Software Requirements Specification

for

Job Role Prediction

Version 2.0 approved

Prepared by

Juhi Checker 7920

Sayali Deo 7926

Anne Rajan 8160

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Revision History

Name	Date	Reason For Changes	Version
Job Role Prediction	28.10.19	Initial Version	1.0
Job Role Prediction	5.6.20	Addition of many new features	2.0

1. Introduction

1.1 Purpose

As students are going through their academics and pursuing their interested courses, it is very important for them to assess their capabilities and identify their interests so that they will get to know in which career area their interests and capabilities are going to put them in. So, as to compete and reach the goal students need to be planned and organized from the initial stages of their education. It is very important to constantly evaluate their performance, identify their interests and evaluate how close they are to their goal and assess whether they are in the right path that directs towards their target. This helps them in improving themselves, motivating themselves to a better career path if their capabilities are not up to the mark to reach their goal and pre-evaluate themselves before going to the career peak point.

Also, recruiters while recruiting the candidates after assessing them in all different aspects, these kinds of career recommender systems help them in deciding in which job role the candidate should be kept in based on his/her performance and other evaluations. Not only that recruiters while recruiting people into their companies evaluate candidates on different parameters and draw a final conclusion to select an employee or not and if selected, finds a best-suited role and career area for him. There are many types of roles like Database administrator, Business Process Analyst, Software Developer, Testing Manager, Networks Manager, Data scientist and so on. All these roles require some prerequisite knowledge in them to be placed in them. So, recruiters analyze these skills, talents and interests and place the candidate in the right job role suited for them. These kinds of prediction systems make their recruitment tasks very easy because as the inputs are given, a recommendation is done based on inputs. But here various factors including abilities of students in sports, academics and their hobbies, interests, competitions, skills and knowledge are also taken into consideration.

In this report, to solve the problem we have proposed an Artificial Neural Network model to help the student find an appropriate domain best suited for them based on their personality, academics, interests, etc. Such a specific choice of career would be highly beneficial for the student to decide his/her future course of action and thus, avoid long periods of anxiety as this prediction system is based on highly accurate deep learning algorithms as well as opinions of professionals who are experts in their respective domains.

1.2 Document Conventions

This document uses Font style Times New Roman and Font size 12.
Other document conventions used in the SRS :

ANN	Artificial Neural Network
TensorFlow	An end-to-end open-source platform for machine learning.
Keras	A high-level neural networks API, written in Python and capable of running on top of TensorFlow
Pandas	Pandas is a software library written for the Python programming language for data manipulation and analysis

1.3 Intended Audience and Reading Suggestions

- As the crux of the software lies in job role prediction for computer science students, they are the major audience. It should be noted that, the users of the software are not only eligible for technical but also non technical job roles based on their specific skill set and interest. Thus, maximum possible job roles are incorporated in the software as close as possible to the real-world.
- Another user-base comprises the companies who wish to recruit candidates based on their profile visible on our interface. On the basis of the candidates resume as well as the job titles best suited to their profiles will help companies in recognising potential job-seekers.

1.3 Product Scope

The Job Role Prediction Software essentially predicts the best suited job role (such as Database Manager, Computer Networks Administrator, Data Analyst, etc.) for computer science students who are graduating and stepping out into the corporate world as freshers. For this purpose, the software requires the candidate's academic background along with numerous factors such as personality, interest, skill-set and others which are identified by various professionals and experts in the career guidance domain. The candidate's data is fed to the software in two ways. Manual entry by the candidate into the software or by uploading the candidate's resume which is scanned by the software's algorithm to generate details in text format. Once the user identifies the best suited job role according to his/her specifications, he/she can find the various companies recruiting job-seekers in that domain. The candidates can thus meet their hiring companies on the software's portal. Furthermore, the software recommends links to courses available on the internet, to hone the user's skills. This is done by the software's web crawling algorithm.

1.4 References

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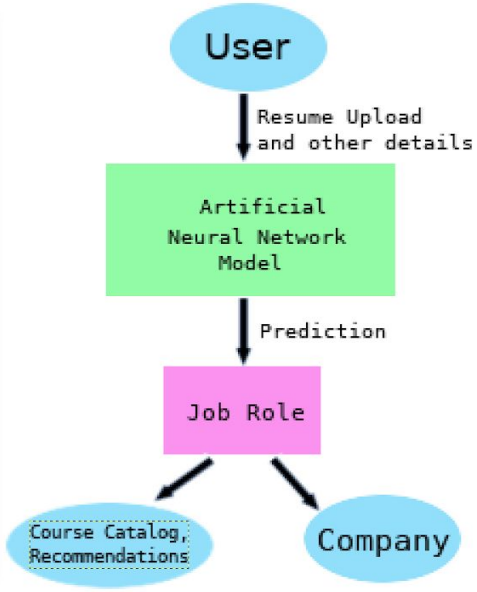
2. Overall Description

2.1 Product Perspective

The software is built from the perspective of computer science students, who lack a single platform that can act as a guidance system to them with respect to the choice of the career path they choose. Unlike the past, recent developments in technology have ensured that a wide variety of options are available to choose from, within the field of computer science itself. Thus, the software provides an unbiased view of the closest matching job role suitable, based on the candidates profile.
Such a prediction based problem has its roots in Deep Learning. This software uses Artificial Neural Networks for the purpose.



2.2 Product Functions

Functionality of the software comprises -

- Scanning user resume and converting all details into text format.
- Predicting the most suitable job role for the user on the basis of these details.
- Connecting the user to all recruiters looking for job seekers in that domain.
- Recommendation of various online courses, educational platforms so that user can further hone his/her skills in that respect.

2.3 User Classes and Characteristics

The user class of the software comprises of -

- Computer Science Students - Generally, they lack a single platform that can act as a guidance system to them with respect to the choice of the career path they choose. Unlike the past, recent developments in technology have ensured that a wide variety of options are available to choose from, within the field of computer science itself. Thus, this software provides an unbiased view of the closest matching job role suitable, based on the candidate's profile.
- Companies - Recruiters can use this software system to meet potential job-seekers. As the suggested job role to the candidate uses expert knowledge of career guidance professionals along with the precision of Deep Learning algorithms, companies can trust the software and rely on its potential to produce the best results.
- Universities/Colleges - On a mass scale, this software can be utilized by universities and colleges to help their students in deciding their career paths.

2.4 Operating Environment

The software will operate with the following software components and applications: The software being developed will be running under Mac OS and/or Windows 10/ Linux operating systems. The hardware that will be running these programs will follow the specifications that appear in this document in section 3. To briefly state, Camera with inbuilt webcam, GPU, High Speed connection to database, and a strong Internet access.

2.5 Design and Implementation Constraints

Memory: For designing purposes, Google drive with a memory of about 15GB will be used for storing and loading the dataset. Google Colab provides connection to Python 3 Google Compute Engine Backend with 12 GB RAM and disk space of about 360 GB.
Language requirements: Software will be available only in the English language.
Programming Constraints : Python 3 language, TensorFlow backend 2.0

2.6 Assumptions and Dependencies

Since, Google Colaboratory has been used, all the required dependencies like GPU, TensorFlow, Keras library, Sci-kit learn library, Numpy, Pandas are installed. Full working of the Job Role Prediction Software will depend on the network. So the status of the internet connection must be maintained at all times. User needs to upload a properly scanned copy of the resume with the help of any mobile camera. He/she can even fill out personal details not mentioned in the resume manually in the system.
It is assumed that the web interface will be compatible with every web browser. It is also assumed that the dataset obtained is 100% accurately labelled and the information in the dataset is correct.

3. External Interface Requirements

3.1 User Interfaces

- Home Page : This is the initial page of the app. This page has option of login if account is already created, signup if the user wants to create an account, an about us displaying details of the app, comments, FAQ etc
- Signup Page: The user must enter all valid details in all the fields in order to create an account. Once the details are valid the user is redirected to the login page where he has to enter his username and password.
- Login Page: The user must enter his username and password that matches with the one entered during signup.
- AboutUs Page: This page consists of various details of the system.
- User Profile Page: Once the User has logged in he reaches his profile page which consists of details entered by him during the SignUp and also has the option of editing details. This page consists of links to a few other pages mentioned below.
- Resume Builder Page: Here, the user can upload a scanned copy of his/her resume so that required details can be extracted by the system. Other details of the user (mandatory but not present in the resume) can be manually fed into the system here.
- Predict Job Role: This page displays the job role best suited for the user depending on the inputs specified by the user.
- View Course Catalog: This page recommends the user with various links to online courses and educational platforms where the user can hone his/her necessary skills.

3.2 Hardware Interfaces

A phone/home computer with a camera for resume upload.
High Speed connection to Database
Any Internet Browser
Strong Internet Access

Hardware Requirements -

Parameters	**Requirements**
Operating System	Windows, Linux, MacOS (Support for ML libraries and Python)
Ram	4 GB+

Processor	Intel Core i3 or Higher core Processor(CPU)/2.1GHz or Higher

3.3 Software Interfaces

Python

Python's design philosophy emphasizes code readability through use of significant whitespace. Its language constructs and object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects.

Flask

Flask is a lightweight WSGI web application framework. It is designed to make getting started quick and easy, with the ability to scale up to complex applications. It began as a simple wrapper around Werkzeug and Jinja and has become one of the most popular Python web application frameworks.

SQLAlchemy

SQLAlchemy is the Python SQL toolkit and Object Relational Mapper that gives application developers the full power and flexibility of SQL.

It provides a full suite of well known enterprise-level persistence patterns, designed for efficient and high-performing database access, adapted into a simple and Pythonic domain language.

Keras

Keras is a high-level neural networks API, written in Python and capable of running on top of TensorFlow, CNTK, or Theano. It was developed with a focus on enabling fast experimentation.

Tensorflow

TensorFlow is an end-to-end open-source platform for machine learning. It has a comprehensive, flexible ecosystem of tools, libraries, and community resources that lets researchers push the state-of-the-art in ML and developers easily build and deploy ML-powered applications.

Software	**Version**

Flask	1.1.1
SQLAlchemy	1.2
Python	3.5.3
Flask	1.0.2
Keras	2.3.0
Tensorflow	2.0

3.4 Communications Interfaces

Job Role Prediction Software requires active internet connection to upload the resume of the user and run the neural network model so as to obtain results. The Internet is also required to install plugins and update components like API's, modules, etc.

4. System Features

This section explains Job Role Prediction software's most prominent features and explains how they can be used and the results they will give back to the user.

4.1 User Registration and profile setup

● This feature allows any user expert or typical to register themselves in our application.
● Any new user will be directed to the registration page where they have to provide the email and password they will require to log in to the application.
● After the email and password is set, the user is directed towards the profile set up page where they will enter details like their name, age, previous medications, gender, etc.
● Successful completion of these steps registers the user into the system.
● Registration of the user is helpful for updating the database to improve the results.

4.2 User Login

● This feature allows the registered user to login using their credentials.
● Once login is successful, the user is directed to page where they can view their profile or upload resume scan.
● Login is only successful on giving proper credentials.

4.3 Resume Builder

- In case the user does not have a resume ready, he/she can use the resume builder provided by the system to generate a resume by manually specifying personal, educational details, etc. and choosing from a variety of templates. The user can also download the built resume into his/her local machine.

4.4 Predict Job Role

- This feature displays the top three job roles best suited for the user along with the percentage of their preference.
- This is achieved using Artificial Neural Networks.

4.5 View Course Catalog

- This feature recommends the user with various links to online courses and educational platforms where the user can hone his/her necessary skills.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

● The application will run if the system has reliable internet connection. The application can run on both computers and mobile phones.
● The results are generated within minutes and does not take a lot of time thus making response time appropriate and quick for the users.
● Response to user errors and undesirable situations have been taken care of to ensure that the application runs without any uncertainty.

5.2 Safety Requirements

This software uses the dataset from a reliable source. The predicted job role is just based on the similarity in patterns amongst the profiles of 20,000 people. The user should understand that the algorithm provides a close enough probability of the job role suggested to suit the user's personality. The software in no way promises success in career prospects but rather a head-start for a fresher into the corporate world.

5.3 Security Requirements

No security features have been implemented as of now. Privacy issues do not arise since the majority of the software is open source.

5.4 Software Quality Attributes

Job Role Prediction software provides users with both simple and complex features. Due to its well designed and easy to use interface, it can be used by both experts and typical users. However the users must have a basic knowledge on how to scan and upload an image of the resume and respond to companies recruiting individuals in the same domain as the user.

Appendix A: Glossary

JRPS - Job Role Prediction Software
OS - Operating System
SRS - Software Requirement Specification