## INTRODUCTION

Human resource management (HRM or HR) is the strategic approach to the effective and efficient management of people in a company or organization such that they help their business gain a competitive advantage.

It is designed to maximize employee performance in service of an employer's strategic objectives.

The field of human resources analysis, which can be understood as an approach to human recourses management focused on data and analytical thinking.

Human resources analysis an optimal use of human resources to ensure that the human resources of an organization remain an asset and not a liability.

The project analyzes the data of the employees working in the organization.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S.NO | Authors | Title | Publishing | Techniques |
| 1 | AMAN KHARWAL | Human Resource Analysis with Python | *Agronomy for Sustainable Development* volume (2015) | The field of human resources analysis, which can be understood as an approach to human resources management focused on data and analytical thinking, is quickly becoming an indispensable part of organizational configurations. |
| 2 | JOHN-PAUL HATALA | Social Network Analysis in Human Resource Development: A New Methodology | Louisiana State University | Through an exhaustive review of the literature, this article looks at the applicability of social network analysis (SNA) in the field of human resource development |
| 3 | John W. Boudreau | Utility Analysis for Decisions in Human Resource Management | Cornell University | This chapter will discuss utility analysis (VA), which attempts to answer such questions by focusing on decisions about human resources. Utility analysis refers to the process that describes, predicts and/or explains what determines the usefulness or desirability of decision options, and examines how that information affects decisions |

## LITERATURE SURVEY

## METHODOLOGY

## Hardware –

## Processor –

## 1. AMD Athlon 3000G and above

## 2. Intel i3 4th gen and above

## Ram – 4Gs

## Storage - 240gs SSD / 512gb HHD

## Software –

## 1. windows 10

## 2. visual studio code

## 3. python

## Python –

## Flask – web hosting library

## Plotly – plotting graphs

## Csv and pandas – csv file and data

## IMPLEMENTATION

## app2.py

from flask import Flask, render\_template

from flask\_assets import Bundle, Environment

import pandas as pd

import json

import plotly

import plotly.express as px

import csv

app = Flask(\_\_name\_\_)

js = Bundle('style.css')

assets = Environment(app)

assets.register('main\_js',js)

train = pd.read\_csv('aug\_train.csv')

missing\_value = 100 \* train.isnull().sum()/len(train)

missing\_value = missing\_value.reset\_index()

missing\_value.columns = ['variables','missing values in percentage']

def train\_data():

    df = pd.read\_csv("aug\_train.csv")

    with open('aug\_train.csv',newline='') as file:

        data = csv.DictReader(file)

        count = 0

        for row in data:

            if row['education\_level'] == 'Graduate' or row['education\_level'] == 'Phd':

                if int(row['training\_hours']) >= 10:

                    df.loc[count, 'hit\_counter'] = 'hit'

            else:

                df.loc[count, 'hit\_counter'] = 'not\_hit'

            print(count)

            count+=1

        df.to\_csv("aug\_train.csv", index=True)

@app.route('/')

def index():

    return render\_template('index.html')

@app.route('/about')

def about():

    return render\_template('about.html')

@app.route('/tra1n')

def tra1n():

    train\_data()

    return render\_template('tra1n.html',description="Data is trained")

@app.route('/chart1')

def chart1():

    fig = px.imshow(train.isnull().T)

    fig.update\_layout(title='Missing values in data set')

    #fig.show()

    graphJSON = json.dumps(fig, cls=plotly.utils.PlotlyJSONEncoder)

    header="chart1"

    description = "temp1"

    return render\_template('notdash2.html', graphJSON=graphJSON, header=header,description=description)

@app.route('/chart2')

def chart2():

    plot\_city = train['city'].value\_counts()[0:50].reset\_index()

    plot\_city.columns = ['City','Count']

    px.bar(plot\_city,x='City',y='Count',title='City',color='Count')

    fig = px.bar(plot\_city,x='City',y='Count',template='gridon',title='City',color='Count')

    fig.update\_layout(title\_text='plot\_city',title\_y=0.5)

    graphJSON = json.dumps(fig, cls=plotly.utils.PlotlyJSONEncoder)

    header="chart2"

    description = "temp2"

    return render\_template('notdash2.html', graphJSON=graphJSON, header=header,description=description)

@app.route('/chart3')

def chart3():

    plot\_cdi =train['city\_development\_index'].value\_counts().reset\_index()[0:50]

    plot\_cdi.columns = ['cdi','Count']

    plot\_cdi['cdi'] = plot\_cdi['cdi'].astype('str')

    fig = px.bar(plot\_cdi,y="Count", x="cdi",color='Count',title='City development index')

    graphJSON = json.dumps(fig, cls=plotly.utils.PlotlyJSONEncoder)

    header="chart3"

    description = "temp3"

    return render\_template('notdash2.html', graphJSON=graphJSON, header=header,description=description)

@app.route('/chart4')

def chart4():

    plot\_gender = train['enrolled\_university'].value\_counts().reset\_index()

    plot\_gender.columns = ['enrolled\_university','count']

    fig = px.pie(plot\_gender,values='count',names='enrolled\_university',title='enrolled\_university')

    graphJSON = json.dumps(fig, cls=plotly.utils.PlotlyJSONEncoder)

    header="chart4"

    description = "temp4"

    return render\_template('notdash2.html', graphJSON=graphJSON, header=header,description=description)

@app.route('/chart5')

def chart5():

    plot\_gender = train['education\_level'].value\_counts().reset\_index()

    plot\_gender.columns = ['education\_level','count']

    fig = px.pie(plot\_gender,values='count',names='education\_level',title='education\_level')

    graphJSON = json.dumps(fig, cls=plotly.utils.PlotlyJSONEncoder)

    header="chart5"

    description = "temp5"

    return render\_template('notdash2.html', graphJSON=graphJSON, header=header,description=description)

@app.route('/chart6')

def chart6():

    plot\_gender = train['major\_discipline'].value\_counts().reset\_index()

    plot\_gender.columns = ['major\_discipline','count']

    fig = px.pie(plot\_gender,values='count',names='major\_discipline',title='Major discipline')

    fig.update\_traces(textposition='inside', textinfo='percent+label')

    graphJSON = json.dumps(fig, cls=plotly.utils.PlotlyJSONEncoder)

    header="chart6"

    description = "temp6"

    return render\_template('notdash2.html', graphJSON=graphJSON, header=header,description=description)

@app.route('/chart7')

def chart7():

    plot\_gender = train['company\_size'].value\_counts().reset\_index()

    plot\_gender.columns = ['company\_size','count']

    fig = px.pie(plot\_gender,values='count',names='company\_size',title='company\_size is determined by no. of people employees')

    graphJSON = json.dumps(fig, cls=plotly.utils.PlotlyJSONEncoder)

    header="chart7"

    description = "temp7"

    return render\_template('notdash2.html', graphJSON=graphJSON, header=header,description=description)

@app.route('/chart8')

def chart8():

    train = pd.read\_csv('aug\_train.csv')

    plot\_gender = train['hit\_counter'].value\_counts().reset\_index()

    plot\_gender.columns = ['hit\_counter','count']

    fig = px.pie(plot\_gender,values='count',names='hit\_counter',title='desired employment graph')

    graphJSON = json.dumps(fig, cls=plotly.utils.PlotlyJSONEncoder)

    header="chart8"

    description = "temp8"

    return render\_template('notdash2.html', graphJSON=graphJSON, header=header,description=description)

if \_\_name\_\_ == "\_\_main\_\_":

    app.run(debug=True)

index.html

  <!DOCTYPE html>

<html lang="en">

<head>

  <meta charset="utf-8">

  <meta content="width=device-width, initial-scale=1.0" name="viewport">

  <title>HOME</title>

  <meta content="" name="description">

  <meta content="" name="keywords">

  <!-- Google Fonts -->

  <link href="https://fonts.googleapis.com/css?family=Open+Sans:300,300i,400,400i,600,600i,700,700i|Roboto:300,300i,400,400i,500,500i,700,700i&display=swap" rel="stylesheet">

  <!-- Vendor CSS Files -->

  <link href = "{{ url\_for('static',filename='css/style.css')}}" rel = "stylesheet">

  <link href = "{{ url\_for('static',filename='vendor/animate.css/animate.min.css')}}" rel = "stylesheet">

  <link href = "{{ url\_for('static',filename='vendor/aos/aos.css')}}" rel = "stylesheet">

  <link href = "{{ url\_for('static',filename='/vendor/bootstrap/css/bootstrap.min.css')}}" rel = "stylesheet">

  <link href = "{{ url\_for('static',filename='vendor/bootstrap-icons/bootstrap-icons.css')}}" rel = "stylesheet">

  <link href = "{{ url\_for('static',filename='vendor/boxicons/css/boxicons.min.css')}}" rel = "stylesheet">

  <link href = "{{ url\_for('static',filename='vendor/glightbox/css/glightbox.min.css')}}" rel = "stylesheet">

  <link href = "{{ url\_for('static',filename='vendor/swiper/swiper-bundle.min.css')}}" rel = "stylesheet">

</head>

<body>

  <!-- ======= Header ======= -->

  <header id="header" class="fixed-top d-flex align-items-center header-transparent">

    <div class="container d-flex justify-content-between align-items-center">

      <div class="logo">

        <h1 class="text-light"><a href="index.html"><span>HUMAN RESOURCE MANAGEMENT</span></a></h1>

        <!-- Uncomment below if you prefer to use an image logo -->

        <!-- <a href="index.html"><img src="assets/img/logo.png" alt="" class="img-fluid"></a>-->

      </div>

      <nav id="navbar" class="navbar">

        <ul>

          <li><a class="active " href="/">Home</a></li>

          <li><a href="about">About</a></li>

          <li><a href="tra1n">Train</a></li>

          <li class="dropdown"><a href="#"><span>Graphs</span> <i class="bi bi-chevron-down"></i></a>

            <ul>

              <!--<li><a href="chart1">missing values</a></li>-->

              <li><a href="chart2">City Distribution</a></li>

              <li><a href="chart3">City Development Index</a></li>

              <li><a href="chart4">Enrolled Univertisty Index</a></li>

              <li><a href="chart5">Educational Level Index</a></li>

              <li><a href="chart6">Major Descipline</a></li>

              <li><a href="chart7">Company Size</a></li>

              <li><a href="chart8">Desired Employment Chart</a></li>

              </ul>

          </li>

        </ul>

        <i class="bi bi-list mobile-nav-toggle"></i>

      </nav><!-- .navbar -->

    </div>

  </header><!-- End Header -->

  <!-- ======= Hero Section ======= -->

  <section id="hero" class="d-flex justify-cntent-center align-items-center">

    <div id="heroCarousel" class="container carousel carousel-fade" data-bs-ride="carousel" data-bs-interval="5000">

      <!-- Slide 1 -->

      <div class="carousel-item active">

        <div class="carousel-container">

          <h2 class="animate\_\_animated animate\_\_fadeInDown">WELCOME TO HUMAN-RESOUCE MANAGEMENT</h2>

          <p class="animate\_\_animated animate\_\_fadeInUp">Use the drop down option to browse through the graphs</p>

        </div>

      </div>

   </div>

  </body>

</html>

About.html

<!DOCTYPE html>

<html lang="en">

<head>

  <meta charset="utf-8">

  <meta content="width=device-width, initial-scale=1.0" name="viewport">

  <title>ABOUT</title>

  <meta content="" name="description">

  <meta content="" name="keywords">

  <!-- Google Fonts -->

  <link href="https://fonts.googleapis.com/css?family=Open+Sans:300,300i,400,400i,600,600i,700,700i|Roboto:300,300i,400,400i,500,500i,700,700i&display=swap" rel="stylesheet">

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  <link href = "{{ url\_for('static',filename='/vendor/bootstrap/css/bootstrap.min.css')}}" rel = "stylesheet">

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  <link href = "{{ url\_for('static',filename='vendor/swiper/swiper-bundle.min.css')}}" rel = "stylesheet">

</head>

<body>

  <!-- ======= Header ======= -->

  <header id="header" class="fixed-top d-flex align-items-center header-transparent">

    <div class="container d-flex justify-content-between align-items-center">

      <div class="logo">

        <h1 class="text-light"><a href="index.html"><span>ABOUT</span></a></h1>

        <!-- Uncomment below if you prefer to use an image logo -->

        <!-- <a href="index.html"><img src="assets/img/logo.png" alt="" class="img-fluid"></a>-->

      </div>

      <nav id="navbar" class="navbar">

        <ul>

          <li><a class="active " href="/">Home</a></li>

          <li><a href="about">About</a></li>

          <li><a href="tra1n">Train</a></li>

          <li class="dropdown"><a href="#"><span>Graphs</span> <i class="bi bi-chevron-down"></i></a>

            <ul>

              <!--<li><a href="chart1">missing values</a></li>-->

              <li><a href="chart2">City Distribution</a></li>

              <li><a href="chart3">City Development Index</a></li>

              <li><a href="chart4">Enrolled Univertisty Index</a></li>

              <li><a href="chart5">Educational Level Index</a></li>

              <li><a href="chart6">Major Descipline</a></li>

              <li><a href="chart7">Company Size</a></li>

              <li><a href="chart8">Desired Employment Chart</a></li>

              </ul>

          </li>

        </ul>

        <i class="bi bi-list mobile-nav-toggle"></i>

      </nav><!-- .navbar -->

    </div>

  </header><!-- End Header -->

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      <!-- Slide 1 -->

      <div class="carousel-item active">

        <div class="carousel-container">

          <h2 class="animate\_\_animated animate\_\_fadeInDown">HUMAN-RESOUCE MANAGEMENT</h2>

          <p class="animate\_\_animated animate\_\_fadeInUp">Human resource management (HRM or HR) is the strategic approach to the effective and efficient management of people in a company or organization such that they help their business gain a competitive advantage. It is designed to maximize employee performance in service of an employer's strategic objectives.</p>

        </div>

      </div>

   </div>

  </body>

</html>

Train.html

  <!DOCTYPE html>

<html lang="en">

<head>

  <meta charset="utf-8">

  <meta content="width=device-width, initial-scale=1.0" name="viewport">

  <title>HOME</title>

  <meta content="" name="description">

  <meta content="" name="keywords">

  <!-- Google Fonts -->

  <link href="https://fonts.googleapis.com/css?family=Open+Sans:300,300i,400,400i,600,600i,700,700i|Roboto:300,300i,400,400i,500,500i,700,700i&display=swap" rel="stylesheet">

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</head>

<body>

  <!-- ======= Header ======= -->

  <header id="header" class="fixed-top d-flex align-items-center header-transparent">

    <div class="container d-flex justify-content-between align-items-center">

      <div class="logo">

        <h1 class="text-light"><a href="index.html"><span>HUMAN RESOURCE MANAGEMENT</span></a></h1>

        <!-- Uncomment below if you prefer to use an image logo -->

        <!-- <a href="index.html"><img src="assets/img/logo.png" alt="" class="img-fluid"></a>-->

      </div>

      <nav id="navbar" class="navbar">

        <ul>

          <li><a class="active " href="/">Home</a></li>

          <li><a href="about">About</a></li>

          <li><a href="tra1n">Train</a></li>

          <li class="dropdown"><a href="#"><span>Graphs</span> <i class="bi bi-chevron-down"></i></a>

            <ul>

              <!--<li><a href="chart1">missing values</a></li>-->

              <li><a href="chart2">City Distribution</a></li>

              <li><a href="chart3">City Development Index</a></li>

              <li><a href="chart4">Enrolled Univertisty Index</a></li>

              <li><a href="chart5">Educational Level Index</a></li>

              <li><a href="chart6">Major Descipline</a></li>

              <li><a href="chart7">Company Size</a></li>

              <li><a href="chart8">Desired Employment Chart</a></li>

              </ul>

          </li>

        </ul>

        <i class="bi bi-list mobile-nav-toggle"></i>

      </nav><!-- .navbar -->

    </div>

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    <div id="heroCarousel" class="container carousel carousel-fade" data-bs-ride="carousel" data-bs-interval="5000">

      <!-- Slide 1 -->

      <div class="carousel-item active">

        <div class="carousel-container">

          <h2 class="animate\_\_animated animate\_\_fadeInDown">{{description}}</h2>

          <p class="animate\_\_animated animate\_\_fadeInUp">Use the drop down option to browse through the graphs</p>

          <a class="animate\_\_animated animate\_\_fadeInUp" href="chart8">or click here</a>

        </div>

      </div>

   </div>

  </body>

</html>

Generator.html

<!doctype html>

<html>

    <head>

        <meta charset="utf-8">

        <meta content="width=device-width, initial-scale=1.0" name="viewport">

        <title>chart</title>

        <meta content="" name="description">

        <meta content="" name="keywords">

        <!-- Google Fonts -->

        <link href="https://fonts.googleapis.com/css?family=Open+Sans:300,300i,400,400i,600,600i,700,700i|Roboto:300,300i,400,400i,500,500i,700,700i&display=swap" rel="stylesheet">

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        <link href = "{{ url\_for('static',filename='vendor/aos/aos.css')}}" rel = "stylesheet">

        <link href = "{{ url\_for('static',filename='/vendor/bootstrap/css/bootstrap.min.css')}}" rel = "stylesheet">

        <link href = "{{ url\_for('static',filename='vendor/bootstrap-icons/bootstrap-icons.css')}}" rel = "stylesheet">

        <link href = "{{ url\_for('static',filename='vendor/boxicons/css/boxicons.min.css')}}" rel = "stylesheet">

        <link href = "{{ url\_for('static',filename='vendor/glightbox/css/glightbox.min.css')}}" rel = "stylesheet">

        <link href = "{{ url\_for('static',filename='vendor/swiper/swiper-bundle.min.css')}}" rel = "stylesheet">

      </head>

      <header id="header" class="fixed-top  align-items-center header-opaque ">

        <div class="container d-flex justify-content-between align-items-center">

          <div class="logo">

            <h1 class="text-light"><a href="index.html"><span>HUMAN RESOURCE MANAGEMENT</span></a></h1>

          </div>

          <nav id="navbar" class="navbar">

            <ul>

              <li><a class="active " href="/">Home</a></li>

              <li><a href="about">About</a></li>

              <li><a href="tra1n">Train</a></li>

              <li class="dropdown"><a href="#"><span>Graphs</span> <i class="bi bi-chevron-down"></i></a>

                <ul>

                  <!--<li><a href="chart1">missing values</a></li>-->

                  <li><a href="chart2">City Distribution</a></li>

                  <li><a href="chart3">City Development Index</a></li>

                  <li><a href="chart4">Enrolled Univertisty Index</a></li>

                  <li><a href="chart5">Educational Level Index</a></li>

                  <li><a href="chart6">Major Descipline</a></li>

                  <li><a href="chart7">Company Size</a></li>

                  <li><a href="chart8">Desired Employment Chart</a></li>

                  </ul>

              </li>

            </ul>

            <i class="bi bi-list mobile-nav-toggle"></i>

          </nav><!-- .navbar -->

        </div>

      </header><!-- End Header -->

  <div id="chart" class="chart"></div>

</body>

<script id="graph" src="https://cdn.plot.ly/plotly-latest.min.js"></script>

<script id = "graph" type="text/javascript">

    var graphs = {{graphJSON | safe}};

    Plotly.plot('chart',graphs,{});

</script>

</html>

## RESULTS DISCUSSION

## Text Description automatically generated

## *(terminal)*

## A computer screen capture Description automatically generated with medium confidence

## *(home page)*

## A computer screen capture Description automatically generated with medium confidence

## *(about page)*

## A computer screen capture Description automatically generated with medium confidence

## *(the page which will be rendered once the data is trained)*

## Graphical user interface Description automatically generated with medium confidence

## *(output of the iterations)*

## Graphical user interface, application Description automatically generated

## *(webpages that can be accessed by the user )*

## Graphical user interface, text, application, table Description automatically generated

## *(webpage of the city distribution chart)*

## *Graphical user interface, text, application, email Description automatically generated*

## *(webpage of citydevelopment index chart)*

## *Graphical user interface, application, table, Excel Description automatically generated*

## *(webpage of the enrolled university chart)*

## *Graphical user interface, application, table, Excel Description automatically generated*

## *(webpage of educational index chart)*

## Graphical user interface, application, table, Excel Description automatically generated

## *(webpage for the trained data)*

## CONCLUSION AND FURURE WORK

## The project portal is fully functional and predicts with desirable accuracy

## Adding more variables to generate the data for the targeted characteristics.

## Moving the web hosting service to Django or hosting it in a web server for testing will be appropriate representation of the intended real-life use

## REFERENCES

## Human Resource Analysis with Python –

## <https://thecleverprogrammer.com/2021/01/04/human-resource-analysis-with-python/>

## Social Network Analysis in Human Resource Development: A New Methodology –

## <https://journals.sagepub.com/doi/10.1177/1534484305284318>

## Utility Analysis for Decisions in Human Resource Management –

## <https://ecommons.cornell.edu/handle/1813/77325>

## Flask - <https://flask.palletsprojects.com/en/2.1.x/>

# HR Analytics using python –

# https://www.kaggle.com/code/kukreti12/hr-analytics-using-python/notebook

* Moderna html template –

https://bootstrapmade.com/free-bootstrap-template-corporate-moderna/