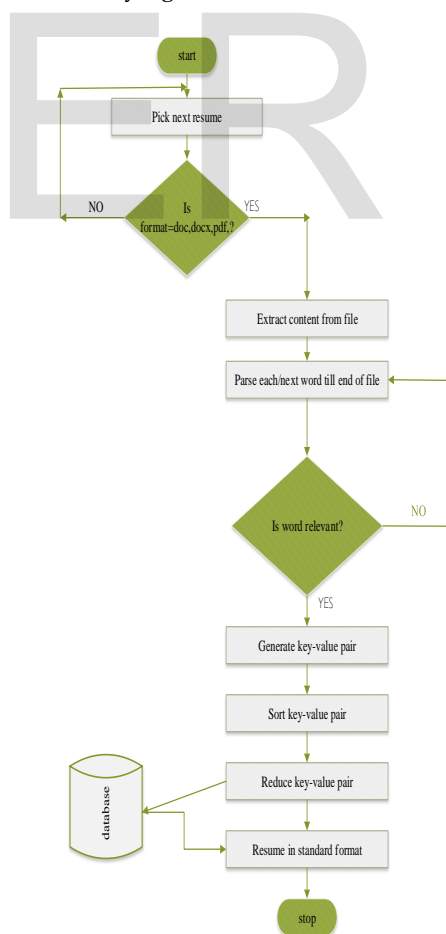


fig.3.4

Parsing of a resume includes three processes which include:

- i. Metadata
- ii. Natural language processing
- iii. Test extractor.

IMPLEMENTATION ARCHITECTURE

As shown in Fig. 3.15, the database-administrator (recruiter) provides the system and set all criteria required for the applicant to use the system. The user after chosen a job designation from a dedicated or third-party site, is directed through an address to the web page of the new system where the applicant registers with required credentials, upload resume, takes both aptitude and personality test, view results and logout. Afterward, the admin view resume scanned resume and test result, and schedule an audio-visual interview for qualified applicant, who will use already registered details to take the interview.

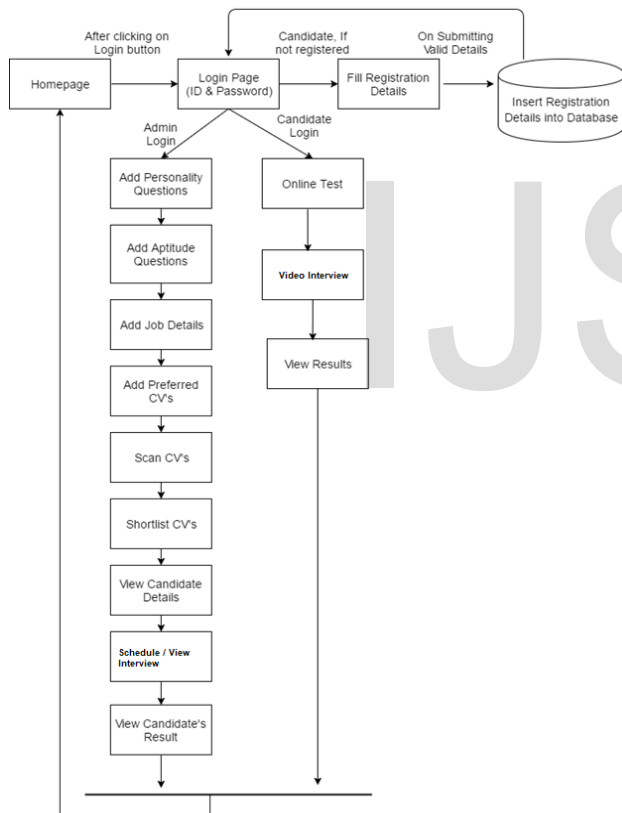
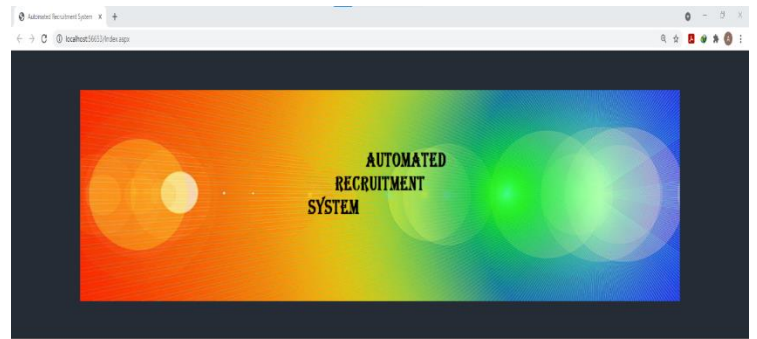


Fig. 3.15

RESULTS

The user module is in different stages. The first stage of the system is shown below, the user clicks the 'login page' link to register or login.



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This is a prototype of using a combination of curriculum vitae, aptitude test, personality test and audio-visual interview to assess an applicant in a recruitment process. The system required for applicant to successfully take the test is, an android, apple smart phone or laptop with webcam. Applicant should begin by creating an account on the platform before signing in with the account created

[Proceed to Login Page ?](#)



Fig. 4.1: Home page of the Automated Recruitment System

The login page is shown below. However, if the user is new, the create account section should be clicked to register. If the user forgets the password, the 'forgot password' section should be clicked to change the password.

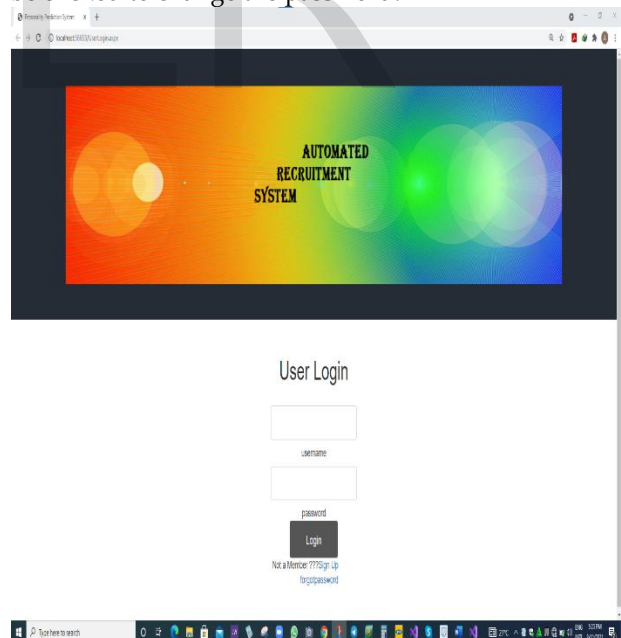


Fig 4.2: Login Page

The next stage in the application process is personal details. The user enters his/her details as shown below and proceeds to the next stage.

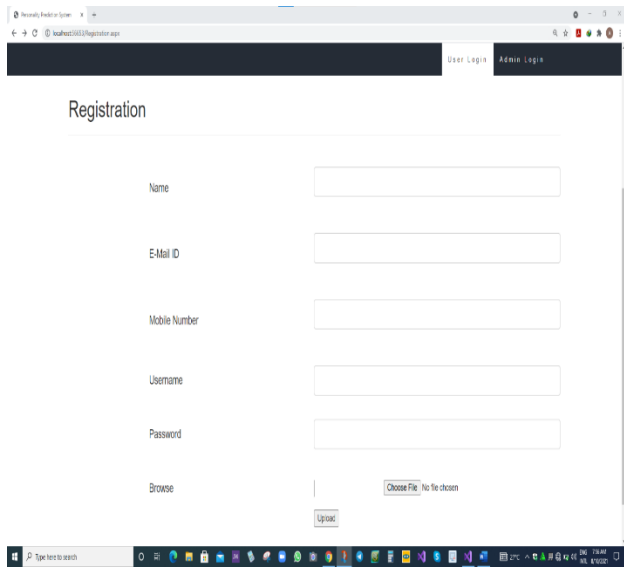


Fig 4.3: user registration Page

The user registers with required credentials, and when successful, login with username and password to take test.

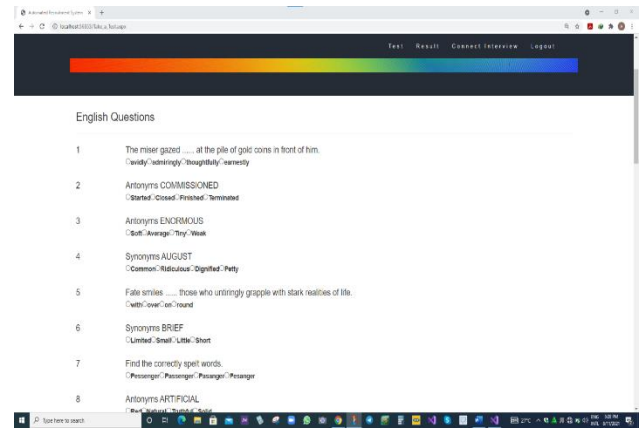


Fig 4.5: Aptitude Test Page

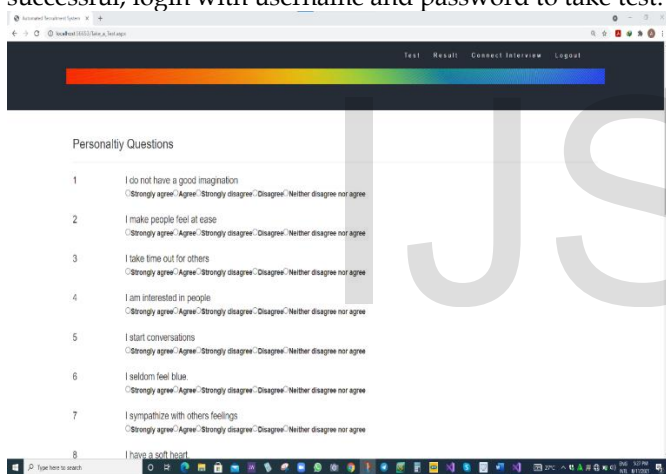


Fig 4.4: Personality Test Page

The personality test is followed by the aptitude test as shown below. For this system, only twenty-five aptitude questions were used to test the system. The user answers the aptitude questions and proceeds to the next stage.

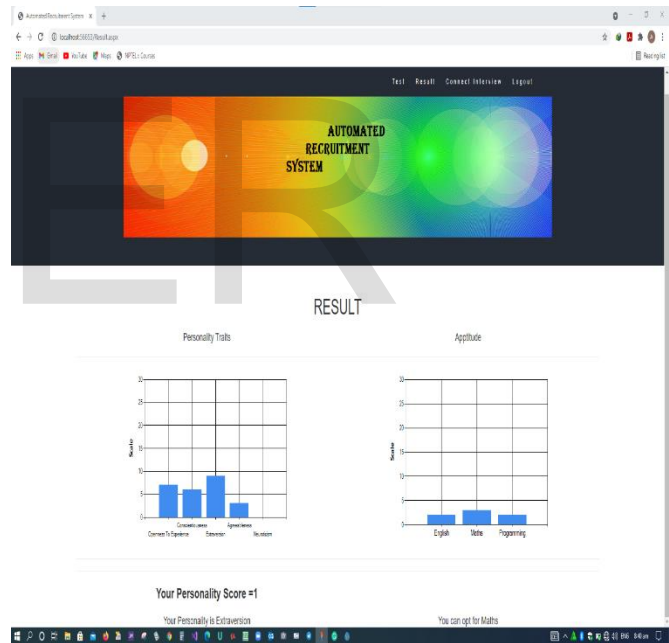


Fig 4.6: tests results

The user receives email alert after being shortlisted and proceeds to the audio-visual interview to take the interview.

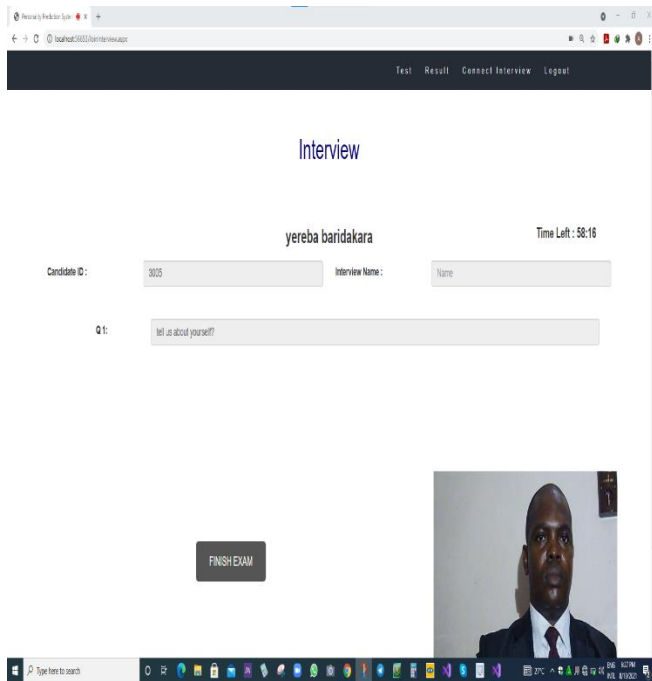


Fig 4.7: Online video Interview

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CONCLUSION

In this project, we have implemented an organization-oriented recruitment system that would assist the human resource department in shortlisting the right candidate for a specific job profile. The system would be used in many business sectors that will require expert candidates, thus reducing the workload on the human resource department.

The new system can help both employer and employee to do their job. It can help organizations going smoothly using technology. Organization can improve their management system from a traditional approach to a modern approach that is technology-based. In addition, an organization can take advantage of competition when their organization more advance.

This automated Recruitment system, application is based on Asp.Net with C#. The development of this System takes a lot of effort. we think this system gives us satisfaction. Though every task is never said to be perfect and, in this development, there is room for improvement. we learned many things and gained a lot of knowledge about the development field.

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