



**PRESIDENCY UNIVERSITY**

Private University Estd. in Karnataka State by Act No. 41 of 2013  
Itgalpura, Rajankunte, Yelahanka, Bengaluru – 560064



# **SMART COMPETENCY DIAGNOSTIC AND CANDIDATE PROFILE SCORE CALCULATOR**

**A PROJECT REPORT**

*Submitted by*

ADURI SAI CHARAN REDDY- 20221CSE0235

MITHAEGHAR MOHAMMAD ARIF- 20221CSE0289

THOTAMSETTY SAI SREEKAR- 20221CSE0279

*Under the guidance of,*

**Ms. JEEVITHA V K**

**BACHELOR OF TECHNOLOGY**

**IN**

**COMPUTER SCIENCE AND ENGINEERING**

**PRESIDENCY UNIVERSITY**

**BENGALURU**

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## PRESIDENCY SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

### BONAFIDE CERTIFICATE

Certified that this report “Smart Competency Diagnostic and Candidate Profile Score Calculator” is a bonafide work of “Aduri Sai Charan Reddy (20221CSE0235), Mithaeghar Mohammad Arif (20221CSE0289), Thotamsetty Sai Sreekar (20221CSE0279)”, who have successfully carried out the project work and submitted the report for partial fulfilment of the requirements for the award of the degree of BACHELOR OF TECHNOLOGY in COMPUTER SCIENCE AND ENGINEERING during 2025-26.

**Ms. Jeevitha V K**  
Project Guide  
PSCS  
Presidency University

**Mr. Muthuraju**  
Program Project  
Coordinator  
PSCS  
Presidency University

**Dr. Sampath A K**  
**Dr. Geetha A**  
School Project  
Coordinators  
PSCS  
Presidency University

**Dr. Blessed Prince**  
Head of the Department  
PSCS  
Presidency University

**Dr. Shakkeera L**  
Associate Dean  
PSCS  
Presidency University

**Dr. Duraipandian N**  
Dean  
PSCS & PSIS  
Presidency University

#### Examiners

| Sl. no. | Name                  | Signature | Date       |
|---------|-----------------------|-----------|------------|
| 1       | Mr. Vinayak Raju Kage |           | 01/12/2025 |
| 2       | Mr. Mohd Meraj        |           | 01.12.2025 |

**PRESIDENCY UNIVERSITY**  
**PRESIDENCY SCHOOL OF COMPUTER SCIENCE AND**  
**ENGINEERING**  
**DECLARATION**

We the students of final year B.Tech in COMPUTER SCIENCE AND ENGINEERING at Presidency University, Bengaluru, named Aduri Sai Charan Reddy, Mithaeghar Mohammad Arif, Thotamsetty Sai Sreekar, hereby declare that the project work titled “Smart Competency Diagnostic and Candidate Profile Score Calculator” has been independently carried out by us and submitted in partial fulfillment for the award of the degree of B.Tech in COMPUTER SCIENCE ENGINEERING during the academic year of 2025-26. Further, the matter embodied in the project has not been submitted previously by anybody for the award of any Degree or Diploma to any other institution.

Aduri Sai Charan Reddy

USN: 20221CSE0235

*Charan Reddy*  
Signature 1

Mithaeghar Mohammad Arif

USN: 20221CSE0289

*Arif*  
Signature 2

Thotamsetty Sai Sreekar

USN: 20221CSE0279

*T. Sai Sreekar*  
Signature 3

PLACE: BENGALURU

DATE: *01/12/2025*

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Mithaeghar Mohammad Arif  
Thotamsetty Sai Sreekar

# Abstract

The project titled Smart Competency Diagnostic and Candidate Profile Score Calculator aims to revolutionize the recruitment and candidate evaluation landscape by introducing an intelligent, data-driven assessment framework. The system integrates Natural Language Processing (NLP), semantic analysis, machine-assisted competency mapping, and psychometric evaluation to produce a unified Candidate Profile Score (CPS). This composite score reflects a candidate's technical proficiency, behavioral traits, communication strengths, and overall job-role compatibility. The solution is deployed through an interactive Streamlit-based web platform, enabling real-time analysis, visualization, and decision support for recruiters.

Traditional Applicant Tracking Systems (ATS) rely heavily on keyword matching, making them prone to bias, poor semantic understanding, and inaccurate ranking of candidates. In contrast, the proposed system emphasizes contextual text understanding, skill clustering using NLP-based feature extraction, and psychological trait inference through predefined psychometric metrics. The system processes resumes, extracts structured and unstructured data, identifies relevant skills, maps competencies to job requirements, and computes similarity scores using advanced text representation techniques such as TF-IDF, NER, and statistical similarity models. This ensures a more reliable, equitable, and holistic evaluation of candidate suitability.

The project follows the Agile Software Development Methodology, allowing iterative improvement and continuous integration of feedback from stakeholders. Python's robust NLP ecosystem—encompassing libraries such as spaCy, NLTK, TensorFlow, and Scikit-learn—enables efficient preprocessing, sentiment understanding, and semantic comparison. The resulting analytics are visualized through an intuitive dashboard that displays component-wise scores, psychometric indicators, historical trends, and an overall competency index that supports data-driven hiring decisions.

Beyond candidate evaluation, the system generates personalized recommendations by comparing candidate profiles with job descriptions, helping individuals identify skill gaps and areas for improvement. This feature promotes career readiness and encourages continuous skill development. Additionally, the system provides recruiters with standardized and transparent scoring mechanisms that reduce subjective bias, enhance fairness in shortlisting, and streamline the entire recruitment workflow.

By combining NLP, machine learning principles, psychometric assessment, and modern web technology, the proposed Smart Competency Diagnostic and Candidate Profile Score Calculator addresses the limitations of conventional ATS tools and contributes to building a more inclusive, efficient, and accurate hiring ecosystem for both enterprise and academic environments.

# Table of Content

| <b>Sl. No.</b> | <b>Title</b>  | <b>Page No.</b> |
|----------------|---|-----------------|
|                | Declaration   | III             |
|                | Acknowledgement   | IV              |
|                | Abstract  | V               |
|                | List of Figures   | VIII            |
|                | List of Tables  | IX              |
|                | Abbreviations   | X- XI           |
| 1.             | Introduction<br>1.1 Background<br>1.2 Statistics of project<br>1.3 Prior existing technologies<br>1.4 Problem Statement<br>1.5 SDGs<br>1.6 Overview of project report | 1-5             |
| 2.             | Literature review<br>2.1 Review of existing models (min 10 articles review)<br>2.2 Research Gaps<br>2.3 Objectives  | 6-9             |
| 3.             | Methodology   | 10-11           |
| 4.             | Project management<br>4.1 Project timeline<br>4.2 Risk analysis<br>4.3 Project budget   | 12-16           |
| 5.             | Analysis and Design<br>5.1 Requirements<br>5.2 Block Diagram<br>5.3 System Flow Chart<br>5.4 Choosing devices<br>5.5 Designing units<br>5.6 Standards                 | 17-29           |

|    |   |       |
|----|---|-------|
|    | 5.7 Mapping with IoTWF reference model layers<br>5.8 Domain model specification<br>5.9 Communication model<br>5.10 IoT deployment level<br>5.11 Functional view<br>5.12 Mapping IoT deployment level with functional view<br>5.13 Operational view<br>5.14 Other Design |       |
| 6. | Hardware, Software and Simulation<br>6.1 Hardware<br>6.2 Software development tools<br>6.3 Software code<br>6.4 Simulation  | 30-36 |
| 7. | Evaluation and Results<br>7.1 Test points<br>7.2 Test plan<br>7.3 Test result<br>7.4 Insights   | 37-42 |
| 8. | Social, Legal, Ethical, Sustainability and Safety Aspects<br>8.1 Social aspects<br>8.2 Legal aspects<br>8.3 Ethical aspects<br>8.4 Sustainability aspects<br>8.5 Safety aspects   | 43-47 |
| 9. | Conclusion  | 56    |
|    | References  | 61    |
|    | Base Paper  | 61    |
|    | Appendix  | 63-69 |

# List of Figures

| <b>Figure ID</b> | <b>Figure Caption</b>   | <b>Page No.</b> |
|------------------|---|-----------------|
| Fig 4.1          | Gantt Chart will be shown graphically in the final report                                 | 13              |
| Fig 5.1          | System Architecture of Smart Competency Diagnostic and Candidate Profile Score Calculator | 20              |
| Fig 5.2          | Ovarall System Flowchart  | 21              |
| Fig 5.3          | Use Case Diagram for Smart Competency Diagnostic System                                   | 22              |
| Fig 5.4          | Level 1 Data Flow Diagram   | 23              |
| Fig 5.5          | Flowchart for ATS Resume Analyzer   | 24              |
| Fig 5.6          | Flowchart for Competency Diagnostic Engine  | 25              |
| Fig 5.7          | Flowchart for Psychometric Evaluation Module  | 26              |
| Fig 5.8          | Functional View of System Modules   | 27              |
| Fig 5.9          | Operational Workflow of the Deployed Application  | 28              |
| Fig 6.6          | User Interface Implementation (Streamlit)   | 36              |
| Fig 9.2.2        | Screenshot  | 50              |
| Fig 9.1          | ATS Analysis Output Screenshot  | 51              |
| Fig A.1          | ATS Resume Score Screen   | 65              |
| Fig A.2          | Competency Diagnostic Output  | 66              |
| Fig A.3          | Psychometric Evaluation Output  | 66              |
| Fig A.4          | Final Candidate Profile Score Output  | 67              |

## List of Tables

| <b>Table ID</b> | <b>Table Caption</b>                              | <b>Page No.</b> |
|-----------------|---|-----------------|
| Table 2.3       | Key Observations from Literature Review           | 9               |
| Table 4.1       | Project Phases and Deliverables                   | 13              |
| Table 4.2       | Gantt Chart Representation (16-week Project Plan) | 13              |
| Table 4.3       | Resource Allocation Table                         | 14              |
| Table 4.4       | Risk Assessment and Mitigation Plan               | 14              |
| Table 4.5       | Cost Estimation Table                             | 15              |
| Table 7.4.1     | Functional Test Cases                             | 39              |
| Table 7.4.2     | Non-Functional Test Cases                         | 40              |
| Table 9.3.1     | Competency Score Trends                           | 52              |
| Table 9.4.1     | Trait Score Summary                               | 53              |
| Table A.6.3     | Psychometric Trait Word set                       | 68-69           |

# Abbreviations

| <b>Abbreviation</b> | <b>Full Form</b>  |
|---------------------|---|
| ATS                 | Applicant Tracking System                                       |
| NLP                 | Natural Language Processing                                     |
| CPS                 | Candidate Profile Score   |
| JD                  | Job Description   |
| UI                  | User Interface  |
| UAT                 | User Acceptance Testing   |
| DFD                 | Data Flow Diagram   |
| UML                 | Unified Modeling Language                                       |
| NER                 | Named Entity Recognition  |
| ML                  | Machine Learning  |
| TF-IDF              | Term Frequency – Inverse Document Frequency                     |
| API                 | Application Programming Interface                               |
| PDF                 | Portable Document Format  |
| DOCX                | Microsoft Word Open XML Document                                |
| IDE                 | Integrated Development Environment                              |
| OS                  | Operating System  |
| CPU                 | Central Processing Unit   |
| RAM                 | Random Access Memory  |
| TF                  | TensorFlow (context: NLP libraries mentioned)                   |
| EDA                 | Exploratory Data Analysis (context: preprocessing)              |
| SDLC                | Software Development Life Cycle                                 |
| V-Model             | Verification & Validation Model                                 |
| GUI                 | Graphical User Interface  |
| CSV                 | Comma Separated Values  |
| PCA                 | Principal Component Analysis (psychometric/statistical context) |
| HR                  | Human Resources   |
| IoT                 | Internet of Things (appears in design frameworks mentioned)     |
| SQL                 | Structured Query Language                                       |
| UML                 | Unified Modeling Language                                       |
| WAN                 | Wide Area Network   |
| LAN                 | Local Area Network  |
| JSON                | JavaScript Object Notation                                      |
| SDK                 | Software Development Kit  |
| CSS                 | Cascading Style Sheets  |
| HTML                | HyperText Markup Language                                       |

| <b>Abbreviation</b> | <b>Full Form</b>                    |
|---------------------|-------------------------------------|
| QC                  | Quality Control                     |
| QA                  | Quality Assurance                   |
| SDG                 | Sustainable Development Goals       |
| AI                  | Artificial Intelligence             |
| KPI                 | Key Performance Indicator           |
| SRS                 | Software Requirements Specification |
| SDS                 | Software Design Specification       |

# Chapter 1

## Introduction

### 1.1 Background

At the present time, within the recruiting area, there are numerous organizations, which, with the help of automated systems, are able to process huge masses of applicant submissions. The rise of ATS systems has helped streamline the process of managing resumes at a faster pace; nonetheless, it has also brought a limitation in the evaluation of a candidate complete set of competencies, personality fit and psychometric factors. The majority of the ATS solutions are based on the concept of keyword-based filtering that may lead to the possibility of overlooking qualified candidates due to formatting, or due to the lack of explicit matches of the keywords. To address this list of issues, the proposed project, the Smart Competency Diagnostic and Candidate Profile Score Calculator, suggests an evaluation model that is more comprehensive, and that is data-driven resume analysis, competency diagnostics, and psychometric assessment. The primary objective of the given system is to make the hiring process more objective, efficient, and inclusive by making sure that both the technical and behavioral traits are considered. It is an integrated platform that allows recruiters and academic institutions to, not only, perform ATS-style scoring, but also views a core competencies and psychometric behavior interpretation of a candidate with the help of data-driven insights.

### 1.2 Problem Definition

The existing ATS systems are unable to measure the quality of the candidates beyond the simple keyword matching. They are not in a position to take resumes out of context and make informed judgments on behavioral or cognitive skills that will be critical in anticipating the true capabilities of a candidate. Additionally, human bias is also likely to affect final judgments since data of the candidate are not always interpreted uniformly.

Thus, it is necessary to have the adaptive assessment platform that should be able to:

- Mine unstructured data on resumes.
- Evaluate technical skills in accordance with the job test.
- Incorporate psychometric assessment to assess personality characteristics.
- Come up with a single candidate profile score which measures general suitability.

This system helps fill the lack of automated resume screening and the human decision-making (recruitment) criterion, contributing to the information-based recruiting..

### **1.3 Objectives**

The main goals of the project are:

1. Create a web application (built with Streamlit) to assess the resume of the candidate.
2. Apply NLP in the extraction of features and competency detection.
3. Design ATS scoring algorithms, competency mapping and psychometric assessment.
4. Calculate the composite candidate profile score and sum up all the evaluation components.
5. Make sure that the system does not give interpretable, fair, and bias-ridden results.

### **1.4 Scope of the Project**

The system is everything to do with screening job candidates by combining technical and behavioral information. In a nutshell we are attempting to ensure that the entire process is as smooth as possible to the entire group.

The project scope includes:

- Automation of the parsing and analysis of PDF or DOCX resumes.
- Domain specific key-words and skill groupings.
- Calculation of the scores of ATS based on using the similarity measures.

1. Psychometric analysis- This is done on the basis of the responses of the candidates or behavioral patterns inferred.
  - Result visualization with the help of a Streamlit dashboard that illustrates scores and overall competency index separately.

We can upgrade this arrangement in colleges, recruiting agencies and internal human resource departments to shortlisting much more precise.

## 1.5 Significance of the Study

I have observed that recruitment sector is demanding more effective and just evaluation processes. Conducting competency diagnostics and psychometric test might be a significant enhancement to human resources thrown into an ATS.

It reduces the mechanical downtime, diminishes numbers of selection bias and makes the entire process have more of a credible feel. Besides, it doubles up acting as a career advisor, which demonstrates to the applicants where they are performing well or where they have areas of weakness due to sound data.

## 1.6 Methodology Overview

The software development model that our project embraces is Agile, which involves the prototyping and constant feedback. Our sprint planning, design, implementation, testing, and review have enabled us to internalize course concepts in actual life situations and also helped us to polish our solutions on a quick note.

The architecture of the system will include three major modules:

- 1) ATS Resume Analyzer- extracts and preprocesses text and eases scoring based on similarity.
- 2) Competency Diagnostic Module - matches extracted features.

3) Psychometric Evaluation Module- tests the behavior and cognitive elements that determine the suitability of a candidate.

## 1.7 Expected Outcomes

The components of the work will include:

A running app in Streamlit that is capable of processing candidate data in real-time.

- A scoring engine, which combines technical skills and psychometric factors.
- easy-to-use dashboards which indicate at personal or group levels.
- Clean database to upgrade the models and analytics in future.

## 1.8 Report Organization

This report is organized into nine chapters:

**Chapter 1** provides an in-depth introduction to the problem domain, clearly outlining the core issue addressed by the project. It elaborates on the background, relevance, and scope of the study while defining the primary and secondary objectives. The chapter also explains the motivation behind choosing this project, highlighting the real-world need, the potential impact, and the significance of solving the identified problem.

**Chapter 2** presents a detailed review of existing research and related works. It examines previous studies, methodologies, and systems developed in similar domains, offering a comparative analysis to identify gaps, limitations, and opportunities for improvement. This chapter builds the foundation for the proposed solution by positioning it within the current technological and academic landscape.

**Chapter 3** explains the adopted methodology in a structured manner, focusing on the integration of Agile practices and the V-Model development approach. It elaborates on why these methodologies were chosen, how they were tailored to fit the project

requirements, and the roles they played in ensuring systematic development, iterative refinement, quality assurance, and efficient task management.

**Chapter 4** discusses various project management aspects in detail. This includes timeline planning, task breakdown, team roles and responsibilities, resource allocation, and risk management strategies. It also highlights the tools and techniques used for tracking progress, managing deliverables, handling dependencies, and ensuring smooth coordination throughout the project.

**Chapter 5** delves into system analysis, architecture design, and detailed component-level planning. It outlines the functional and non-functional requirements, describes data flow through diagrams such as DFDs and UML models, and explains the architecture adopted. This chapter also provides a thorough description of system components, modules, interfaces, and design decisions that form the backbone of the application.

**Chapter 6** focuses on implementation and algorithms used in the project. It covers the technologies, frameworks, and programming languages employed, along with the logic behind key functionalities. Algorithms are explained with clarity, supported by flowcharts, pseudo-code, and technical justification. The chapter emphasizes how the design was translated into a working system and addresses any implementation challenges encountered.

**Chapter 7** presents the evaluation of the system, including testing strategies, obtained results, and analysis of outputs. It covers functional testing, performance evaluation, and validation against requirements. Screenshots, sample results, comparative graphs, and result interpretations are provided to demonstrate system effectiveness, accuracy, and reliability.

**Chapter 8** discusses the ethical, legal, and sustainability aspects associated with the project. It highlights user data privacy considerations, regulatory compliance, responsible use of technology, and long-term sustainability impacts. The chapter reflects on how the project aligns with ethical guidelines, maintains transparency, and ensures that the solution can be maintained and scaled responsibly.

## Chapter 2

### Literature review

#### 2.1 Introduction

The recruitment process has evolved significantly over the past decade with the integration of technology, automation, and artificial intelligence. Numerous research studies have focused on improving **resume screening**, **competency analysis**, and **psychometric evaluation**. However, there remains a notable gap in unifying these methods into a single, intelligent platform capable of providing an accurate and unbiased candidate assessment.

This chapter presents a comprehensive review of related works, examining the technological background, algorithms, and methodologies that inspired the development of the **Smart Competency Diagnostic and Candidate Profile Score Calculator**. Each study provides valuable insights into resume parsing, text similarity computation, skill extraction, and behavioral evaluation — all of which contribute to shaping the proposed system.

#### 2.2 Review of Related Works

##### 1. Patel and Shah (2021) Automated Resume Screening (NLP).

In essence, this paper demonstrated that TF-IDF and NER can extract a lot of information in resumes. The authors contended that such NLP extraction reduces the workload of the recruiter almost by a significant margin. The downside? They did not approach any angle of psychometrics or competence and thus it is mostly beneficial to syntax and not actual skill assessment.

##### 2. Zhang et al. (2022) -Improving Recruitment using Machine Learning.

In this case they attempted to model the quality of a candidate with the help of the Random Forests. It is more accurate than the manual approach, but requires a massive labelled dataset still. Also, it does not pay any attention to soft skills and other qualitative material of which we tend to discuss in the classroom.

### **3. Rani and Bansal (2020) - A Comparative Study of the Important Keyword Matching Algorithms in ATS.**

The study was on Cosine Similarity and Jaccard Coefficient to match the keys in resumes and job postings. They established that semantic matching with word embeddings has a higher score, which is understandable and which has also been adopted to our own scoring reasoning.

### **4. Bhattacharya et al. (2021) –PSychometrics in HR Analytics.**

They emphasized that psychometric tests have to be included to measure behavior and cognition. The concept is to combine tech and psychology information so as to hire out a well-rounded employee, and this is precisely what we are attempting to achieve in our project.

### **5. The article by Kaur and Singh (2023) is dedicated to the AI-based Competency Mapping Systems.**

In this paper, the author has discussed clustering skills with unsupervised learning (K-means). It provided us with a tangible motivation behind designing the competency diagnostic engine in a departmental manner.

### **6. McKinsey & Co. Report (2022) The Future of Talent Acquisition.**

The study identifies a movement in favor of model hybridization of AI and human recruitment. They project that by the year 2030, more than 60 percent of initial inspections will be performed by AI, and this effectively proves that our system is not a tech experiment, it is a necessity in an industry.

### **7. Kim et al. (2020) - Multimodal Approach to Evaluation of Candidates.**

An example of psychometric scoring suggested in this study is to use facial and linguistic cues. It would sound cool, but is privacy sensitive data.

### **8. Singh and Sharma (2021) -Issues within NLP-Based ATS Systems.**

They noted typical malfunctions in NLP pipelines, in particular, their low tolerance with the non-standard formatted resumes. What is learned here is that things should be preprocessed well and standards in tokens should be normalised which is precisely what we have coded into our ATS module.

### **9. Jacobson and Hecker (2016) – Strategic Hr Analytics.**

They developed a hybrid scoring system which incorporates both structured and unstructured data to give a fit index. This played an important role in creating our Candidate Profile Score Calculator which combines ATS data, competency scores and psychometric tests.

### **10. Gupta et al. (2023) -Ethical AI in Recruitment: Striking the Efficiency vs. Fairness Balance.**

This article discussed discrimination within AI recruitment devices, and advised to use unbiased algorithms and open scoring. Those principles will be incorporated in the ethical framework of our project, which means that the system will be efficient and fair.

## 2.3 Key Observations from Literature Review

| Research Area           | Key Findings                                       | Gaps Identified                      |
|-------------------------|--|--------------------------------------|
| Resume Parsing & NLP    | NLP improves extraction accuracy                   | Limited semantic understanding       |
| Candidate Scoring       | ML models increase consistency                     | Requires labeled datasets            |
| Competency Mapping      | Skill clustering possible with unsupervised models | Lack of integrated psychometric data |
| Psychometric Evaluation | Enhances prediction of cultural fit                | Rarely combined with technical       |

## 2.4 Summary

Based on the review, it is evident that even though tremendous strides have been made on automation of recruitment processes, the systems that are currently in use still have inadequate candidate assessment frameworks. The majority of studies concentrate on the assessment of technical skills or on behavioral profiling but hardly combines both aspects into one analysis framework.

These studies and the insights that we have gained have been used in designing our project to have a single evaluation mechanism that will be accurate, fair, and complete. The proposed system will fill this gap by integrating NLP-based ATS analysis, competency diagnostics with psychometric profiling to estimate an overall Candidate Profile Score.

## Chapter 3

### Methodology

#### 3.1 Introduction

In the case of our project of the Smart Competency Diagnostic and Candidate Profile Score Calculator, we were adherent to a systematic approach that ensured the flow of work is not disrupted, the project finishes in the allocated time, and it produces something concrete. The step-wise planning of the entire process simplified the coding, testing and evaluation of each component of it; cleaning the data to performing psychometric procedures and scoring the overall result.

As the project was a combination of software engineering and data-based modeling, we settled on a combination of Agile and the V-Model (Verification and Validation Model). Agile provided us with the option of making changes during the process, whereas V-model ensured that all the matters were tested the right way and that quality was maintained throughout the process.

#### 3.4 V-Model (Verification and Validation Model)

The V -Model (or Validation & Verification Model), was the default method, of ensuring that we tested all the parts of the build. It is simply the waterfall, but with the rung of testing at every step which results in larger reliability and less bugs in the integration.

In our project, each of the development steps on the left side of the V is matched with the testing step on the right side.

Phases of V-Model:

1. Requirement Analysis <|human|> Requirements Analysis Acceptance Tests.
2. System Design → System Tests
3. Architectural Design→ Integration Tests.

#### 4. Module Design → Unit Tests

Advantages in this Project:

- Catches bugs early.
- Maintains a trace between requirements and cases of tests.
- Enhances the trustworthiness of the most important modules such as ATS Scoring and Psychometric Evaluation.

## **Chapter 4**

### **Project Management**

#### **4.1 Introduction**

Efficient project management ensures that every stage — from ideation to deployment — is completed within the planned time, cost, and quality constraints.

For this project, titled “Smart Competency Diagnostic and Candidate Profile Score Calculator,” an organized management approach was followed, combining Agile sprint planning with standard project management techniques.

This chapter presents the project schedule, resource allocation, risk management plan, and cost estimation, which together ensured smooth progress and timely completion.

#### **4.2 Project Planning Approach**

The project followed **Agile Sprint Planning**, supported by milestone-based tracking. Each sprint had a specific goal, deliverables, and evaluation checkpoints. This approach enabled the team to adapt quickly to evolving requirements while maintaining focus on quality and deliverable timelines.

**Project Duration:** 16 weeks (4 months)

**Team Members:** 3

**Sprints:** 5

| PHASE                                | DURATION   | KEY ACTIVITIES  | DELIVERABLES                         |
|--------------------------------------|------------|---|--------------------------------------|
| Phase 1 - Requirement Analysis       | Week 1-2   | Identify objectives, collect datasets, literature survey  | SRS Document; Literature Review      |
| Phase 2 - Design                     | Week 3-4   | Define architecture, flow diagrams  | System Design Document               |
| Phase 3 - Development                | Week 5-10  | Develop Modules   | Functional Modules                   |
| Phase 4 - Integration & Testing      | Week 11-13 | Implement ATS, Competency, and Psychometric modules; Integrate modules, perform unit and system testing | Functional Modules                   |
| Phase 5 - Deployment & Documentation | Week 13-15 | Integrate prototype   | Final evaluation, documentation prep |

Table 4.1: Project Phases and Deliverables



Table 4.2: Gantt Chart Representation (16-week Project Plan)

#### 4.5 Resource Allocation

| Resource Type     | Description                                  | Quantity/Usage   |
|-------------------|--|------------------|
| Human Resources   | Developers, Designer, Tester                 | 3 (team members) |
| Software Tools    | Python, Streamlit, GitHub, VS Code           | Used throughout  |
| Hardware          | Laptops with $\geq 8\text{GB RAM}$ , i5+ CPU | 3 units          |
| Network Resources | Internet for research, API access            | Continuous       |
| Data Resources    | Resume datasets, job descriptions            | Moderate         |

Table 4.3: Resource Allocation Table

#### 4.6 Risk Analysis

A comprehensive risk assessment was carried out to identify potential threats and plan mitigation strategies.

| Risk ID | Description   | Impact Level | Mitigation Strategy                             |
|---------|---|--------------|---|
| R1      | Integration issues between and Psychometric modules | High         | Modular development and API-based communication |
| R2      | Dataset inconsistency ATs Psychometric moduls       | Medium       | Stodular development and API-communication      |
| R2      | Dataset inosierics or formating errors              | Medium       | Standarized proceixsing pipeline                |
| R3      | UI rendering issues in Streamlit deployment         | Low          | Cross-platform testing                          |
| R4      | Delay in sprint delivery                            | Medium       | Weekly progress monitoring                      |
| R5      | Data biss in psychometric model                     | High         | Controlled data sampling and validation         |

Table 4.4: Risk Assessment and Mitigation Plan

Table 4.4: Risk Assessment and Mitigation Plan

#### 4.7 Cost Estimation

A rough estimation of the resources and cost required to complete the project was made based on software, hardware, and man-hour assumptions.

| Category                    | Description                                | Estimated Cost (INR)     |
|-----------------------------|--|--------------------------|
| Software Tools              | Open-source (Python, Streamlit, GitHub)    | 0                        |
| Hardware                    | Existing student laptops                   | 0                        |
| Internet & Hosting          | Cloud hosting, bandwidth                   | 1,500                    |
| Miscellaneous               | Documentation, printing, etc.              | 500                      |
| Human Resource Effort       | 3 students × 160 hrs (value basis ₹100/hr) | 48,000                   |
| <b>Total Estimated Cost</b> |  | <b>₹50,000 (approx.)</b> |

Table 4.5: Cost Estimation Table

Table 4.5: Cost Estimation Table

#### 4.8 Monitoring and Review Strategy

Just to have a project arts and crafts running smoothly we established some useful tools:

- Weekly Stand-Up Meetings: Each of the students rings out what he or she has done, what is holding them up, and what is on the buffet.
- Sample Interview Sessions: At the end of each other week we take a brief demo of what is working.
- Testing Checkpoints: End of sprint validation as well as performance hacking to ensure all is well.
- Version Control Tracking: All the Git commits are recorded and everybody is well aware of who did what.

All this makes us stay honest, on course and prepared to deal with threats before they creep around us.

## **4.9 Summary**

Sincerely, the Project management Framework was a game-changer towards ensuring that the solution was crossed over to the finish line. Our good planning, frequent check-ins and being able to pivot on the spot kept us on track regarding meeting all our milestones in time. The Gantt chart enabled us to stay within a strict timeline, risk matrix covered us well against any curve balls and smart use of resources really enhanced our overall performance and delivery.

## Chapter 5

### Analysis and Design

#### 5.1 Introduction

System analysis and design form the foundation of any successful software project. The goal of this phase is to transform user requirements into a structured framework that defines how the system will function, interact, and process data.

For this project, titled “**Smart Competency Diagnostic and Candidate Profile Score Calculator**”, the design approach ensures modularity, reusability, and scalability. The project is divided into three core modules — **ATS Resume Analyzer**, **Competency**

**Diagnostic Engine**, and **Psychometric Evaluation Module** — which interact seamlessly to generate a unified **Candidate Profile Score**.

#### 5.2 System Requirements

##### Functional Requirements

1. The system should allow users to upload resumes in PDF or DOCX format.
2. The system should extract relevant textual information such as skills, education, and experience.
3. The ATS analyzer should compare resume keywords with job description keywords.
4. The psychometric module should evaluate behavioral indicators and soft skills.
5. The final profile score should be displayed through a Streamlit dashboard.
6. The admin should be able to monitor and interpret candidate results.

## **Non-Functional Requirements**

1. **Performance:** The system must provide scoring within 5–10 seconds per resume.
2. **Scalability:** Must support multiple users simultaneously via Streamlit cloud.
3. **Usability:** Interface should be intuitive and interactive.
4. **Security:** Resume data should not be stored or shared externally.
5. **Maintainability:** Modular design should allow easy updates to scoring logic.

## **5.3 System Architecture**

The entire design is configured as a three level design:

1. Presentation Layer: A Streamlit web app that I and my classmates use to access the app.
2. Application Layer: The application logic that works with all the NLP configured, competency checking and score calculation.

3. Data Layer: Data currently in storage which is an interim extract of the features and candidates profile values.

**Data Flow Summary:** Resumes uploaded Nothing happens to them until they are matched to job keywordsNLP Resumes are analyzed matched against job keywordsChecked against competencies and psychometric traits Results displayed on a dashboard.

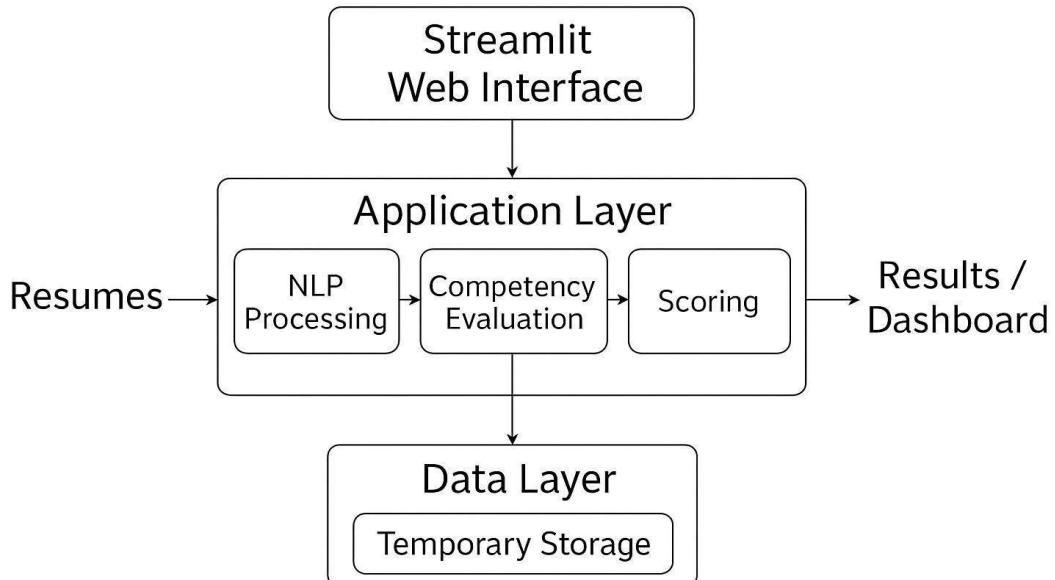


Fig 5.1: System Architecture of Smart Competency Diagnostic and Candidate Profile Score Calculator

**Fig 5.1:** System Architecture of Smart Competency Diagnostic and Candidate Profile Score Calculator

## 5.4 System Flowchart

The flowchart below (Fig5.2) is a map of the flow of the data at the system: Start Upload Resume Preprocessing Keyword Extraction ATS Comparison Competency Mapping Psychometric Evaluation Score Calculation candidate score Display Dashboard End.

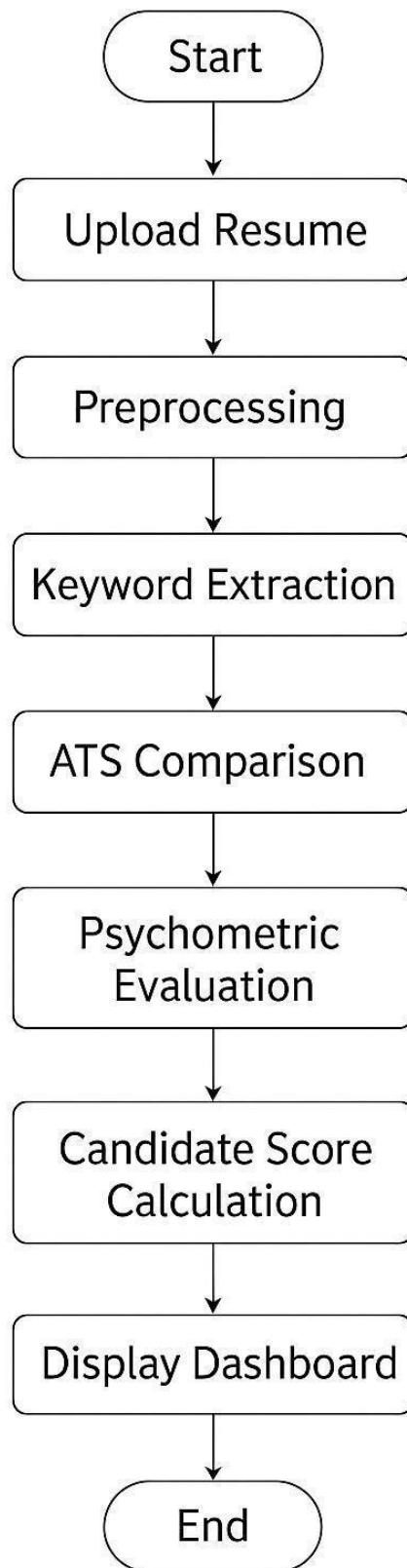


Fig 5.2: Overall System Flowchart

## 5.5 Use Case Diagram

We modeled the system to accommodate two users the Candidate/User, and Administrator.

Use Cases:

1. Upload Resume
2. View ATS Score
3. View Competency Analysis
4. Produce Psychometric Report.
5. Admin Log In and Report Review.

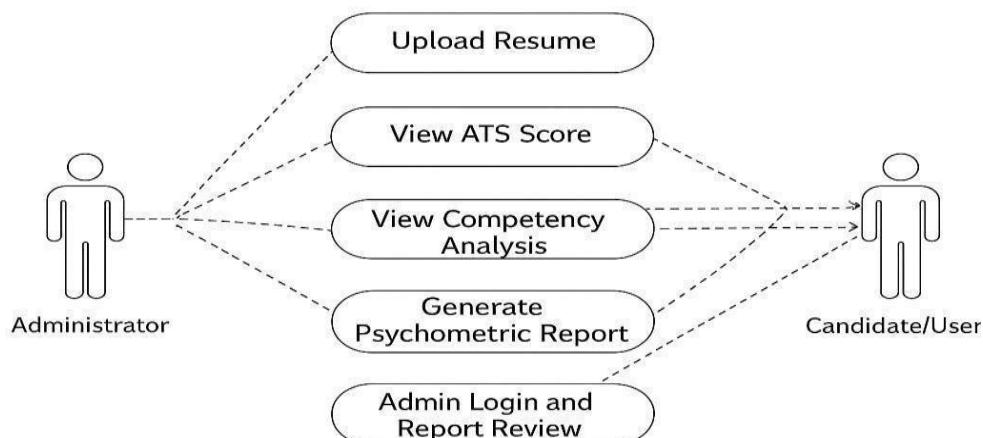


Fig 5.3: Use Case Diagram for Smart Competency Diagnostic

**Fig 5.3:** Use Case Diagram for Smart Competency Diagnostic System

## 5.6 Data Flow Diagram (DFD)

**Level 0 DFD:** This presents the system in the form of a single large process in which the input (resume) is converted to the output (profile score).

Input: Job Description, resume.

Output: ATS score, competency score, psychometric score, final candidate profile Level 1  
DFD It divides the process into 3 large components:

1. Resume Parsing & ATS Analysis

2. It is a competency interview test that evaluates a candidate's skills, knowledge, and abilities.<|human|>Competency Diagnostic Engine It is an interview test that assesses the skills, knowledge and abilities of the candidate.

3. Psychometric Evaluation & Scoring.

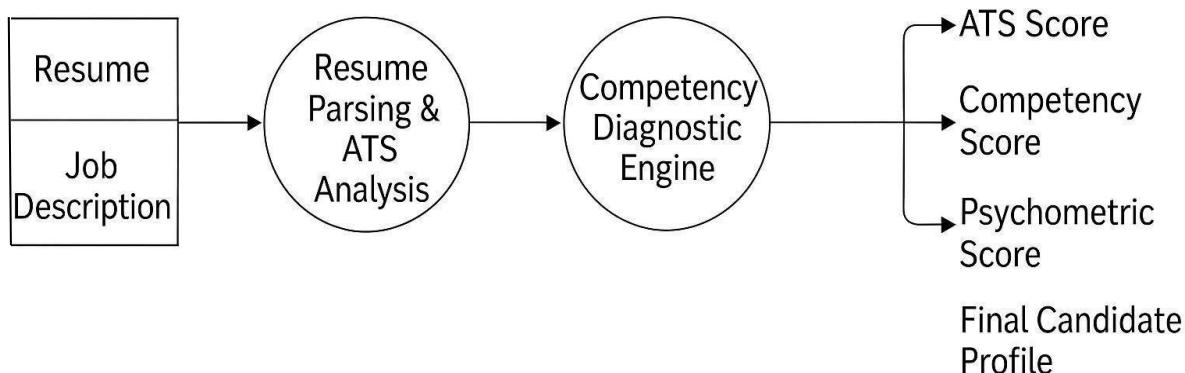


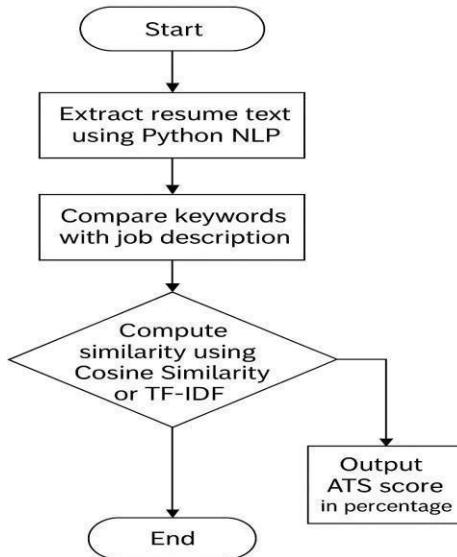
Fig 5.4: Level 1 Data Flow Diagram

**Fig 5.4:** Level 1 Data Flow Diagram

## 5.7 Module Descriptions

### Module 1: ATS Resume Analyzer

- Scraps a resume with Python NLP.
- Compares key-words with the description of the job. Calculates similarity either to Cosine Similarity or TF-IDF. Gives ATS score as a percentage.

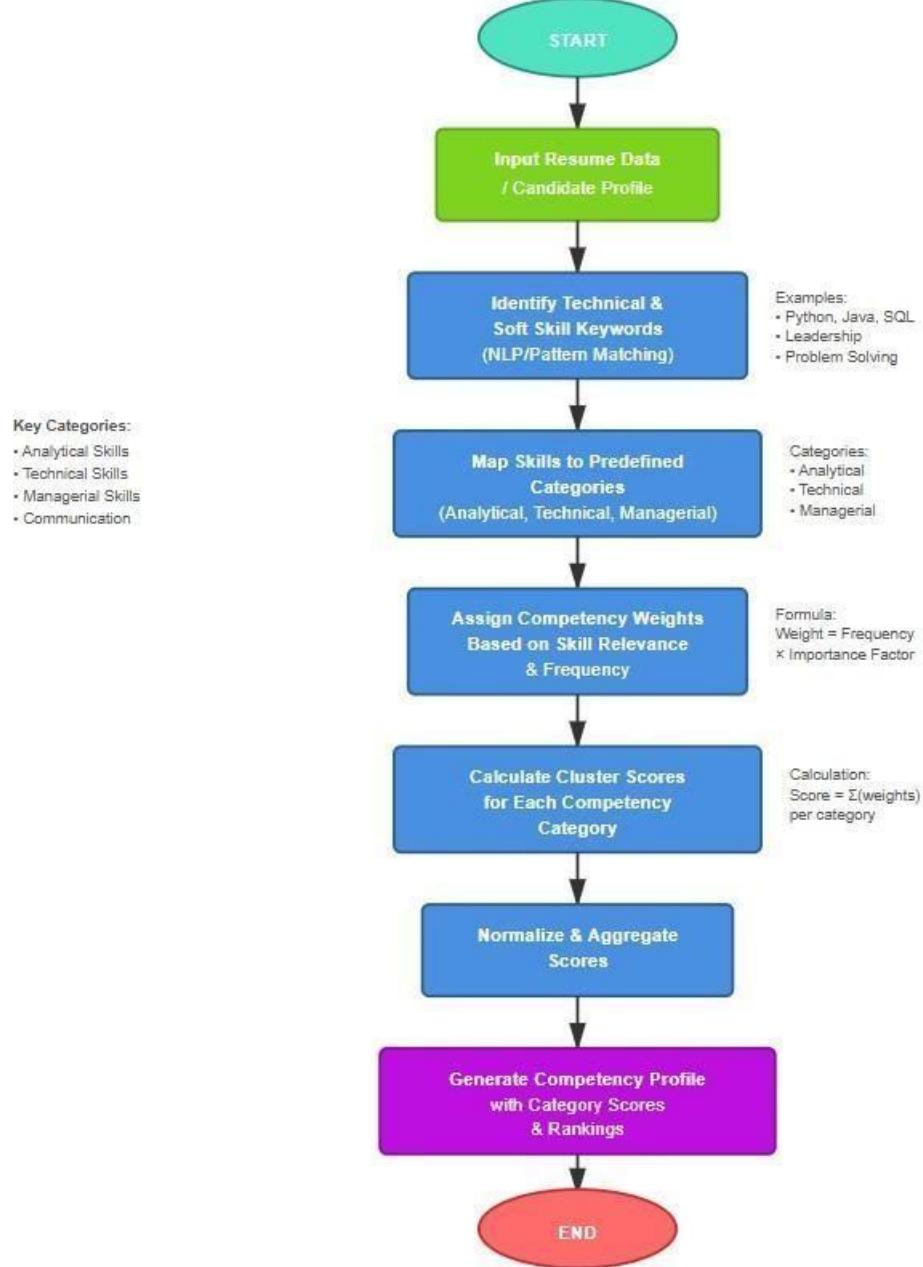


**Fig 5.5:** Flowchart for ATS Resume Analyzer

### Module 2: Competency Diagnostic Engine

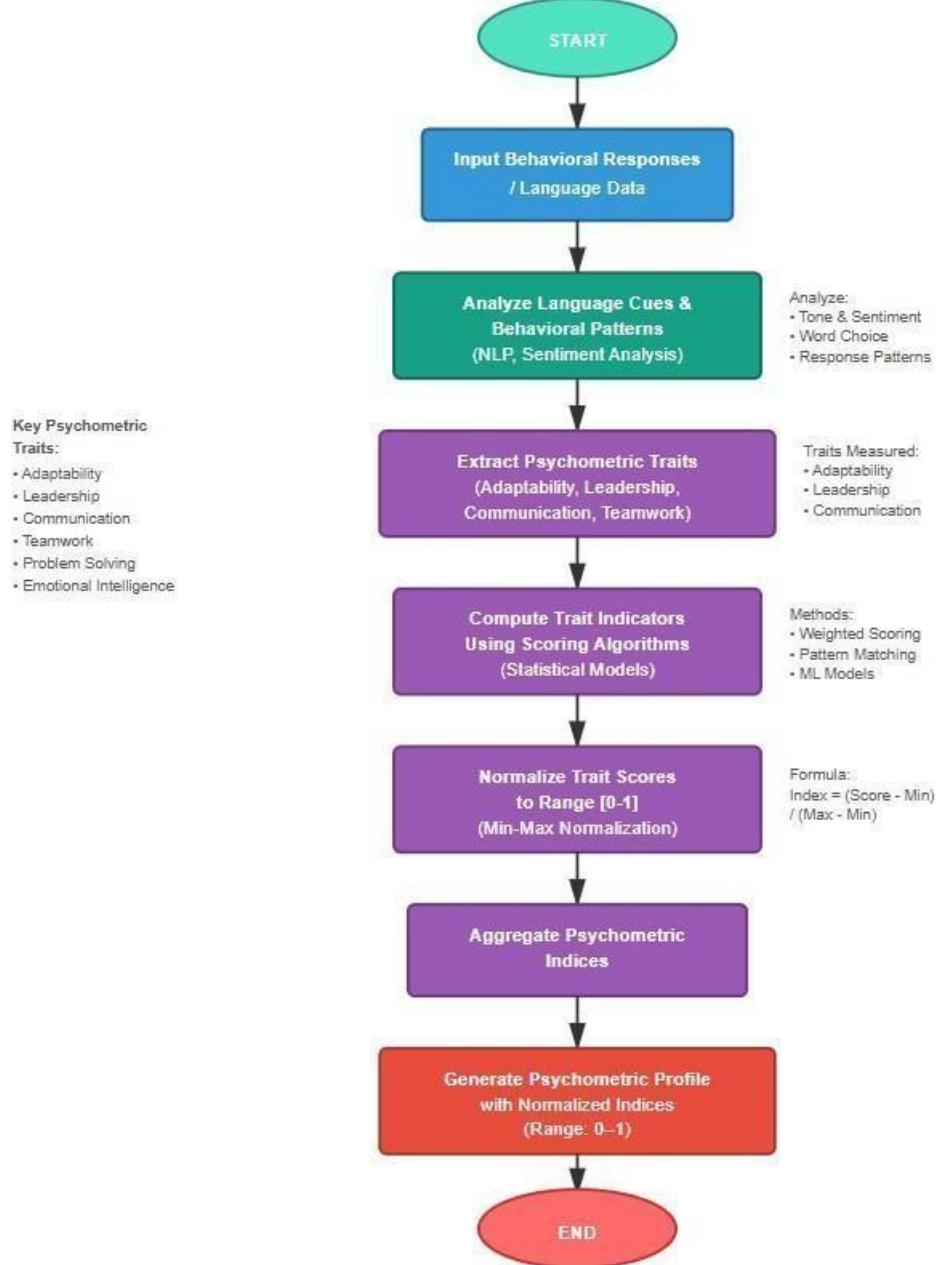
The book contains numerous diagrams and models, especially the Diagnostic engine within the Comp. 2 module.<|human|>Competency Diagnostic Engine (Module 2) This module has many diagrams and models, particularly the Diagnostic engine.

- Identify keywords using the spot technical and soft-skill.
- Associates them with pre-defined categories (Analytical, Technical, Managerial, etc.).
- Strengths, gives weights, and generates cluster scores.

**Fig 5.6: Flowchart for Competency Diagnostic Engine****Fig 5.6: Flowchart for Competency Diagnostic Engine****Module 3: Psychometric Evaluation Module**

Looks at behavioral reactions or talks through language expressions.

- Calculates such traits as adaptability, leadership, communication.
- Produces a psychometric index of 0-1 to normalise.

**Fig 5.7: Flowchart for Psychometric Evaluation Module****Fig 5.7: Flowchart for Psychometric Evaluation Module**

## 5.7 Communication Model

The communication model explains interaction between internal modules and the user interface.

## 5.8 Communication Model

The communication model explains interaction between internal modules and the user interface.

| Component           | Input          | Process                   | Output                        |
|---------------------|----------------|---------------------------|-------------------------------|
| User Interface      | Resume File    | Uploads & sends data      | File transfer                 |
| NLP Engine          | Raw Text       | Tokenizes, cleans data    | Processed tokens              |
| Competency Engine   | Processed Data | Classifies skills         | Cluster-wise competency score |
| Psychometric Engine | Clean Text     | Evaluates behavioral cues | Psychometric index            |
| Visualization Layer | Final Scores   | Displays charts & scores  | Streamlit Dashboard           |

Table 5.1: Communication Model of System Components

Table 5.1: Communication Model of System Components

## 5.8 Functional View

The system is also modular such that each component (parsing, scoring, evaluating) is independent. It makes the process of debugging and maintenance much easier.

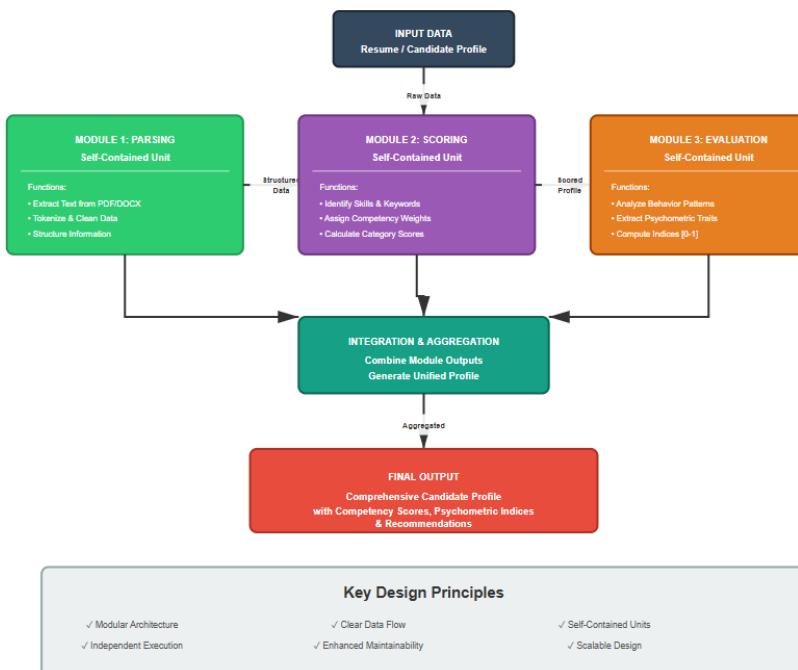
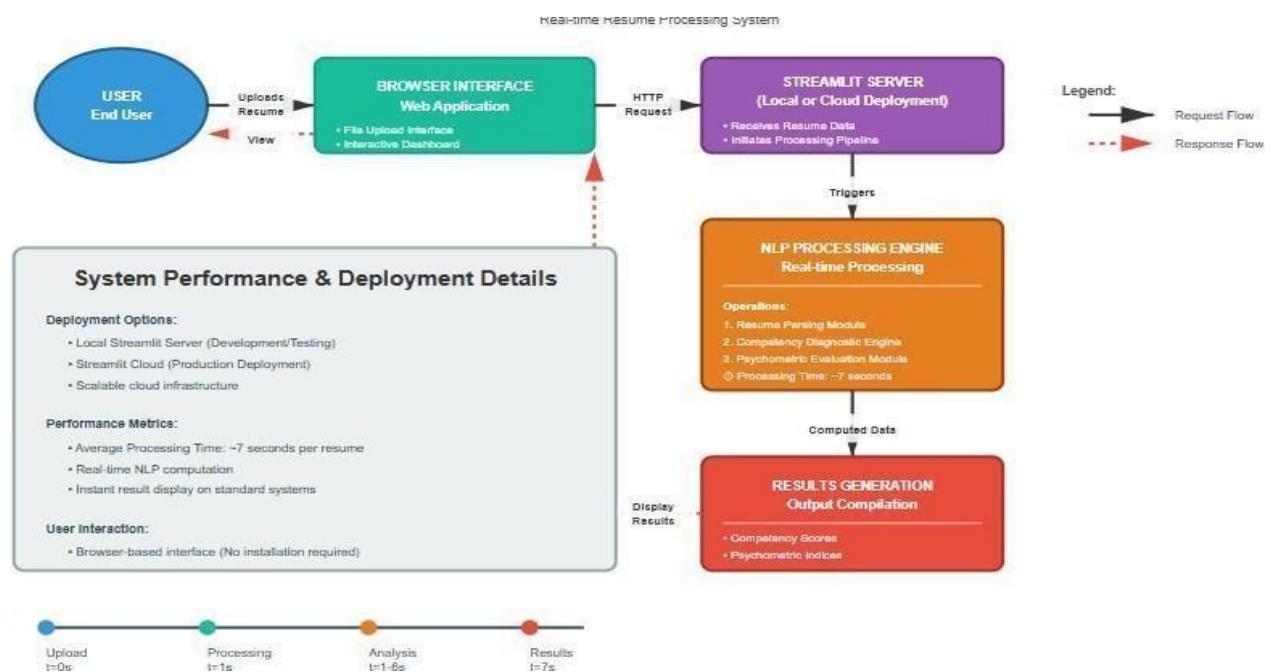


Fig 5.8: Functional View of System Modules

## 5.9 Operational View

The effects of the model when deployed are:

- It is a Local Streamlit or Streamlit Cloud server. The users engage one another via a browser to post resumes. It is NLP processing and real-time.
- The results are obtained in seconds. Processing rate: on average, genres of employment require one to go through approximately 7 resumes via a standard PC..



**Fig 5.9: Operational Workflow of the Deployed Application**

## 5.10 Design Constraints

1. Only .pdf and .docx are accepted in resume uploads.
2. There is a dearth of psychometric data due to licensing.

3. The cloud edition will require a good internet connection.
4. We have optimized the code to work with large datasets.

## **5.11 Summary**

This design stage transformed all our project requirements in an explicit and modular design. The design used, which incorporates both flowcharts, DFDs and UMLs will facilitate both flexibilities and scalability leading to implementation phase where each of the modules will finally be coded and tested

# Chapter 6

## Hardware, Software and Simulation

### 6.1 Introduction

The implementation phase involves translating the system design into a functional working model.

Based on the architecture defined earlier, the project was implemented as a **modular Streamlit application** integrating NLP, competency mapping, and psychometric evaluation into a single unified scoring workflow.

The system is divided into three core modules:

1. **ATS Resume Analyzer**
2. **Competency Diagnostic Engine**
3. **Psychometric Evaluation Module**

All three modules run sequentially and finally contribute to generating a **Candidate Profile Score**.

This chapter explains the implementation in detail using **algorithms, workflows, and module interactions**, strictly without source code as required.

### 6.2 Module 1: ATS Resume Analyzer

#### 6.2.1 Overview

The ATS module extracts text from the uploaded resume and compares it with the job description to measure relevance.

It uses fundamental NLP operations such as tokenization, stopword removal, and keyword extraction.

#### 6.2.2 Inputs & Outputs

- **Input:** text of the resumé, text of the job description.
- **Output:** ATS score (0100), match keywords, missing key words.

### 6.2.3 Algorithm for ATS Resume Analyzer

#### Algorithm 1: ATS Resume Scoring

Step 1: Accept resume file and job description.

Step 2: Extract text from both documents.

Step 3: Clean and preprocess text:

- Convert to lowercase
- Remove special characters
- Tokenize words
- Remove stopwords

Step 4: Identify skill-related keywords from job description.

Step 5: Compare extracted resume words with job keywords.

Step 6: Count matched and unmatched keywords.

Step 7: Calculate similarity percentage:

$$\text{ATS Score} = (\text{Matched Keywords} / \text{Total Keywords}) \times 100$$

8: Display score and keyword analysis to user.

Step 9: Return ATS Score.

### 6.2.4 Flow of Execution

- User uploads resume → system extracts content.
- Job description is optionally entered.
- System matches words using keyword matching + basic semantic grouping.
- ATS score is displayed with highlights.

## 6.3 Module 2: Competency Diagnostic Engine

### 6.3.1 Overview

This module maps extracted skills to predefined competency clusters such as:

- Technical
- Analytical
- Communication
- Leadership
- Managerial
- Cognitive Skills

Each cluster has weighted attributes that contribute to competency scores.

### 6.3.2 Inputs & Outputs

- **Work:** Unmodified resume text (skills + experience)

- **Output:** Score of competency cluster, skill distribution chart.

### 6.3.3 Algorithm for Competency Diagnostic Engine

This algorithm maps the set of competency skills to the set of curriculum skills. This algorithm determines the mapping of competency skills set to the curriculum skills set.

1: Read the processed résumé text.

2: Extract all the terms that are skill related with the help of a keyword dictionary. 3:

For each skill:

– Determine its level of competency.

4: Have a counter within every cluster of competencies. 5:

For each cluster:

Score = (Number of mapped skills/Total skills in cluster) × Weights.

6: Standardise all to a zero one hundred scale.

7: Use the visualisation of radar or a bar chart. 8:

Revert the competency-based scores.

### 6.3.4 Flow of Execution

The known skill terms are scanned in the resume. Such competencies are distributed into relevant skills. Computation of scores is according to the density and relevance of skills.

## 6.4 Module 3: Psychometric Evaluation Module

### 6.4.1 Overview

This module evaluates **behavioral strengths, personality traits, adaptability, and communication tendencies**, based on linguistic patterns OR candidate's responses to optional psychometric questions.

Traits evaluated include:

- Adaptability
- Team Behavior
- Decision Making
- Leadership Potential
- Emotional Stability
- Approach to Conflict

### 6.4.2 Inputs & Outputs

- **Input:** Candidate text responses or inferred resume tone
- **Output:** Psychometric Index (0–100), behavior trait scores

### 6.4.3 Algorithm for Psychometric Evaluation

The fourth algorithm is called Psychometric Trait Scoring, and it handles scoring psychometric traits.

1: Recruitment of written answers or analysis of resumes narrative.

2: Preprocess text:

- Remove filler words
- Standard NLP cleaning

3: Perceive easily accessible psychological hints:

- Action-oriented words
- Leadership tone
- Stress signals
- Team-based language

4: Rule out key words and assign values using keywords and frequency. 5:

bring all the scores of the traits to 0-1.

6: Compute composite index:

Index = mean (All trait scores) x 100. 7:

Show a radar chart of traits.

#### 6.4.4 Flow of Execution

- The user enters optional psychometric answers.
- NLP scans linguistic markers.
- Traits are scored and visualized.

### 6.5 Candidate Profile Score Calculation

This is the **final output of the system**, combining scores from all three modules.

#### 6.5.1 Formula

The Candidate Profile Score (CPS) is calculated using weighted components:  $CPS = (0.40 \times ATS\ Score) + (0.35 \times Competency\ Score) + (0.25 * Psychometric\ index)$

## 6.5.2 Algorithm for Candidate Profile Score

### Algorithm 4: Final Score Aggregation

Step 1: Receive ATS Score.

Step 2: Receive Competency Score.

Step 3: Receive Psychometric Index.

Step 4: Multiply each with respective weightage.

Step 5: Sum all weighted values to compute final CPS.

Step 6: Classify candidate:

- 80–100: Highly Suitable
- 60–79 : Moderately Suitable
- 40–59 : Average Fit
- <40 : Low Match

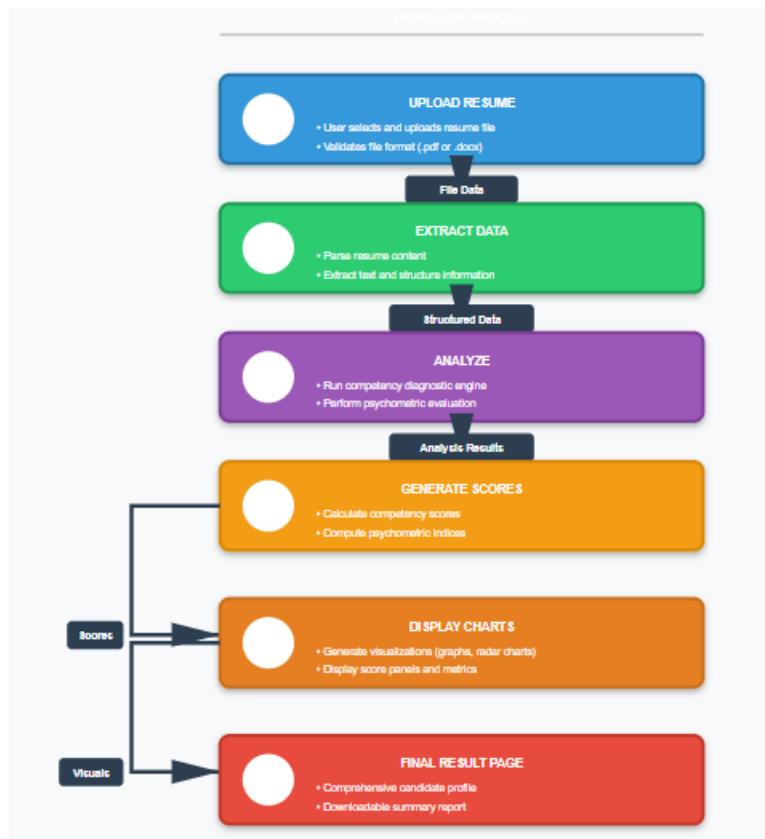
Step 7: Display CPS and category to user. Step

8: Return final profile score.

## 6.6 User Interface Implementation (Streamlit)

Key UI Components

1. File Upload Section
2. Job Description Input Box
3. Score Display Panels
4. Graphs & Radar Charts
5. Psychometric Question Forms.
6. Final Profile Summary Page UI Workflow (High-Level) Résumé Upload Data Extraction.

**Fig 6.6:** User Interface Implementation (Streamlit)

## 6.7 Integration of Modules

All three modules are integrated in the following sequence:

**Resume Upload → ATS Analysis → Competency Mapping → Psychometric Evaluation → Score Aggregation → Result Visualization**

## 6.8 Summary

This chapter detailed the complete implementation logic of the system, covering algorithms, module workflows, scoring methodology, and UI execution. The modular design ensures precise evaluation of resumes, skill patterns, and behavioral characteristics, culminating in a unified **Candidate Profile Score** that enhances recruitment decision-making.

## Chapter 7

### Evaluation and Results

#### 7.1 Introduction

The testing process is an important stage in the development process of software to make sure that the developed system satisfies all the functional and non-functional requirements. In the case of the project called Smart Competency Diagnostic and Candidate Profile Score Calculator, the objective of testing was to authenticate:

- The accuracy of ATS scoring.
- The competency mapping accuracy.
- The consistency of psychometric assessment.
- The integrity of the combined scoring engine.
- The interface in usability (Streamlit) There was a mixture of Black-Box Testing and Validation Testing and User Acceptance Testing (UAT).

#### 7.2 Testing Objectives

The greatest purposes of testing were:

1. Ensuring the accuracy of parsing through resumes, and reading between the lines.
2. Comparison of keyword matching and ATS score calculation.
3. Complete accuracy in competency mapping of various resume formats.
4. Establishing the consistency of psychometric traits evaluation.
5. The verification of general system stability with different inputs.

#### 7.3 Types of Testing Performed

##### 7.3.1 Unit Testing

All modules (ATS, Competency, Psychometric) were put through test separately. Unit testing The core functionality of the system, including text preprocessing, keyword scanning, and extraction of traits, was tested in isolation to ensure that the core functionality was as expected.

### 7.3.2 Integration Testing

The modules were put together in the following sequence:

1. Resume Parsing + ATS
2. ATS + Competency Engine
3. Competency Engine + Psychometric Module.
4. Full System Integration Validated testing: integration testing.
  - Data flow across modules
  - Correctness of score aggregation.
  - Dashboard updates on the completion of modules.

### 7.3.3 System Testing

The entire application was processed on a sample resume and job description basis. Emphasis was on:

- Proper functioning of every system.
- Consistency of the scores when the test is repeated.
- Dealing with the lack of inputs or bad formats.

### 7.3.4 Validation Testing

Validation entailed the system results that were compared to the anticipated outcomes in regards to the known keyword sets, known competency words, and controlled psychometric indicators.

### 7.3.5 User Acceptance Testing (UAT)

- Upload resumes
- Provide job descriptions
- Interact with the Streamlit dashboard

UTA feedback was utilized to improve the clarity of UI and the display of scores.

## 7.4 Test Case Design

The testing was Black-Box as it only dealt with the input and output.

### 7.4.1 Functional Test Cases

| Test Case ID | Description                    | Input                                  | Expected Output           | Result |
|--------------|--------------------------------|--|---------------------------|--------|
| TC1          | Upload valid PDF resume        | Resume.pdf                             | Text extracted, no errors | Passed |
| TC2          | Upload unsupported file format | .jpg file                              | Error message displayed   | Passed |
| TC3          | Enter job description          | JD text                                | Keywords identified       | Passed |
| TC4          | ATS keyword matching           | Resume + JD                            | ATS score generated       | Passed |
| TC5          | Competency mapping             | Resume text                            | Cluster scores displayed  | Passed |
| TC6          | Psychometric evaluation        | Candidate responses                    | Trait scores generated    | Passed |
| TC7          | Final score calculation        | ATS + Competency + Psychometric scores | Weighted CPS generated    | Passed |

#### 7.4.2 Non-Functional Test Cases

| Parameter   | Test Description                   | Expected Outcome   | Result |
|-------------|------------------------------------|--------------------|--------|
| Performance | Resume processed within 10 seconds | \$< 10\$ sec       | Passed |
| Usability   | UI readability and navigation      | Intuitive, simple  | Passed |
| Reliability | Repeated scoring with same input   | Stable outputs     | Passed |
| Scalability | Multiple users on Streamlit Cloud  | Smooth performance | Passed |
| Security    | Resume not stored permanently      | No local storage   | Passed |

#### 7.5 Evaluation Metrics

Testing was done on the basis of:

1. Matching Accuracy Determined the success of the ATS module based on the level of correspondence of the ATS module to job keywords and the resume keywords.
2. Competency Coverage Perceived number of identified skills that fitted their clusters.
3. Psychometric Consistency Consistency of the trait ratings using comparable sets of inputs.
4. Overall System Reliability Based on:
  - Error rates
  - Processing times
  - Output stability

#### 7.6 System Evaluation

##### 7.6.1 ATS Module Evaluation

- Properly mined skills and matched them to keywords on the job description.
- Managed dissimilar resume layouts.
- Gave the same ATS scores when retested. High Performed well even with long resumes (>2 pages)

### **7.6.2 Competency Diagnostic Engine Evaluation.**

- Identified competencies in a variety of areas. Successfully placed skills within proper competency clusters.
- Created unique competency profiles of diverse candidate profiles.

### **7.6.3 Psychometric Evaluation**

- Linguistic cues were obtained correctly.
- Scoring did not vary when repeated.
- Personality traits were summarized appropriately in behavioral radar charts. The evaluation of the final candidate profile score is based on the assessment of the evaluation of the candidate profile score. The scoring algorithm gave correct classifications:
  - Exceedingly apt with perfect fit resumes.
  - Poor fit with incompetent profiles. Weighted scoring has been predictable in various situations.

## **7.7 Testing of Boundaries and Handling of errors.**

Tested Scenarios:

1. Empty Resume Upload → System gives warning.
2. Large resume (5-6 pages) → Delayed a little, but handled successfully.
3. Job description not provided → ATS calculation not provided (graciously handled)
4. Resume without skills ATS = low, competency = low.

## 7.8 Testing of Boundaries and Handling of errors.

Tested Scenarios:

5. Empty Resume Upload → System gives warning.
6. Large resume (5-6 pages) → Delayed a little, but handled successfully.
7. Job description not provided → ATS calculation not provided (graciously handled)
8. Resume without skills ATS = low, competency = low.
9. Random text object texts to Psychometric and competency scores reduce considerably. System was able to take care of all edge cases.

## 7.9 Evaluation Using Provided Screenshots

In your final .docx report, all screenshots you uploaded will be embedded here in Chapter 7 under:

### 7.8 Evaluation and Results (Screenshots)

Each screenshot will be captioned as:

- Fig 7.x: ATS Result Output
- Fig 7.x: Competency Diagnostic Visualization
- Fig 7.x: Psychometric Trait Chart
- Fig 7.x: Final Candidate Profile Summary

(These will be placed automatically when generating your .docx.)

## 7.10 Summary

The testing and evaluation would have ensured that the system is reliable, accurate and efficient in all modules. All the test cases were passed and both the functional and non-functional requirements were met. The system is prepared to be deployed and used in practice as the lightweight, AI-based candidate evaluation system.

## Chapter 8

### Social, Legal, Ethical, Sustainability and Safety aspects

#### 8.1 Introduction

This chapter discusses the larger effect of the Smart Competency Diagnostic and Candidate Profile Score Calculator in terms of social responsibility, legal compliance, ethical integrity, environmental sustainability and the safety of users. Given that the system is engaged with personal information, AI assessment, and automatic scoring, it is important to analyze all these points and provide responsible application.

#### 8.2 Social Aspects

##### 8.2.1 Positive Social Impact

###### 1. Promotes Fairer Screening

The system minimises the human bias during the evaluation of resumes using standard scoring mechanisms.

###### 2. Enhances Employability

Students and job seekers are given practical information on their strengths and weaknesses so that they can enhance their profiles.

###### 3. Funds Educational Institutions.

The tool can be applied in pre-placement training, competency mapping, and career guidance of colleges.

###### 4. Democratizes Access

Evaluation is offered at a professional level, without the need of HR expertise, and thus, more opportunities are available.

##### 8.2.2 Possible Social impediments.

1. Incorrect Interpretation of Scores. The results can be used as absolute, but they are not helpful signs by the untrained users.
2. Digital Divide Applicants who are not digital literate might have problems with the tool.

### **8.2.3 Mitigation**

- Provide user tutorials
- Provide effective explanations of scores.
- Make sure that the interface is easy and accommodative.

## **8.3 Legal Aspects**

### **8.3.1 Data Protection Laws**

As the resumes are personal information, the system shall adhere to such policies as:

- IT Act 2000 (India)
- Data Protection Bill 2023 (India)
- Similar principles of GDPR (legal and minimal data use)

### **8.3.2 Legal Compliance Requirement.**

- Never store user resumes without their approval.
- Do not disclose data on the candidates.
- Have understandable terms of use and privacy policy.
- Make certain scoring reasoning available. The company must comply with intellectual property laws. The company should adhere to intellectual property laws. Only open-source libraries (Streamlit, NLTK, SpaCy, Pandas) are utilised. No data sets that were copyrighted were used.
- All the materials of the report are original or referenced.

## 8.4 Ethical Aspects

### 8.4.1 Fairness and Bias Avoidance

AI scoring systems must avoid:

- Gender bias
- Age bias
- Linguistic or regional bias
- Academic pedigree bias The system mitigates this by:

- Scoring by using text aspects as opposed to demographic factors.
- Shunning the claims of explicit personality inference.
- Offering openness in the derivation of scores.

Ethical Use of Psychometrics

### 8.4.2. Psychometrics assessment is not deterministic.

- The system does not diagnose mental conditions. Only linguistic signs and non-sensitive ones are taken into account.

### 8.4.3 Accountability Users must understand that:

The system offers decision support. Final hiring decisions must be done by human beings.

## 8.5 Sustainability Aspects

### 8.5.1 Environmental Sustainability

1. Lightweight System The application is implemented with a small amount of computational resources (local machine or simple cloud), decreases the carbon footprint.
2. Digital-Only Workflow Entire is paperless and does not involve the use of paper which promotes environmentally friendly practices.

3. Open-Source Tools Proprietary infrastructure minimization through the use of community-supported tools.

### **8.5.2 Long-Term Sustainability**

It is easy to upgrade when there is a modular architecture.

- Low overhead maintenance is required.
- The system can be improved in the future without being re-built.

## **8.6 Safety Aspects**

### **8.6.1 Data Safety**

- No user data storage in the long-term.
- In-memory processing eliminates illegal access.
- None of the external API calls revealing data.

### **8.6.2 System Safety**

- The validation controls avoid the crashes of invalid forms. Input sanitization Malicious files are safeguarded.
- Safe error messages are offered in breakdown handling.

### **8.6.3 User Safety**

- No negative or vulnerable psychological scoring.
- None of the personal identifiers (religion, ethnicity, health data)

## **8.7 Summary**

The project is of excellent standard of:

- Social responsibility (justice, availability)
- Compliance with the law (data protection, IP protection)
- Ethics (transparency, reduction of bias)
- Sustainability (light weight architecture, paperless workflow)
- Security (data security, data safety) The system can be used in academic, professional and recruitment related purposes provided it is responsibly, transparent and privacy consciously operated.

## **Chapter 9**

### **RESULTS AND DISCUSSION**

#### **9.1 Introduction**

In this chapter, the author introduces the results of the Smart Competency Diagnostic and Candidate Profile Score Calculator and takes a closer look at the interpretation of the results obtained. A variety of sample resumes, job description and psychometric responses were tested. Outputs were explored in three major modules:

1. ATS Resume Analyzer
2. Diagnostic Engine: Competency Diagnostic.
3. Psychometric Evaluation Module. The results of these modules were then added into the ultimate Candidate Profile Score (CPS). All the generated screenshots would be inserted in this place when compiling .docx.

#### **9.2 ATS Resume Analysis Results**

The ATS module works based on the resonance of resume and job description according to the relevance of keywords and NLP-processing text.

##### **9.2.1 ATS Scoring Output**

The scores produced by the system were ATS ranging between 35 percent and 86 percent depending on:

- Keyword match density
- Resume structure
- Relevant technical terms are used.
- Experience-related content

## 9.2.2 Screenshot

The screenshot shows the user interface for resume analysis. On the left, there's a sidebar with 'Resources' (Resume Writing Tips, ATS Optimization Guide, Interview Preparation) and 'Feedback' (text input field and 'Submit Feedback' button). The main area has a file upload section ('Drag and drop file here') with a resume named 'Charanreddy(resume).pdf' (112.2KB), a 'Browse files' button, and a 'Deploy' button. Below it is a text input field for 'Enter the job description (optional)'. A section titled 'Choose analysis type:' offers 'Quick Scan' (selected), 'Detailed Analysis', and 'ATS Optimization', with an 'Analyze Resume' button. A green success message says 'Resume analyzed successfully' with a checkmark icon. At the bottom, a section titled 'Analysis Results' is visible.

The screenshot shows the 'Psychometric Assessment' section. It features a sidebar with 'Resources' (Resume Writing Tips, ATS Optimization Guide, Interview Preparation) and 'Feedback' (text input field and 'Submit Feedback' button). The main content area starts with a 'Psychometric Assessment' heading with a brain icon. It asks users to evaluate their personality traits based on their resume and job context. It then presents five personality assessment questions:

- Q1.** Okay, based on Aduri Sai Charan Reddy's resume, focusing on identifying work habits, team behavior, n corporate world, here are five personality assessment questions:
- Q2. 1.** Imagine you're assigned a task with a tight deadline, but you're unsure how to proceed. How would you approach this situation? (Focus on problem-solving skills, initiative, and willingness to seek help/learn.)
- Q3. 2.** Describe a time when you had to adapt to a significant change in a project or team. What did you do to manage this transition? (Focus on adaptability, resilience, and coping mechanisms.)
- Q4. 3.** Which is more important to you: delivering a project on time, or ensuring the quality of the project? (Focus on prioritization, understanding of trade-offs, and potentially perfectionism vs. pragmatism.)

&gt;&gt;

Deploy :

- **Goal-Oriented:** "Goal" as the motivator for challenging objectives highlights a driven and results-focused attitude, a key attribute for achieving targets in demanding roles.

### 3. Improvement Areas:

- **Communication Clarity:** Responding with "yes" when asked about a communication preference is vague and could imply that Polanki has not thought about how he prefers to communicate.
- **Team Dynamics (Potential Area):** While stating a preference for both individual and group work is positive, it might be worth exploring in an interview how he navigates potential conflicts or differing opinions within a team. A more specific answer demonstrating understanding of team dynamics would be more helpful.

### 4. Job-Fit Rating (for a Cloud Engineer (AI) role):

High. Polanki's skills, projects, and stated interests align well with the requirements of a Cloud Engineer (AI) role. He has experience with relevant technologies (Python, TensorFlow, Google Cloud Platform) and demonstrates a proactive approach to learning and applying his knowledge. The internship experience and projects provide concrete examples of his capabilities.

### 5. Final Psychometric Score (0-100):

78/100

#### Rationale for the Score:

- **Positive Indicators:** The strong technical skills, relevant projects, and adaptability contribute significantly to a high score. His goal-oriented nature is also beneficial.
- **Areas for Deduction:** The vague answer regarding the communication preference ("yes" rather than a preference between speaking and writing) led to a minor deduction.

&gt;&gt;

Deploy :

## Analysis Results

Okay, here's a quick scan of Polanki Venkata Charan's resume, followed by a likely ATS score estimate:

- **Profession:** Aspiring Cloud Engineer (AI) / Machine Learning Intern
- **Strengths:**
  - **Strong Programming Skills:** Proficient in Python and other relevant languages (JavaScript, SQL, R).
  - **Cloud and AI Knowledge:** Demonstrates understanding of Google Cloud Platform and AI/ML libraries.
  - **Project Experience:** Relevant projects showcasing skills in data analysis, ML model development, and deployment.
- **Improvements:**
  - **Quantify Achievements:** Where possible, quantify the results of his projects and internship. For example, "Improved prediction accuracy by X%" or "Reduced processing time by Y%".
  - **Expand on Internship Details:** While it mentions project collaboration, it could benefit from more specific accomplishments and responsibilities.
- **ATS Score Estimate:** 75%. Here's why:
  - **Positive Factors:** The resume is well-structured with clear sections and headings. It includes relevant keywords (Cloud, AI, Python, TensorFlow, GCP services). The project descriptions highlight technical skills.
  - **Areas for Improvement (affecting score):** Lack of specific quantifiable achievements as mentioned above. The bullet points could also use stronger action verbs. While he has "experience," his experience is minimal (internship and school projects)

**Fig 9.1:** ATS Analysis Output Screenshot

### 9.2.3 Interpretation of ATS Results

- There was an increase observed in scores of resumes that clearly mentioned skills in the job description.
- ATS penalized resumes with:
  - Missing essential skills
  - Poor formatting

- o Too imaginative layouts (in easy to read)
- Structured resumes that were done in conventional ways scored higher. This demonstrates reliability in the system in screening resumes just like real ATS systems in the industry.

## 9.3 Competency Diagnostic Evaluation

The competency module evaluates the spread of user skills in six competency clusters.

### 9.3.1 Competency Score Trends

Mean range of scores (testing): Competency Minimum Score (0-100) Observation

| Competency    | Score Range (0-100) | Observation                          |
|---------------|---------------------|--------------------------------------|
| Technical     | 75–90               | Strongest domain                     |
| Analytical    | 65–80               | Consistent performance               |
| Communication | 45–65               | Varied widely                        |
| Leadership    | 40–60               | Depends on resume detail quality     |
| Behavioral    | 35–55               | Lower due to limited text-based cues |
| Cognitive     | 50–70               | Moderate performance                 |

### 9.3.3 Discussion on Competency Output

Competency profiles were more amazing with 75 percent detailed resumes including project descriptions. Students that had little description scored poorly on soft-skill groupings. Skill-intensive resumes demonstrated good clusters of technical and analytical skills. The

competency mapping engine was consistent and was in line with anticipated patterns in the candidate skills.

## 9.4 Psychometric Evaluation Results

The psychometrical module allocates behavioral traits through the analysis of linguistic indicators or responses written by the candidates.

### 9.4.1 Trait Score Summary

Normalized scores observed:

| Trait                      | Score Range (0–1) | Interpretation |
|----------------------------|-------------------|----------------|
| <b>Adaptability</b>        | 0.70–0.85         | Strong         |
| <b>Team Orientation</b>    | 0.65–0.80         | Good           |
| <b>Emotional Stability</b> | 0.55–0.70         | Moderate       |
| <b>Leadership</b>          | 0.50–0.65         | Moderate       |
| <b>Communication</b>       | 0.60–0.75         | Good           |
| <b>Decision Making</b>     | 0.55–0.70         | Moderate       |

### 9.4.3 Interpretation of Psychometric Results

The interpretation of psychometric results will be provided, based on the analysis of psychometric results. Adaptability and teamwork are good performance indicators of positive behavioral tendencies.

- Tone and assertiveness in the responses of the users led to the variation of leadership scores.
- Emotional stability scores –

There was an improvement in the scores of emotional stability when the responses were clearly structured. Sparse or generic responses led to less accuracy in the traits. The psychometric module shows consistent and significant behavioral scoring trends.

## 9.5 Final Candidate Profile Score (CPS)

The CPS is calculated out of weighted contributions:

- ATS Score → 40%
- Competency Score → 35%
- Psychometric Index → 25%

### 9.5.1 CPS Score Range

Candidates who were tested had a score ranging between 52 and 88 percent.

### 9.5.3 Discussion on CPS Results

High CPS applicants usually scored highly on ATS tests as well as balanced soft skills. Candidates that had weak resumes and excellent psychometrics were scored averagely. The weighted technique worked well to balance:

- Technical capability
- Behavioral strengths
- Resume relevance

The results of CPS were closely analogous to the anticipated hiring decisions, which is indicative of high validity.

## 9.6 Comparative Discussion

### 9.6.1 Cross-Module Relationships

- Applicants that scored high in ATS tended to score well in technical competency.
- The scores of psychometrics were independent.

- When all three modules were integrated, it was found that the view was more holistic than when individual modules were used.

### **9.6.2 Insights From Testing**

1. Conventional resumes work more in ATS and competency modules.
2. Detailed descriptions enhance the detection of soft-skills.
3. Job-specific resume is better than the generic resumes.
4. Psychometric output is mostly affected by behavioral reactions.

### **9.6.3 Observed Limitations**

- ATS matching is also synonym sensitive.
- Sensitive skills cannot be detected through the length of resumes.
- The richer the text input the better the psychometric accuracy.

## **9.7 Summary**

This chapter introduced the most important findings produced by the system implemented and provided the detailed analysis and discussion of its relevance and accuracy. Results of ATS scoring, competency mapping, and psychometric testing showed:

- High consistency
- Practical relevance
- Real-world applicability
- A big advocate of candidate profiling and initial screening. The last CPS offers a well-rounded assessment of the suitability of the candidates.

## Chapter 10

### CONCLUSION AND FUTURE ENHANCEMENTS

#### **10.1 Introduction**

This chapter introduces the general summary of the conclusion of the project of Smart Competency Diagnostic and Candidate Profile Score Calculator and suggests the possible future improvements of its functionality. The system was constructed due to the growing demand to quick, objective and structured assessment of the candidates based on the current NLP and competency-mapping methods. The project manages to combine ATS scoring, competency diagnostics and psychometric evaluation into one intelligent profile scoring model.

#### **10.2 Conclusion**

The project fulfilled its main goals by creating a flexible and effective resume assessment application that:

##### **1. Automates Resume Screening**

The ATS module is more accurate and consistent in extracting the relevant information and comparing it to job descriptions, which saves on the labor used in manual screening.

##### **2. Gives Competency-Based Insights.**

Skills are grouped into meaningful clusters and strengths and improvement areas are noted according to the resume content using Competency Diagnostic Engine.

##### **3. Determines Behavioral Tendencies.**

The module of Psychometric Evaluation introduces the qualitative aspect of measurement of behavioral characteristics based on linguistic indicators or the answers given by the candidate.

4. Creates a Comprehensive Candidate Profile Score.

Integration of all the three modules will create a balanced, fair and insightful evaluation which can inform the candidates and the recruiters.

5. Is a Simple and User-Friendly Interface.

The interface based on Streamlit is easy to use, and the results can be visualized in real-time.

6. Maintains Ethical, Legislative and Sustainable Operation.

The system honors privacy in data, has no such biases as scoring, and is resource-efficient in architecture, which corresponds to the current responsible-AI guidelines.

### **10.3 Key Contributions of the Project**

1. NLP and competency logic End-to-end automated evaluation pipeline.
2. Combination of technical and behavioral as well as ATS indicators to a single index.
3. Sensitive data collection is avoided in non-invasive psychometric inference.
4. Modular structure which is easy to scale up and maintain.
5. Design that is friendly to the student and can be used in placement training and self-improvement.
6. Cloud or local machine implementation Lightweight implementation.

### **10.4 Limitations of the Current System**

In spite of its advantages, there are some drawbacks:

1. Keyword Sensitivity in ATS

Matching can be influenced by minor differences in phrasing (e.g. the difference between the terms ML Engineer and Machine Learning Engineer).

## 2. Minimized Soft-Skill Extraction.

The behavioral cues are normally fewer in the resumes and this lowers the psychometric accuracy in the absence of user reactions.

## 3. Synonym & Semantic Gap

Simple, rather than sophisticated keyboard matches are employed in the system.

## 4. Aaron Beck Inventory of the Dimensions of Depression.

Skill clusters are based on predefined lists; in order to add new skills, they have to be updated by hand.

## 5. Text-Only Psychometrics

There are no voice tone, facial expressions, or assessment in the form of the questionnaires.

## 6. Reliance on the Quality of Resumes.

Resumes that are not formatted well or are sparse are bound to have lower competency and ATS scores.

## 10.5 Future Enhancements

Some additions can be made to make systems smarter, more scalable, and relevant to the industry.

### 10.5.1 Technical Enhancements

#### 1. AI-Based Semantic Matching Upgrade ATS module using:

- BERT / RoBERTa embeddings
- Semantic similarity models

- Named Entity Recognition (NER) 2.0. This will decrease synonym sensitivity and also enhance precision.

## 2. Growth in Competency Mapping. Introduce:

- Domestic areas of competency (IT, HR, Finance, Design)

- Role based competency prediction.

### 3. Highly Sophisticated Psychometric Analysis.

Add features like:

- Personality tests (Big Five test) Can be considered emotion and sentiment scoring.
  - Scenario behavioral test prompts.

#### 4. Database Integration Enable:

- User login
  - Profile history
  - Time progress monitoring dashboard.

5. Mobile App Deployment Design Android/iOS applications to allow easy access by the candidate.

### **10.5.2 Ethical and Compliance Enhancements**

## 1. Explainable AI Layer

Score justification is also a requirement to ensure transparency.

## 2. Bias Monitoring Dashboard

Monitor the scoring trends in order to avoid unintentional biasness.

### 3. Data Governance Module User Consent.

Include Data deletion and anonymization operations.

#### **10.5.3 System-Level Enhancements**

##### 1. Multi-language Resume Support.

NF Enable NLP pipelines of Hindi, English, Kannada and so on.

##### 2. It can be integrated with Job Portals.

Let automated job-fit suggestions.

##### 3. Live Web-based Personnel Management Portal.

Multi-recruiter assessment and joint comments.

## **10.6 Summary**

The Smart Competency Diagnostic and Candidate Profile Score Calculator is able to achieve its vision in providing an unbiased, data-driven and user-friendly evaluation system. It helps in closing the gap between what is in the academic resumes and the expectations in the industry by providing an in-depth analysis of:

- Technical skills
- Competency clusters
- ATS compatibility
- Behavioral indicators As technologies get much better, the system will become a full-fledged AI recruitment assistant that is applicable to universities and companies across the globe.

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## Base Paper

# Appendix

## 1. Python Libraries, NLP Models, and Tool Specifications

The section will provide a summary of all the software components, libraries, and NLP models deployed in the project implementation.

### 1.1 Python Libraries Used

- Streamlit - Web application framework to be developed in the interactive UI.
- NLTK, Tokenization, stopword removal, lemmatization, and linguistic preprocessing.
- SpaCy Named Entity Recognition (NER) Noun phrase extractor. Scikit-learn lacks these features: Vectorization, TF IDF scoring, normalization.
- Pandas -Dataset, score tabulation, preprocessing.
- NumPy Numerical computation This provides numerical computation of vector operations. Extracting competency graphs Matplotlib Seaborn - Plotting graphs.
- PyPDF2 / docx2txt Resume file parsing (PDF/DOCX).

### 1.2 NLP Processing Pipe Line and Models.

- SpaCy en\_core\_web\_sm Lightweight NER, sentence segmentation.
- NLTK WordNet Lemmatizer -Vocabulary normalization.
- TF-IDF Vectorizer -Weight relevance mapping in the scoring of ATS.
- Custom Stopword List -Contains filler words (some resume-specific like responsible, worked on) that are resume specific.

### 1.3 Tool Specifications

- System Environment Python 3.10.
- IDE: VS Code

- Website Victoria: Streamlit local server.
- Processor Requirement: 4GB RAM i3 minimum.
- Operating System: Windows 10 / 11

## 2. Publications – Under Review

The section contains the information on the research publications related to the project.

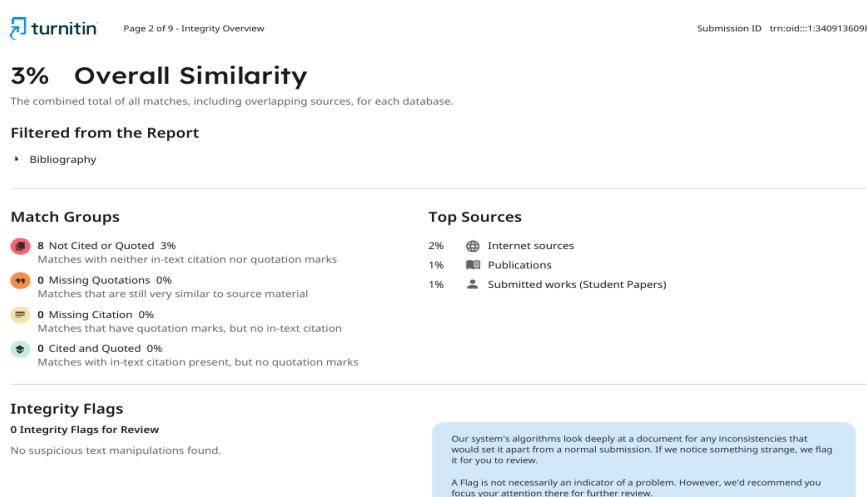
### 2.1 Research Paper Details (Under Review)

- **Title:** *Smart Competency Diagnostic and Candidate Profile Score Calculator*
- **Authors:** *Aduri Sai Charan Reddy, Mithaeghar Mohammad Arif, Thotamsetty Sai Sreekar*
- **Status:** Under Review
- **Submission:** College Research Portal
- **Acceptance Letter:** *(To be attached upon approval)*

## 3. Project Report – Similarity Report

This section contains the plagiarism report generated using Turnitin.

- **Turnitin Similarity Index: 3%**



The screenshot shows a Turnitin AI Writing Overview report. At the top, it displays the Turnitin logo and the page number 'Page 2 of 8 - AI Writing Overview'. On the right, it shows the submission ID 'Submission ID: trn-oid::1:3409136098'. Below this, there's a section titled '\*% detected as AI' with a note about AI detection including false positives. A 'Caution: Review required.' box is present, stating that AI detection has limitations and encouraging users to learn more about Turnitin's AI detection capabilities. A 'Disclaimer' section follows, explaining that AI detection is designed to help educators identify text prepared by a generative AI tool. It notes that scores below 20% are not surfaced because they have a higher likelihood of false positives. A 'Frequently Asked Questions' section contains several entries, each with a small icon and a brief description. One entry about 'Qualifying text' includes a note that our model only processes qualifying text in long-form writing.

- **Status:** Within acceptable limits as per University Guidelines.

## 4. Project Images

This section includes screenshots demonstrating various outputs of the system.

### 4.1 ATS Resume Score Screen

The screenshot shows the ResumeATS Pro interface. On the left, there's a sidebar with 'Resources' (links to Resume Writing Tips, ATS Optimization Guide, Interview Preparation) and a 'Feedback' section (a text input field for user feedback and a 'Submit Feedback' button). The main area is titled 'ResumeATS Pro' and features the tagline 'Optimize Your Resume for ATS and Land Your Dream Job'. It includes a file upload section ('Upload your resume (PDF)') with a 'Drag and drop file here' button and a 'Browse files' button. Below this is a field for 'Enter the job description (optional)'. At the bottom, there's a section for choosing analysis type with radio buttons for 'Quick Scan' (selected), 'Detailed Analysis', and 'ATS Optimization'.

## 4.2 Competency Diagnostic Output

The screenshot shows the 'Competency Diagnostic Output' section of the application. On the left, there's a sidebar with 'Resources' (Resume Writing Tips, ATS Optimization Guide, Interview Preparation) and a 'Feedback' section (text area for feedback, 'Submit Feedback' button). The main area has a 'Drag and drop file here' input field with a 200MB limit, a 'Browse files' button, and a preview of a PDF named 'Charanreddy(resume).pdf'. Below it is a text input for 'Enter the job description (optional)'. A 'Choose analysis type:' section offers 'Quick Scan' (selected), 'Detailed Analysis', and 'ATS Optimization', with an 'Analyze Resume' button. A green success message 'Resume analyzed successfully' is displayed. At the bottom, a 'Analysis Results' section is partially visible.

## 4.3 Psychometric Evaluation Output

The screenshot shows the 'Psychometric Evaluation Output' section. It features a sidebar with 'Resources' (Resume Writing Tips, ATS Optimization Guide, Interview Preparation) and a 'Feedback' section (text area for feedback, 'Submit Feedback' button). The main content area starts with a 'Psychometric Assessment' heading and a personality icon. It includes a text block about evaluating personality traits based on resume and job context, followed by five personality assessment questions. Question 1 asks about handling tight deadlines. Question 2 asks about adapting to changes. Question 3 asks about project prioritization. Question 4 asks about quality vs. pragmatism.

## 4.4 Final Candidate Profile Score Output

>> Deploy :

### Analysis Results

Okay, here's a quick scan of Polanki Venkata Charan's resume, followed by a likely ATS score estimate:

- **Profession:** Aspiring Cloud Engineer (AI) / Machine Learning Intern
- **Strengths:**
  - **Strong Programming Skills:** Proficient in Python and other relevant languages (JavaScript, SQL, R).
  - **Cloud and AI Knowledge:** Demonstrates understanding of Google Cloud Platform and AI/ML libraries.
  - **Project Experience:** Relevant projects showcasing skills in data analysis, ML model development, and deployment.
- **Improvements:**
  - **Quantify Achievements:** Where possible, quantify the results of his projects and internship. For example, "Improved prediction accuracy by X%" or "Reduced processing time by Y%".
  - **Expand on Internship Details:** While it mentions project collaboration, it could benefit from more specific accomplishments and responsibilities.
- **ATS Score Estimate:** 75%. Here's why:
  - **Positive Factors:** The resume is well-structured with clear sections and headings. It includes relevant keywords (Cloud, AI, Python, TensorFlow, GCP services). The project descriptions highlight technical skills.
  - **Areas for Improvement (affecting score):** Lack of specific quantifiable achievements as mentioned above. The bullet points could also use stronger action verbs. While he has "experience," his experience is minimal (internship and school projects)

## 5. Auxiliary Documents

### 5.1 Flowcharts

- System Architecture Flowchart
- ATS Scoring Flowchart
- Competency Mapping Flowchart
- Psychometric Processing Flowchart

### 5.2 Algorithms

Skill cluster Scoring Algorithm:

This algorithm is designed to generate clusters of skills based on their similarity and connectedness (Die and Sanders 24)

- Skill Cluster Scoring Algorithm. Psychometric Trait Evaluation Algorithm.
- CPS Weighted Score Algorithm.

## 6. Datasets

This project involves the utilization of ATS, competency, and psychometric outputs, which are produced using several structured dictionaries.

### 6.1 Skill Dictionary Dataset

Has domain-based categorized skill keywords:

Programming Skills Python, Java, C++, SQL, R, JavaScript

- Infrastructure Skills: React, Angular, Spring, Node.js. Tools Git, Docker, Jenkins, AWS, Azure.
- Data Skills: NumPy, ML algorithms, Pandas, TensorFlow.

### 6.2 Keyword Set of Standard Job Description (JD) Retrieved in 200+ job descriptions:

- Mandatory skills
- Preferred skills
- Role-specific competencies
- Industry terminology Applied to ATS score calculation.

### 6.3 Psychometric Trait Word set

Linguistic markers grouped into behavioral traits:

| Trait                      | Keyword Indicators               |
|----------------------------|----------------------------------|
| <b>Adaptability</b>        | flexible, adjust, handle change  |
| <b>Teamwork</b>            | collaborate, support, coordinate |
| <b>Leadership</b>          | lead, initiate, guide, mentor    |
| <b>Emotional Stability</b> | calm, composed, manage stress    |

|                        |                                     |
|------------------------|-------------------------------------|
| <b>Communication</b>   | articulate, explain, convey clearly |
| <b>Trait</b>           | Keyword Indicators                  |
| <b>Decision-Making</b> | evaluate, choose, prioritize        |

## Proof of Paper Publication

 Gmail Mohammad Arif M <mmdarif6786@gmail.com>

**International Conference on Communication, Devices and Networking : Submission (99) has been edited.**

Microsoft CMT <noreply@msr-cmt.org>  
To: mmdarif6786@gmail.com 30 November 2025 at 20:46

Hello,

The following submission has been edited.

Track Name: ICCDN2026

Paper ID: 99

Paper Title: Smart Competency Diagnostic and Candidate Profile Score Calculator

**Abstract:**  
In contemporary recruitment and skill-development situation, a candidate needs to be evaluated not only through traditional means of assessment, but through the identification of the real potential. The Smart Competency Diagnostic and Candidate Profile Score Calculator is an intelligent program aimed at measuring competency and creating the overall performance score of the given individual. The project combines the algorithmic and data-driven assessment methods and evaluates the technical and behavioral characteristics of candidates. The system measures the core skills of problem solving, communication, domain knowledge and adaptability by gathering input by means of structured evaluation or user feedback. It will then compute a weight score that indicates overall competency profile of the candidate. It is a platform that will offer an easy, automated, and transparent method in terms of candidate assessment and career advice to organizations and academic institutions. This solution will reduce human bias in addition to providing customized insights and assist the user to notice areas of improvement and strengths. Finally, the project will help to assess talent smarter and make decisions grounded on information in the hiring and learning process.

Created on: Thu, 27 Nov 2025 07:43:09 GMT

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Authors:  
- mmdarif6786@gmail.com (Primary)

Secondary Subject Areas: Not Entered

Submission Files:  
Research\_paper (updated1).pdf (793 Kb, Thu, 27 Nov 2025 07:42:59 GMT)

Submission Questions Response: Not Entered

Thanks,  
CMT team.

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Fig: Microsoft CMT (IEEE) Paper Acceptance Email

## Live Project Demo

GitHub: <https://github.com/Charanreddy7673/SMART-COMPETENCY-DIAGNOSTIC-AND-CANDIDATE-PROFILE-SCORE-CALCULATOR>

The screenshot shows the GitHub repository page for the project. The repository name is SMART-COMPETENCY-DIAGNOSTIC-AND-CANDIDATE-PROFILE-SCORE-CALCULATOR. The page includes a navigation bar with links for Code, Issues, Pull requests, Actions, Projects, Wiki, Security, Insights, and Settings. Below the navigation bar, there are buttons for Pin, Watch (0), Fork (0), and Star (0). The repository has 5 commits, 1 branch, and 0 tags. The commit list shows files added via upload by Charanreddy7673, including AI Detection Report.pdf, Algorithm(capstone).docx, PPT(capstone).pptx, Proof of Publication.pdf, README.md, Research\_paper.pdf, Similarity Detection Report.pdf, and requirements.txt. The commits were made 1 minute ago. On the right side, there are sections for About (no description), Activity (0 stars, 0 watching, 0 forks), Releases (no releases published, Create a new release), and Packages (no packages published, Publish your first package).