

HUMAN RESOURCE ANALYSIS USING PYTHON

by

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ABSTRACT

- The field of human resources analysis, which can be understood as an approach to human resources 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 REVIEW

1 . Human Resource Analysis with Python (AMAN KHARWAL):

Abstract-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. Social Network Analysis in Human Resource Development: A New Methodology (JOHN-PAUL HATALA, Louisiana State University):

Abstract-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

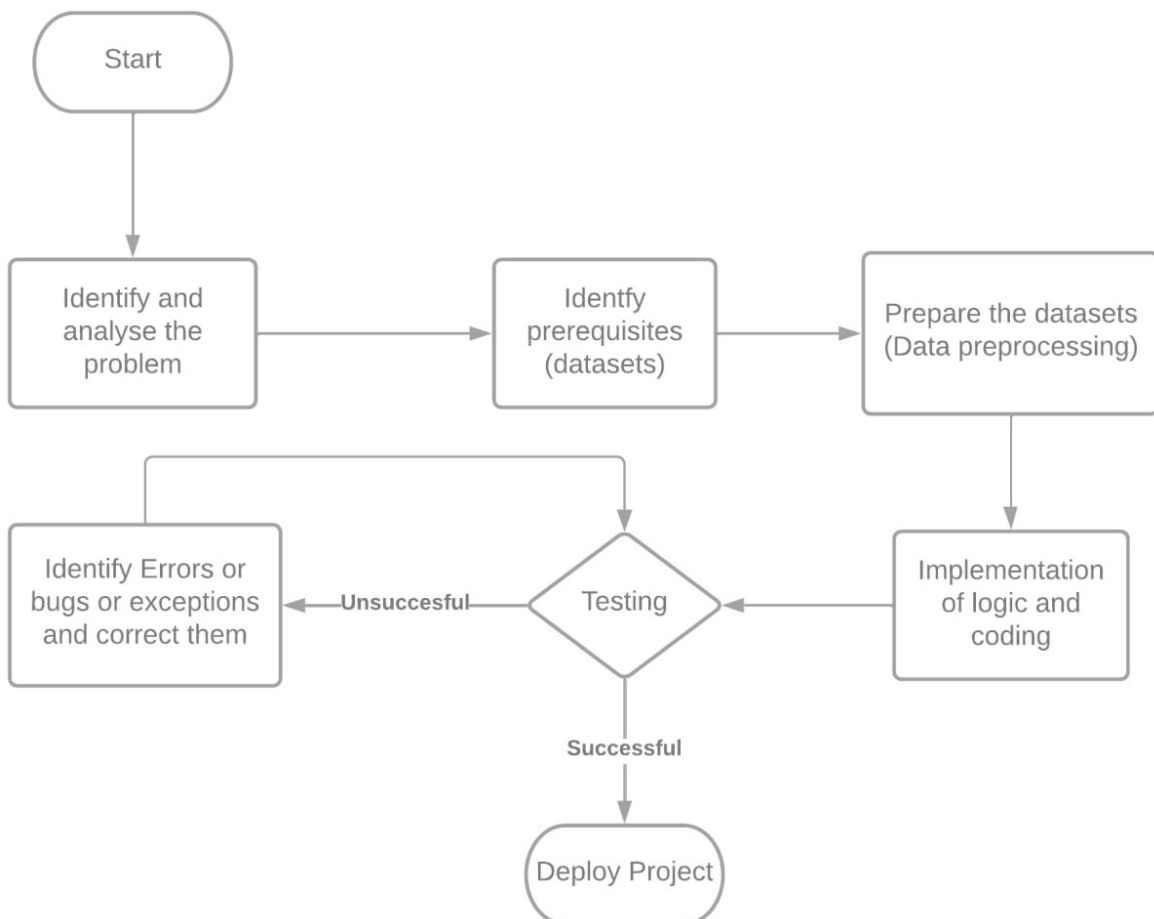
3. Utility Analysis for Decisions in Human Resource Management (John W. Boudreau Cornell University):

Abstract-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

METHODS

- The project is coded in python
- The dependencies that are used are
 - Numpy – mathematical functions
 - Pandas – data analysis and manipulation
 - Matplotlib – plotting library
 - Seaborn – visualization library based on matplotlib
 - Plotly – plot 2d data and color scaling functionality

IMPLEMENTATION FLOWCHART



FUNCTIONING OF THE CODE

Libraries:

```
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
```

Flask initialization

```
app = Flask(__name__)
assets = Environment(app)
if __name__ == "__main__":
    app.run(debug=True)
```

Generating new column from the data using conditions

```
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)
```

flask links and chart plotting

```
@app.route('/')
def index():
    return render_template('index.html')

@app.route('/about')
```

```

def about():
    return render_template('about.html')

@app.route('/train')
def train():
    train_data()
    return render_template('train.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_uni
versity')

    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)

```

HTML FILES

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">

<!-- =====
* Template Name: Moderna - v4.8.0
* Template URL: https://bootstrapmade.com/free-bootstrap-template-corporate-
moderna/
* Author: BootstrapMade.com
* License: https://bootstrapmade.com/license/
===== -->
</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"></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="train">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-
RESOURCE MANAGEMENT</h2>
                <p class="animate__animated animate__fadeInUp">Use the drop down option
to browse through the graphs</p>
            </div>
        </div>
    </div>
</body>
</html>

```

Plotty.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,600,600
i,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">

        <!-- =====
        * Template Name: Moderna - v4.8.0
        * Template URL: https://bootstrapmade.com/free-bootstrap-template-
corporate-moderna/
        * Author: BootstrapMade.com
        * License: https://bootstrapmade.com/license/
        ===== -->
</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="train">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>

```

```

        </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>

```

GITHUB COMMITS

```

PS D:\source\latifa\figma\2\asset\project\human-resource-analysis-with-python> git log
commit 9f58a9cc52a73c8a2879a3189bda8a6ac9c2f7f
Merge: 9f79ae2 d7ba68c
Author: 20180830151-satya <933620a0@20180830151-satyadusers.noreply.github.com>
Date: Wed Feb 23 09:16:12 2022 +0530

    Merge pull request #1 from 20180830151-satya/main

    updated

commit d7ba68cc52a73c8a2879a3189bda8a6ac9c2f7f
Author: 20180830151-satya <933620a0@20180830151-satyadusers.noreply.github.com>
Date: Wed Feb 23 09:16:47 2022 +0530

    Add files via upload

commit 93861579a40d0bde17cc4e3ccc99d13f00890c
Author: 20180830151-satya <933620a0@20180830151-satyadusers.noreply.github.com>
Date: Wed Feb 23 09:16:47 2022 +0530

    Delete sample_submission.csv

commit 6a64c07880c4d8c118042c4c979c0c4f804e18
Author: 20180830151-satya <933620a0@20180830151-satyadusers.noreply.github.com>
Date: Wed Feb 23 09:16:11 2022 +0530

    Delete aug_train.csv

commit 94338bcca772ba225696a915a85587a68a0ba
Author: 20180830151-satya <933620a0@20180830151-satyadusers.noreply.github.com>
Date: Wed Feb 23 09:16:12 2022 +0530

    ... updating ...

commit 9f58a9cc52a73c8a2879a3189bda8a6ac9c2f7f (HEAD -> main, origin/main, origin/HEAD)
Merge: 9f79ae2 d7ba68c
Author: 20180830151-satya <933620a0@20180830151-satyadusers.noreply.github.com>
Date: Wed Feb 23 09:16:12 2022 +0530

    Merge pull request #1 from 20180830151-satya/main

    updated

commit d7ba68cc52a73c8a2879a3189bda8a6ac9c2f7f
Author: 20180830151-satya <933620a0@20180830151-satyadusers.noreply.github.com>
Date: Wed Feb 23 09:16:38 2022 +0530

```

```

PS D:\source\latifa\figma\2\asset\project\human-resource-analysis-with-python> git log
commit 9f58a9cc52a73c8a2879a3189bda8a6ac9c2f7f
Merge: 9f79ae2 d7ba68c
Author: 20180830151-satya <933620a0@20180830151-satyadusers.noreply.github.com>
Date: Wed Feb 23 09:16:12 2022 +0530

    Merge pull request #1 from 20180830151-satya/main

    updated

commit d7ba68cc52a73c8a2879a3189bda8a6ac9c2f7f
Author: 20180830151-satya <933620a0@20180830151-satyadusers.noreply.github.com>
Date: Wed Feb 23 09:16:47 2022 +0530

    Add files via upload

commit 93861579a40d0bde17cc4e3ccc99d13f00890c
Author: 20180830151-satya <933620a0@20180830151-satyadusers.noreply.github.com>
Date: Wed Feb 23 09:16:47 2022 +0530

    Delete sample_submission.csv

commit 6a64c07880c4d8c118042c4c979c0c4f804e18
Author: 20180830151-satya <933620a0@20180830151-satyadusers.noreply.github.com>
Date: Wed Feb 23 09:16:11 2022 +0530

    Delete aug_train.csv

commit 94338bcca772ba225696a915a85587a68a0ba
Author: 20180830151-satya <933620a0@20180830151-satyadusers.noreply.github.com>
Date: Wed Feb 23 09:16:12 2022 +0530

    ... updating ...

commit 9f58a9cc52a73c8a2879a3189bda8a6ac9c2f7f (HEAD -> main, origin/main, origin/HEAD)
Merge: 9f79ae2 d7ba68c
Author: 20180830151-satya <933620a0@20180830151-satyadusers.noreply.github.com>
Date: Wed Feb 23 09:16:12 2022 +0530

    Merge pull request #1 from 20180830151-satya/main

    updated

commit d7ba68cc52a73c8a2879a3189bda8a6ac9c2f7f
Author: 20180830151-satya <933620a0@20180830151-satyadusers.noreply.github.com>
Date: Wed Feb 23 09:16:38 2022 +0530

```

```
Windows PowerShell
PS D:\work\k1stuffy\year 2\sem4\pfsd\project\q\presentations> git log
commit 2b3dd7739d4c6d1adb4746a63589cff4e6eff80 (HEAD -> main, origin/main, origin/HEAD)
Author: lucidcreeper <2810030071@klh.edu.in>
Date: Tue Mar 22 10:44:02 2022 +0530

    formatting

commit bd0c77feeadd30730582ca4b67b71397d03ecb1f2
Author: lucidcreeper <2810030071@klh.edu.in>
Date: Mon Mar 21 14:56:48 2022 +0530

    formatting

commit 654d733682b93e67404e6801c3cefa3ecc3303d6
Author: lucidcreeper <2810030071@klh.edu.in>
Date: Sun Mar 20 21:35:54 2022 +0530

    train functionality added

commit 439f5789c86f04d3272a191e08c37fc10a534ac6
Author: lucidcreeper <2810030071@klh.edu.in>
Date: Fri Mar 18 16:58:35 2022 +0530

    about page edited

commit 3aaa500454f2f2c0aa44164c26cf1abc49fc9cd3
Author: lucidcreeper <2810030071@klh.edu.in>
Date: Fri Mar 18 16:47:28 2022 +0530

    web styling
    ... skipping ...
commit 2b3dd7739d4c6d1adb4746a63589cff4e6eff80 (HEAD -> main, origin/main, origin/HEAD)
Author: lucidcreeper <2810030071@klh.edu.in>
Date: Tue Mar 22 10:44:02 2022 +0530

    formatting

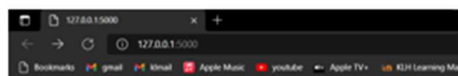
commit bd0c77feeadd30730582ca4b67b71397d03ecb1f2
Author: lucidcreeper <2810030071@klh.edu.in>
Date: Mon Mar 21 14:56:48 2022 +0530

    formatting

commit 654d733682b93e67404e6801c3cefa3ecc3303d6
Author: lucidcreeper <2810030071@klh.edu.in>
Date: Sun Mar 20 21:35:54 2022 +0530

    train functionality added
```

ALPHA TESTING



[missing values](#)

[city](#)

[city development index](#)

[enrolled univertisty](#)

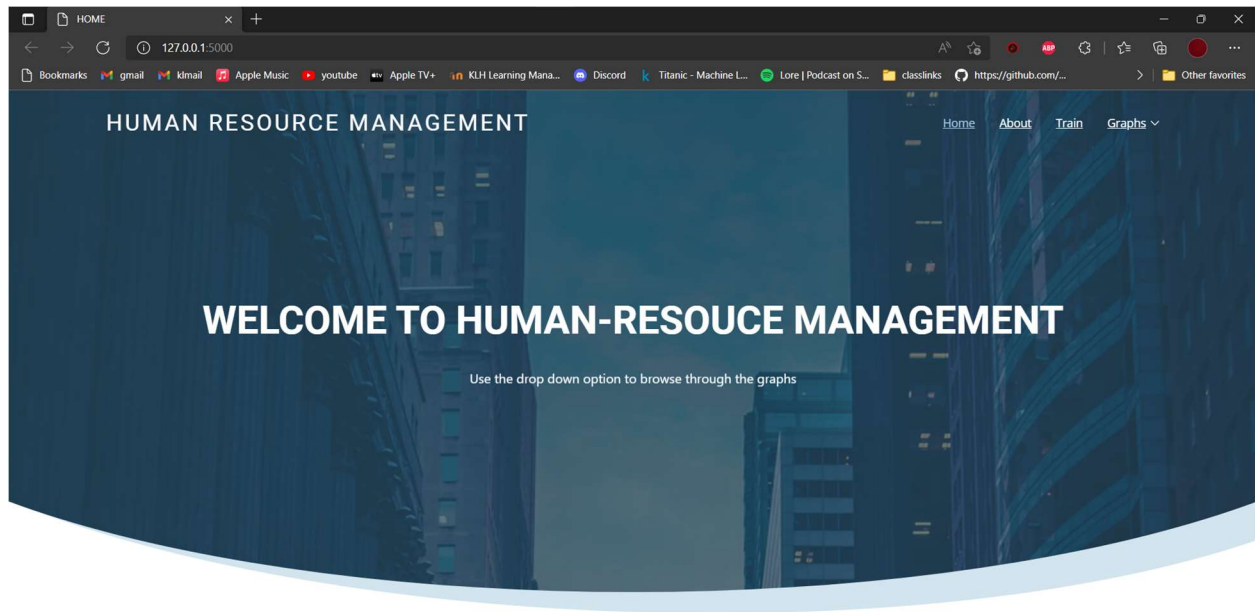
[educational_level](#)

[major descipline](#)

[company_size](#)



BETA TESTING



```
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127.0.0.1 - - [03/Apr/2022 20:38:58] "GET /train HTTP/1.1" 200 -
127.0.0.1 - - [03/Apr/2022 20:38:58] "GET /static/css/style.css HTTP/1.1" 304 -
127.0.0.1 - - [03/Apr/2022 20:38:58] "GET /static/vendor/animate.css/animate.min.css HTTP/1.1" 304 -
127.0.0.1 - - [03/Apr/2022 20:38:58] "GET /static/vendor/aos/aos.css HTTP/1.1" 304 -
127.0.0.1 - - [03/Apr/2022 20:38:58] "GET /static/vendor/bootstrap-icons/bootstrap-icons.css HTTP/1.1" 304 -
127.0.0.1 - - [03/Apr/2022 20:38:58] "GET /static/vendor/ghighos/css/ghighos.min.css HTTP/1.1" 304 -
127.0.0.1 - - [03/Apr/2022 20:38:58] "GET /static/vendor/boxicons/css/boxicons.min.css HTTP/1.1" 304 -
127.0.0.1 - - [03/Apr/2022 20:38:58] "GET /static/vendor/wisper/wisper-bundle.min.css HTTP/1.1" 304 -
127.0.0.1 - - [03/Apr/2022 20:38:58] "GET /static/vendor/bootstrap/css/bootstrap.min.css HTTP/1.1" 304 -
127.0.0.1 - - [03/Apr/2022 20:38:58] "GET /static/vendor/bootstrap-icons/fonts/bootstrap-icons.woff2?7b047b2f68632269d24f6e0d57b3b5 HTTP/1.1" 304 -
127.0.0.1 - - [03/Apr/2022 20:38:58] "GET /static/img/hero-bg.jpg HTTP/1.1" 304 -
```

