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.

LITERATURE SURVEY

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

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 –

  1. Flask – web hosting library
  2. Plotly – plotting graphs
  3. 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_universi
ty')

    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">

  <!-- 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>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 -->
```

```
  <!-- ======= 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">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">

  <!-- 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">{{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>
```

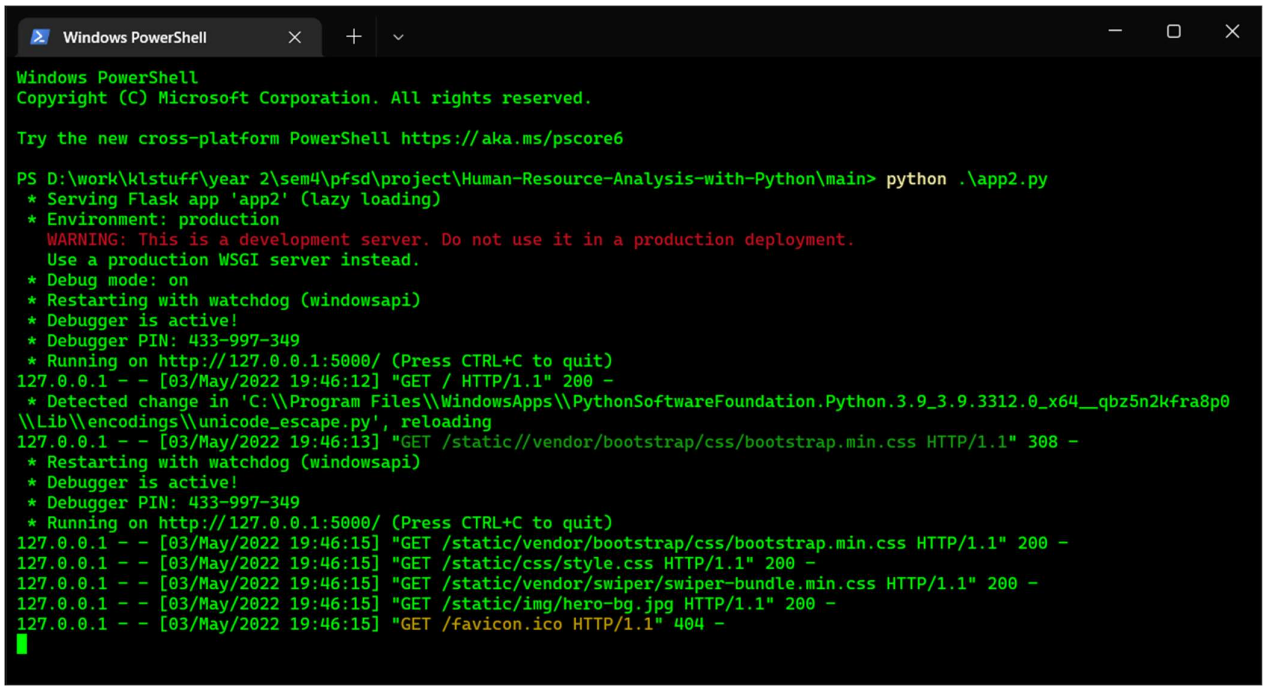
Generator.html

```
<!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">

        <!-- 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">
```

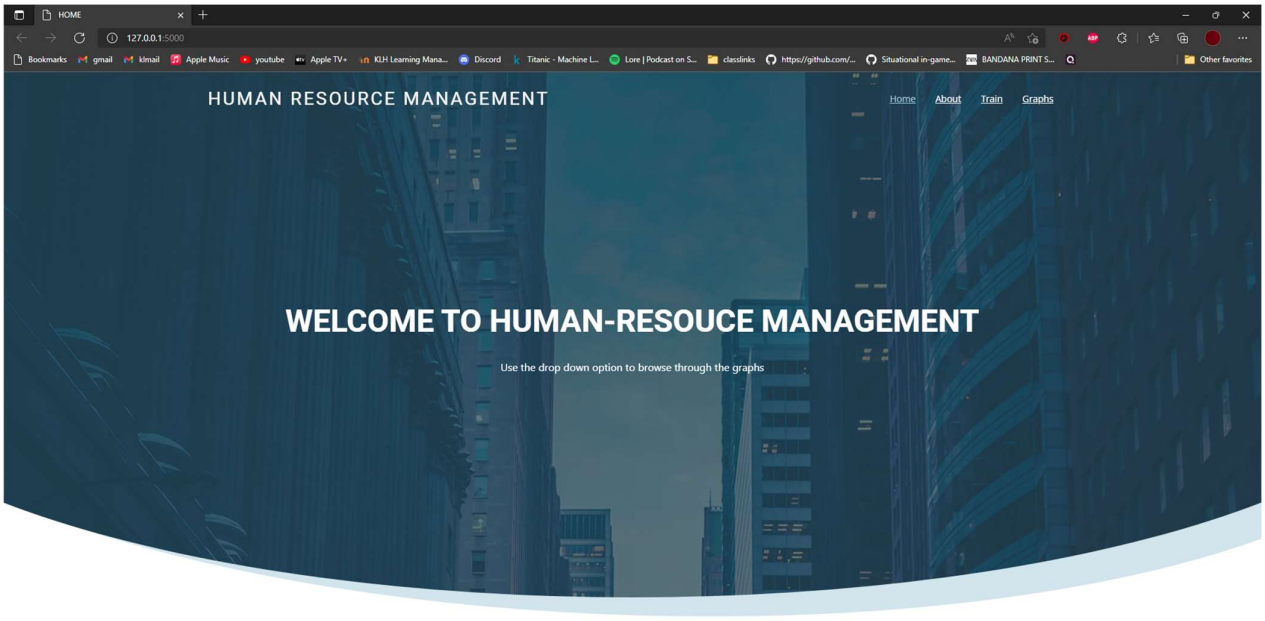
```
        <link href = "{{
url_for('static',filename='vendor/boxicons/css/boxicons.min.css')}}" rel =
"stylesheet">
        <link href = "{{
url_for('static',filename='vendor/glightbox/css/glightbox.min.css')}}" rel =
"stylesheet">
        <link href = "{{ url_for('static',filename='vendor/swiper/swiper-
bundle.min.css')}}" rel = "stylesheet">

      </head>
      <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>
```

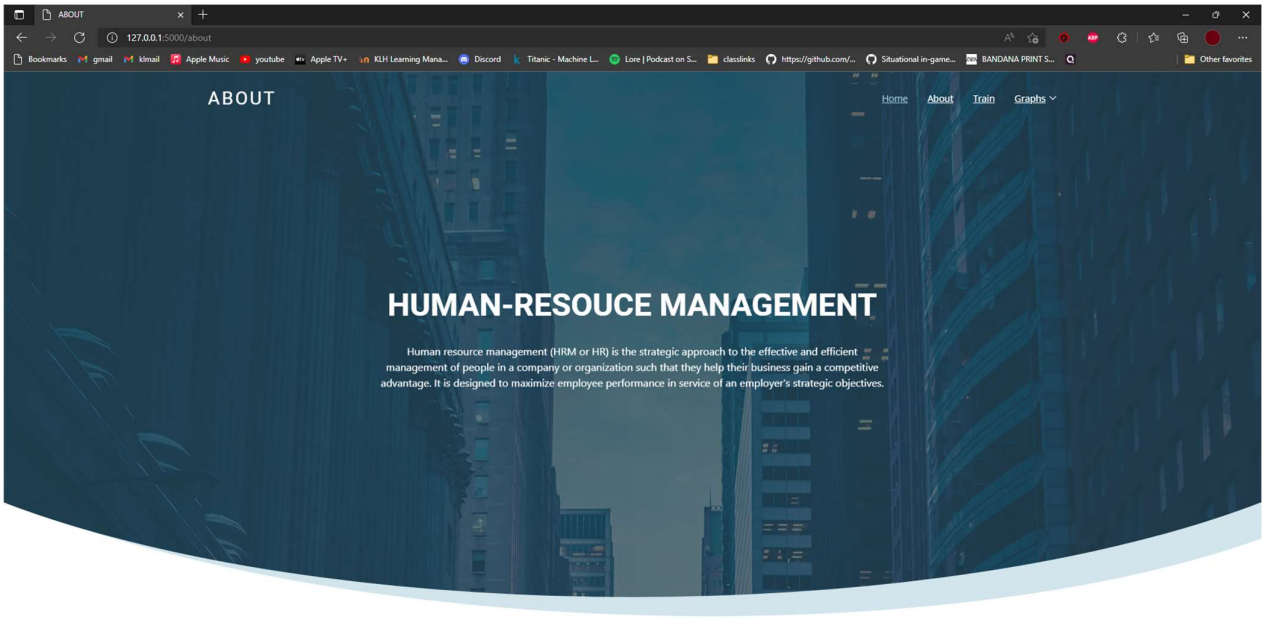
RESULTS DISCUSSION



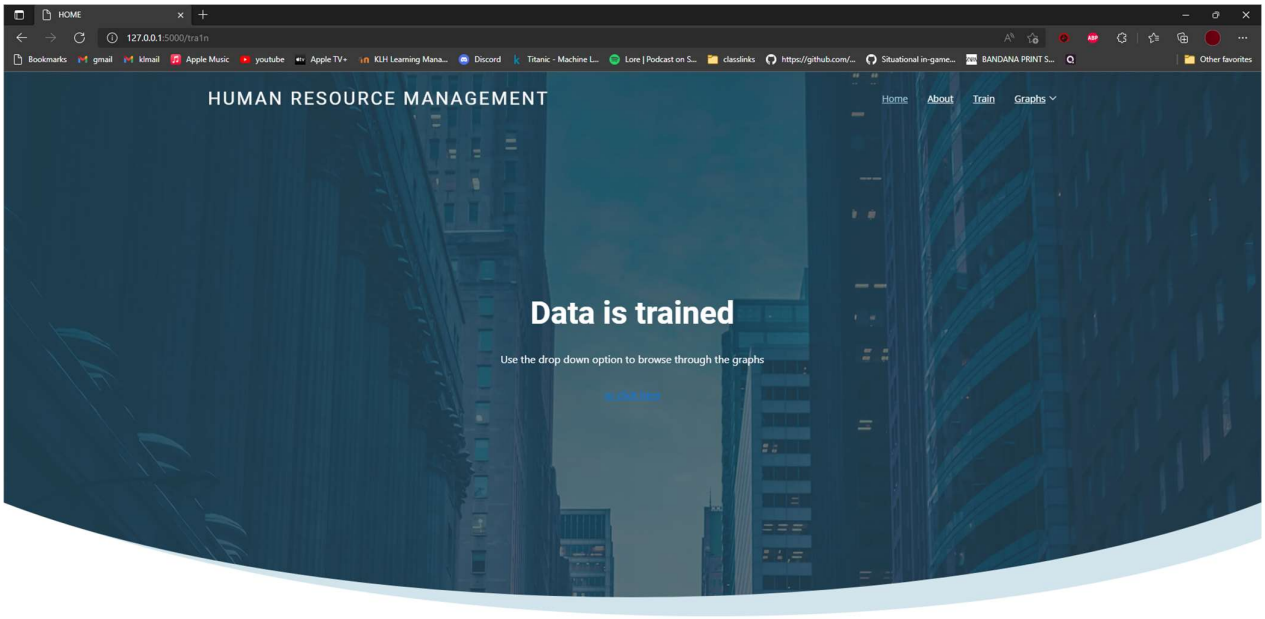
(terminal)



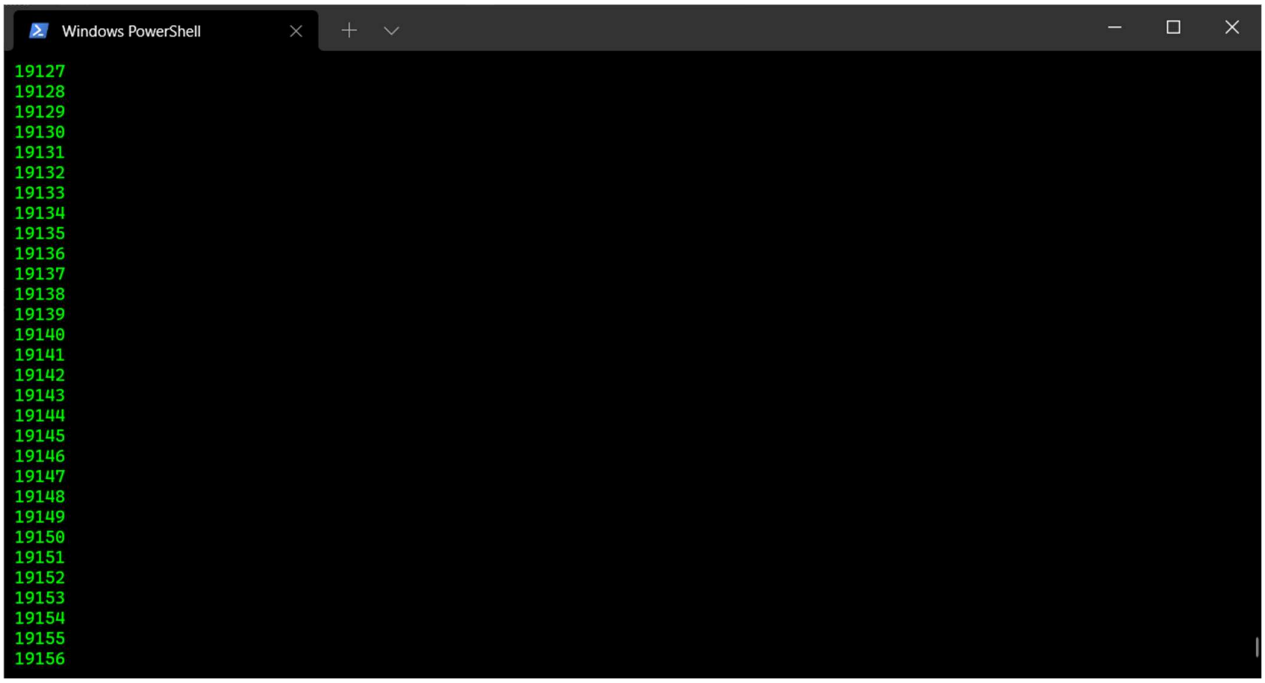
(home page)



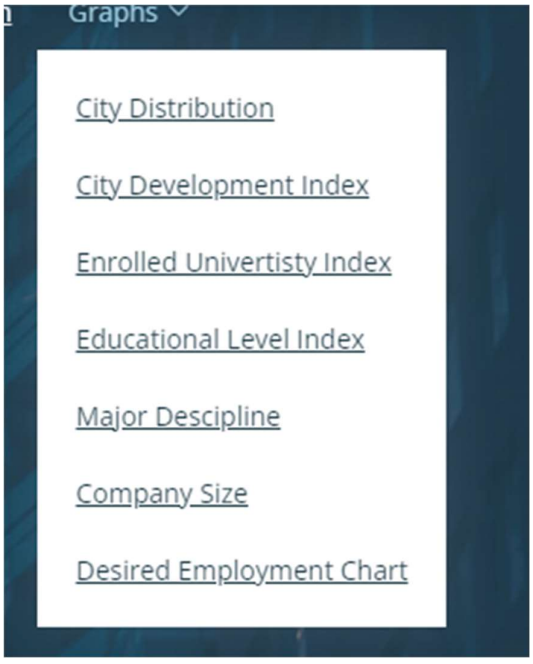
(about page)



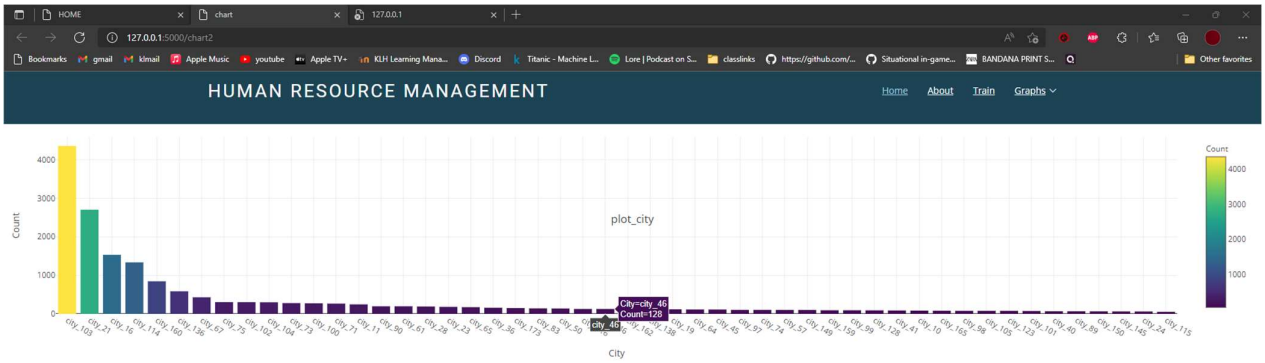
(the page which will be rendered once the data is trained)



(output of the iterations)



(webpages that can be accessed by the user)



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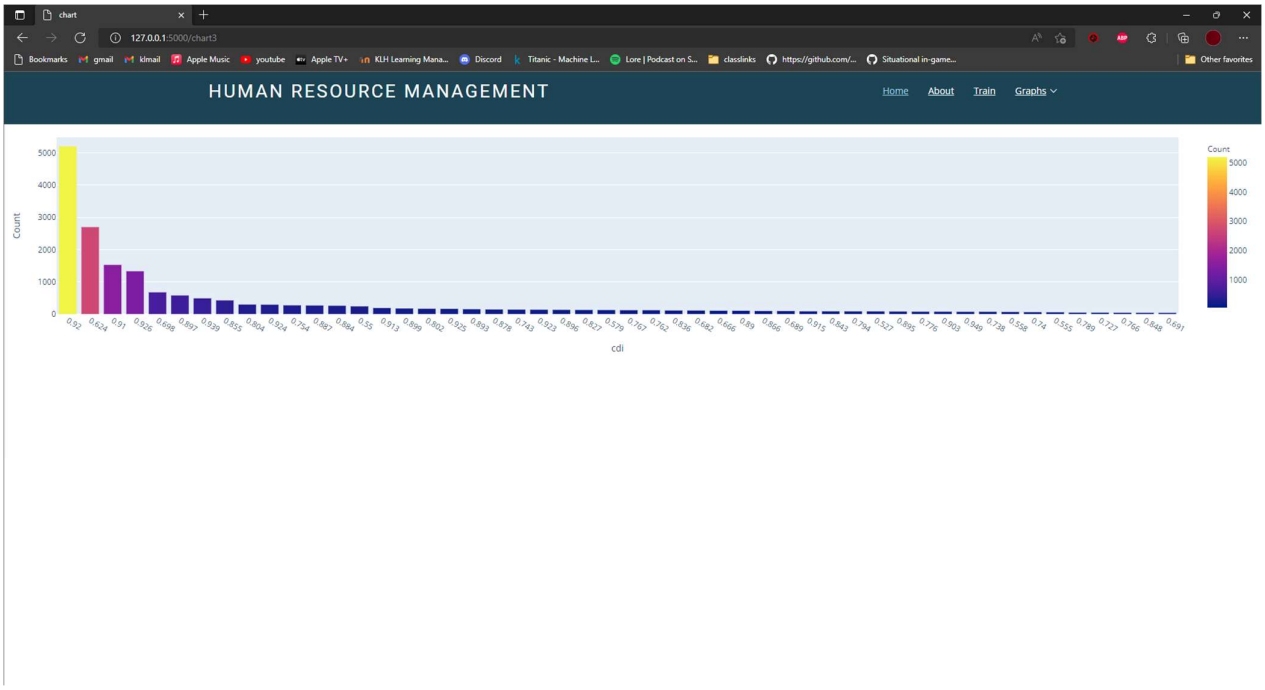

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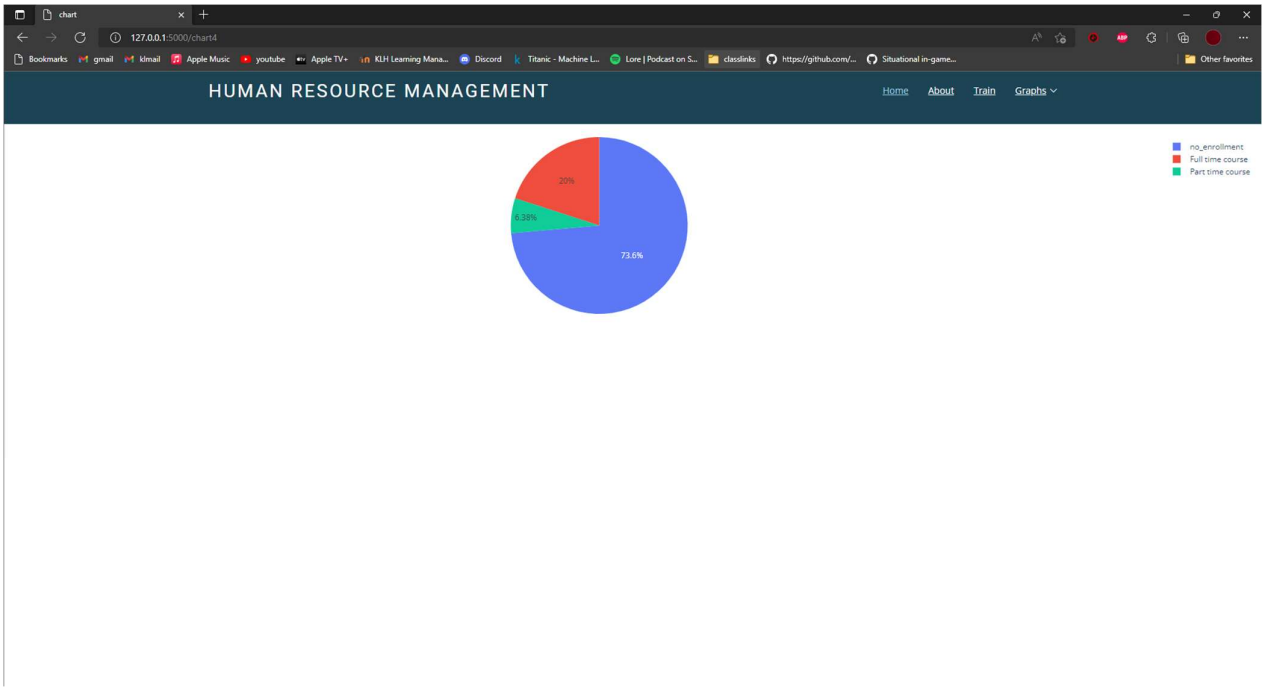

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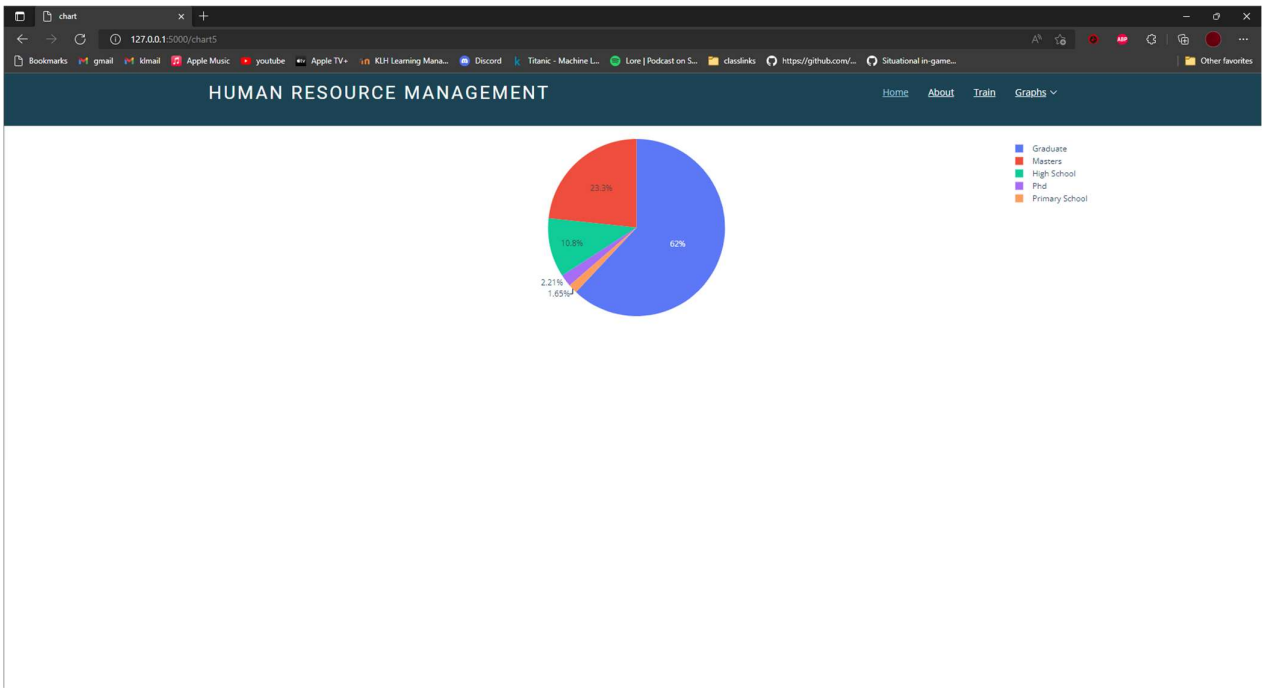

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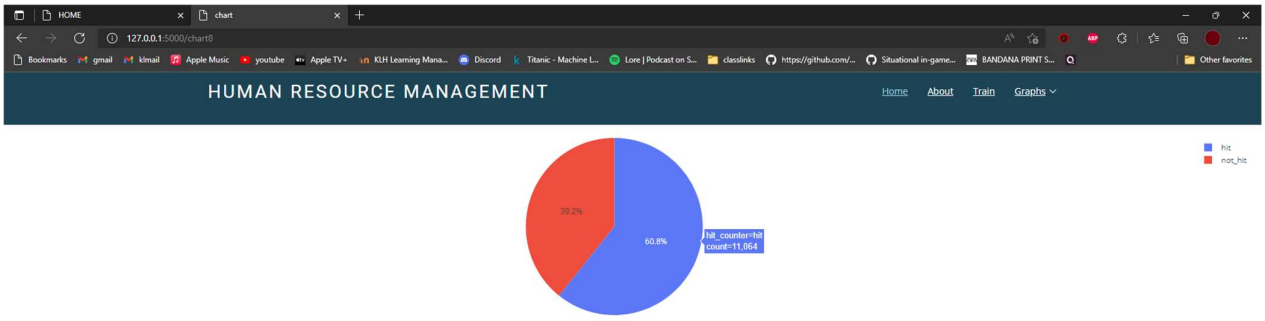

(webpage for the trained data)

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

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