PES UNIVERSITY, BANGALORE

Department of Computer Science and Engineering

Software Requirements Specification

for

Attrition Analysis System

Version 1.0 approved

Prepared by Team Edith

Attrition Analysis Pvt. Ltd.

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Revision History

Name	Date	Reason For Changes	Version
Attrition Analysis Software	31/10/22	Implemented Flask Backend	1.1.0

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Introduction

Purpose

The product for which the software requirements are specified in this document is the Attrition Analysis System, version 1.0.

The document elaborates on the

- Need for the software
- Software and other requirements
- Design and Implementation Constraints
- Features aimed to implement in version 1.0

AAS 1.0 will be deployed as a web-app for the end user, with the main features implemented.

Intended Audience

The document is intended for the product developers, project manager, testers, documentation writers and team mentor.

Product Scope

The Attrition analysis system helps the Product and Service Industries to analyze patterns and potential trends that affect attrition rates in companies. A thorough analysis on these trends help companies understand underlying reasons behind attrition and can take measures to mitigate the situation and retain valuable employees. Being an effective HR analytics tool, the software helps businesses in making informed decisions with respect to managing its employees and ensuring qualitative outcome.

References

Dataset for training is used from Kaggle.com. The application is suited to run in any recent browser hosting a server.

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Overall Description

Product Perspective

The product aims to provide business insights into hiring employees and ensure their continued service during their tenure. The various trends predicted navigate the organization's investments and efforts into ensuring the employee's smooth tenure.

Product Functions

Main features the products aims to provide:

- Attrition prediction
- Employee trend analysis in the organization

User Classes and Characteristics

- Employers
- Product Managers
- Board Members of an organization

Operating Environment

The software operates with a server (preferably Live/Apache Xampp). No particular hardware requirements. The app can run in any operating system provided it is run on a latest updated browser.

Design and Implementation Constraints

The software performs analysis and prediction only on a fixed set of attributes.

2.6 Assumptions and Dependencies

The backend for analysis assumes the same set of attributes to be tested on employees against attributes tailored for each organization.

External Interface Requirements

User Interfaces

The web application comes with a simple HTML front end with a provision to upload a CSV file. The UI is fairly minimalistic for the user with a single file upload. After processing of the file, the results along with statistics are displayed on the web page itself.

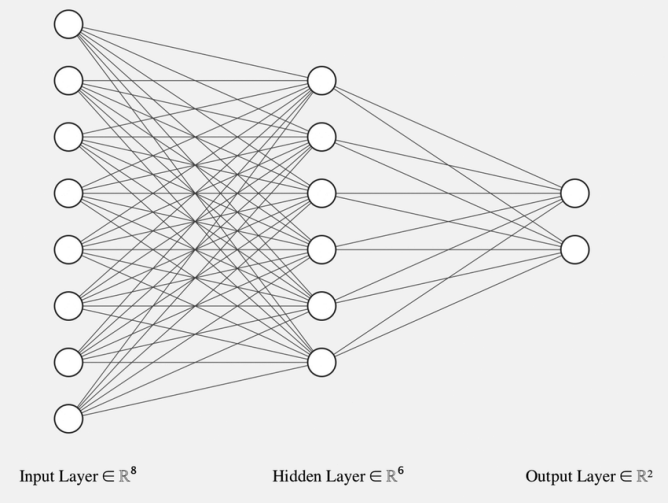
Software Interfaces

The application is hosted using a Flask server which communicates with a TensorFlow backend using implicit Python module import. Version 1 accepts CSV format of input only. Python packages used for the server implementation and the backend include Numpy, Pandas,

Matplotlib, Sklearn, Tensorflow, Flask, Seaborn, werkzeug, and OS. Frontend is implemented using the basic web stack containing HTML, CSS and JavaScript.

Analysis Models

Artificial Neural Networks are utilized to analyze and further predict the likelihood of attrition in companies. Based on the attributes provided by the customer including but not limited to age, sex, department, Education field etc. The model includes one input layer, one hidden layer and one output layer. The input, hidden and output layer contain 6,6,1 units respectively. The categorical data is encoded to ensure input meets the standards of the Artificial Neural Network. The input and hidden layers have the Rectifier activation function and the output layer has the sigmoid activation function which given a binary output.



Sample ANN

System Features

Attrition Prediction

5.1.1 Description and Priority

Priority: High
The software predicts whether a given set of employees will go through attrition or not, depending on a trend analysis from a previous employee dataset.

5.1.2 Stimulus/Response Sequences

The user needs to upload a csv file, no matter the size, and for the given file, we predict 'yes' or 'no' w.r.t attrition for each employee.

5.1.3 Functional Requirements

REQ-1: Latest Chrome Browser to support Live Server
REQ-2: Updated Python 3.10.4 and dependent libraries

Exploratory Data Analysis

5.2.1 Description and Priority

Priority: High
The software performs an exploratory data analysis on the input dataset based on pre-defined metrics and outputs the trends identified from the same as EDA plots.

5.2.2 Stimulus/Response Sequences

The user needs to upload a csv file, no matter the size, and for the given file, we perform exploratory data analysis for the whole batch of employees.

5.1.3 Functional Requirements

REQ-1: Latest Chrome Browser to support Live Server
REQ-2: Updated Python 3.10.4 and dependent libraries

Other Nonfunctional Requirements

Safety Requirements

The website will consist of RSA 2048 encryption to ensure secure communication and secure access of data to prevent data tampering.

Security Requirements

Confidential data shared by the customer will include explicit details about their employees. This data will be extracted by the web application and will be given as input for Exploratory Data Analysis and into the Artificial Neural Network. Customers must agree to privacy policy giving access to the confidentail employee database. The database and the information it entails will not be shared with any third party under any circumstances. Additional layers of security will ensure that the data is not accessed by eavesdroppers.

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Software Quality Attributes

The software is based on javascript web application and python libraries including matplotlib and tensorflow, keras. These are easily adaptable and maintainable. In addition, availability and accessibility is taken care of since the product is a web application available on the internet. The web-app is system independent and interoperable.

Other Requirements

Privacy policy to agree to the sharing of employee databases.