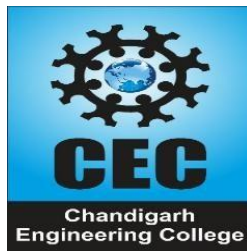


PROJECT REPORT

ON

Intelligent Career Guidance System

Project-I



Department of Computer Science and Engineering
CHANDIGARH ENGINEERING COLLEGE JHANNERI, MOHALI

**In partial fulfilment of the requirements for the award of the Degree of
Bachelor of Technology in Computer Science & Engineering**

SUBMITTED BY:

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Under the Guidance of

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MAY 2025



**Affiliated to I.K Gujral Punjab Technical University, Jalandhar
(Batch: 2022-2026)**

DECLARATION

We, Nilesh Chhabra, Vanshika Nain, Renuka Rani, Yachana Thakur hereby declare that the report of the project entitled Intelligent Carrer Guidance System has not presented as a part of any other academic work to get my degree or certificate except Chandigarh Engineering College Jhanjeri, Mohali, affiliated to I.K. Gujral Punjab Technical University, Jalandhar, for the fulfilment of the requirements for the degree of B. Tech in Computer Science & Engineering

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ACKNOWLEDGEMENT

It gives me great pleasure to deliver this report on Project-I, which I worked on for my B. Tech in Computer Science & Engineering 3rd year, which was titled Intelligent Carrer Guidance System. We are grateful to my university for presenting me with such a wonderful and challenging opportunity. We also want to convey my sincere gratitude to all coordinators for their unfailing support and encouragement. We are extremely thankful to the HOD and Project Coordinator of Computer Science & Engineering at Chandigarh Engineering College Jhanjeri, Mohali (Punjab) for valuable suggestions and the heartiest cooperation.

We are also grateful to the management of the institute and Dr. Avinash, Director Engineering, for giving me the chance to acquire the information. I also appreciate all of my faculty members, who have instructed me throughout my degree.

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ABSTRACT

With rapid growth of the internet, there has been a huge amount of information being made available to the user which often leads to an information overload and thus needs to be organized efficiently. Students often face a dilemma in deciding to choose a career in their life. There are several factors that influence the students when choosing their career path such as their personal aptitudes, educational achievements and their skill sets. The following report proposes an AI based career guidance and recommendation system where the authors leverage the use of AI to help candidates choose the right career early in their professional lives. The proposed system makes use of Machine Learning techniques on collected and preprocessed career information data gathered from various sources and builds a predictive model to solve the purpose. The dataset is based on the proficiency in computer science and related subjects along with psychological traits of the individual which are then mapped to the appropriate career roles that the individual possessed

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Chapter 1

1.1 INTRODUCTION

Career guidance can be described as a process through which students become familiar with various career options and job opportunities and are prepared for those opportunities. Career counselling is the approach that will allow the student to understand his options, find his best skills and get acquainted with the world of work to make choices about employment, education and life.[1]

Competition today is heavily multiplying day by day. It is too hard in the present day to face the technical world. To compete and reach the goal of students, they need to be planned and organized from the initial and final stages of their education. So, it's important to perpetually assess their performance, establish their interests and assess how close they're to their goal and assess whether they are within 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. Not only that, but recruiters also while recruiting people into their companies evaluate candidates on different parameters and draw a conclusion to select an employee or not and if selected, find a relevant stream and career area to students. There are many types of roles like Database administrator, Business Process Analyst, 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 candidates' performance in 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, recommendation is made based on input. Though the career counselors may assist the students many times it would be difficult for them to completely understand the inclination of the students, academics and thus the counseling process may be limited. Also, not all students would be privileged to avail themselves of such facilities. Globally there are some attempts in this area, but we need to work in this area for our students. Hence, we would be working on the web-based application, henceforth referred to as "Intelligent Career Planning & Guidance Assistant" [1]

Intelligent Career Planning & Guidance Assistant is a computer program built with the help of experts where the details of the students and their aptitudes help find the right course for their future. Choosing the right field after engineering is a very important life decision. Many Machine learning techniques have been applied to develop student performance prediction algorithms.

1.2 Problem Definition

Our approach is to create an AI based web application which enables users to avail career counselling facilities and career guidance at the early stage of their career and professional life. We propose creation of a novel dataset for the same and apply traditional and state of the art techniques to suggest career options.[2]

1.3 Project Overview

Students often face a dilemma in deciding to choose a career in their life. There are several factors that influence the students when choosing their career path such as their personal aptitudes, educational achievements and their environment. Hence, by means of this project we will aim to provide students with career counselling and career exploration platforms. ML based models are used to create our prediction engine for career prediction using various personality traits.

1.4 Impact

With rapid growth of the internet, there has been a huge amount of information being made available to the user which often leads to an information overload and thus needs to be organized efficiently. Students often face a dilemma in deciding to choose a career in their life. There are several factors that influence the students when choosing their career path such as their personal aptitudes, educational achievements and their environment. Students have always faced challenges when it comes to getting effective but free guidance with respect to career choices and advice, especially in developing or underdeveloped countries. This large disparity leads to an increasing number of students, who lack the resources to network with other professionals in their dream career roles.[3]

1.5 Purpose of the project

The Intelligent Career Guidance System is designed to enhance career decision-making through artificial intelligence and data-driven insights. Traditional career counselling methods often rely on subjective opinions, generalized advice, or limited resources, leading to uninformed decisions. This project seeks to overcome these challenges by offering a personalized and adaptive solution that considers individual skills, interests, and aspirations.

By utilizing AI algorithms, the system provides tailored recommendations based on a person's strengths, career preferences, and evolving job market trends. It helps bridge the gap between education, skills, and employment opportunities, ensuring individuals receive informed career guidance. Predictive analytics and industry insights allow users to make data-backed career choices rather than relying on assumptions. The system aims to empower users with interactive career planning tools, making career exploration more efficient and aligned with real-world opportunities. Its ultimate goal is to offer dynamic career guidance that adapts to changing industry demands and personal growth.

1.6 Importance of career guidance

Career guidance plays a crucial role in helping individuals make informed decisions about their professional paths. In today's rapidly evolving job market, where opportunities and industries are constantly shifting, having a structured approach to career planning ensures people choose roles that align with their skills, interests, and long-term goals. It helps individuals avoid career mismatches, reduces uncertainty, and enhances their confidence in pursuing the right opportunities.[3]

By providing insights into market trends, skill requirements, and industry expectations, career guidance allows people to make strategic decisions about education and skill development. It fosters a sense of direction, enabling individuals to plan their career progression effectively and maximize their potential. Whether for students exploring future professions or professionals looking to transition to new roles, career guidance serves as a roadmap, helping individuals set realistic goals and achieve career satisfaction. It also contributes to overall job market efficiency, ensuring that talent meets demand and individuals are equipped for meaningful professional growth.

1.7 Overview of intelligent career guidance systems

Intelligent career guidance systems use artificial intelligence and data-driven techniques to help individuals make informed career choices. These systems analyse personal skills, interests, education, and market trends to provide tailored recommendations. Unlike traditional career counselling, which relies on human advisors and subjective assessments, intelligent career guidance leverages algorithms, predictive analytics, and machine learning to offer more precise insights. It can dynamically update suggestions based on evolving industries and emerging job opportunities, ensuring individuals receive up-to-date guidance. These systems often include interactive tools such as skill assessments, career prediction models, and real-time labour market analysis to align users with suitable professions. By minimizing guesswork and enhancing decision-making, intelligent career guidance improves career satisfaction and professional success. [4]

Chapter 2

2.1 Literature Review

The literature on intelligent career guidance explores various methods and technologies used to enhance career decision-making through artificial intelligence and data-driven approaches. Traditional career guidance has relied on human counsellors, aptitude tests, and general career recommendations, but recent advancements in AI have revolutionized this process by introducing predictive analytics, machine learning, and personalized career insights.

Research studies highlight the role of AI-powered career counselling systems that assess individual skills, interests, and market trends to generate tailored career recommendations. These systems utilize algorithms that analyse educational backgrounds, professional experiences, and labour market data to identify the best-fit careers. Additionally, adaptive learning models help refine career suggestions over time as users gain new skills or industry demands shift.

Literature also discusses the integration of natural language processing and AI-driven chatbots in career guidance, enabling interactive and real-time advice for users. Some studies emphasize ethical considerations, such as bias in AI recommendations and the need for transparent decision-making processes. Overall, existing research establishes that intelligent career guidance systems enhance career planning by providing more accurate, data-backed insights compared to conventional methods. [3]

2.2 Existing career guidance methods

Existing career guidance methods have traditionally relied on structured approaches to help individuals navigate career choices. One common method is career counselling, where trained professionals assess a person's interests, skills, and personality traits through discussions and standardized tests to recommend suitable career paths. Another widely used approach is psychometric testing which includes aptitude tests and personality assessments designed to match individuals with careers that align with their abilities and preferences.

Educational institutions often provide career guidance through workshops, mentorship programs, and internship opportunities, allowing students to explore different professions before making long-term decisions. Government and employment agencies also play a role by offering job fairs, vocational training programs, and employment services tailored to various industries.

Additionally, self-help resources such as career guidebooks, online courses, and industry reports enable individuals to make informed career choices independently. While traditional career guidance methods have been effective, they often rely on static information and generalized recommendations, making them less adaptable to rapidly changing job markets. As a result, technology-driven solutions like intelligent career guidance systems are emerging to provide personalized, data-driven insights for more dynamic decision-making. [2]

2.3 Role of AI and data-driven decision-making in career guidance

AI and data-driven decision-making have transformed career guidance by offering personalized and dynamic support. Traditional career counselling methods often rely on static information and general recommendations, whereas AI-powered systems analyse individual profiles, skills, preferences, and evolving job market trends to provide tailored career advice. Machine learning algorithms assess historical career patterns, identify skill gaps, and predict future job prospects, ensuring individuals receive guidance aligned with industry demands.

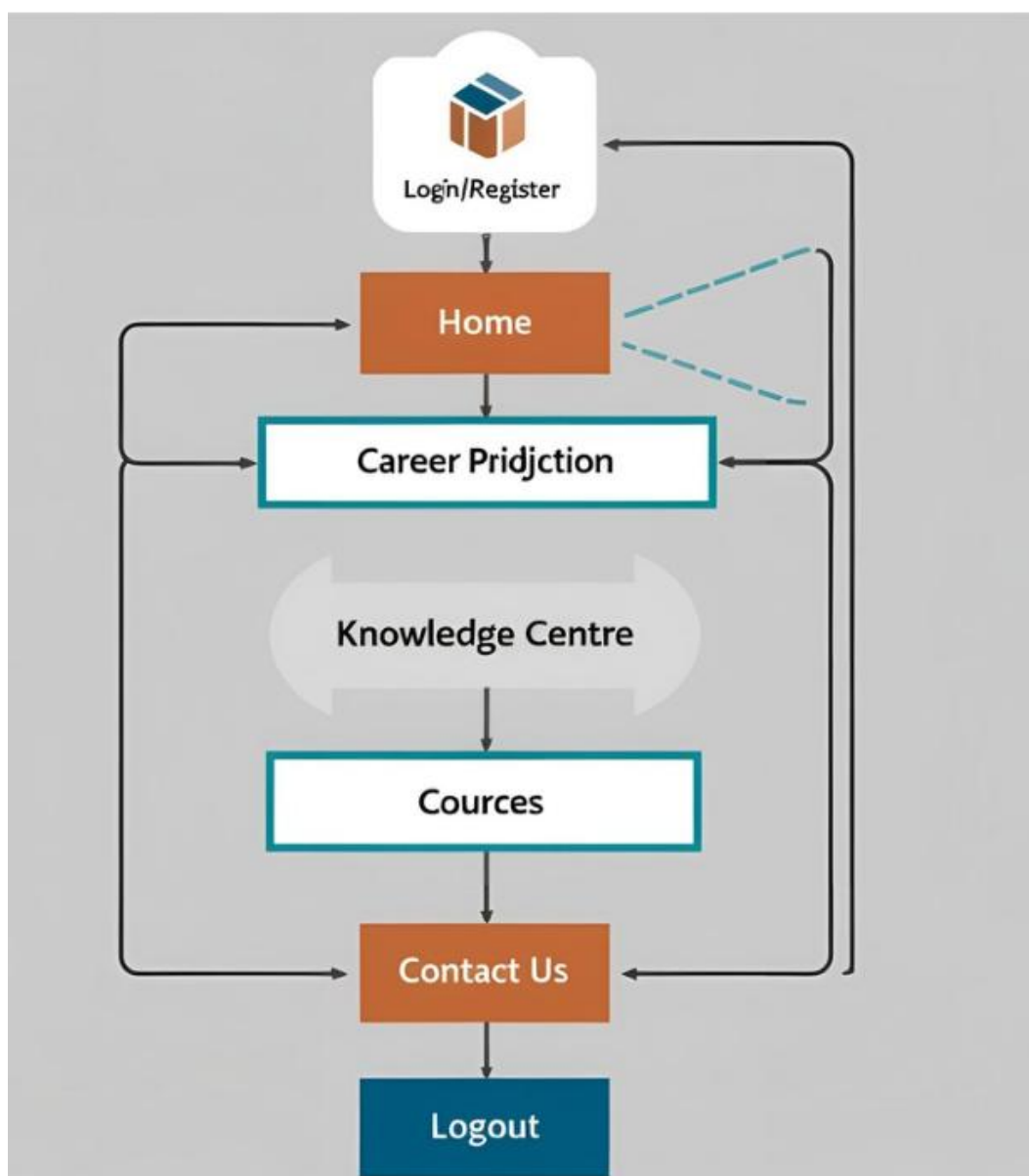
Data-driven decision-making enhances accuracy by using real-time labour market insights, salary expectations, and employment trends to help users make informed choices. AI-powered platforms also incorporate natural language processing and recommendation engines, allowing users to interact with intelligent career assistants that provide adaptive advice based on their evolving interests and skills. These systems remove biases often present in traditional methods and improve accessibility by making career guidance available to a broader audience. AI-driven career counselling fosters smarter decision-making, ensuring individuals have the right tools to navigate complex career paths efficiently. [2]

2.4 Comparative analysis of traditional vs. intelligent systems

Traditional career guidance systems primarily rely on human counsellors, standardized assessments, and generalized career recommendations. These methods involve psychometric tests, personal interviews, and mentorship programs to help individuals choose suitable career paths. While effective, they often lack adaptability and real-time insights into the evolving job market. Traditional systems may also be influenced by subjective opinions and limited data, leading to career recommendations that might not fully align with industry demands or personal aspirations.

Intelligent career guidance systems, on the other hand, leverage artificial intelligence and data-driven methodologies to provide personalized career recommendations. These systems analyse individual skills, interests, educational backgrounds, and current job market trends using machine learning and predictive analytics. By incorporating real-time labour market insights, AI-based career guidance offers dynamic, customized suggestions that evolve as industries change. Unlike traditional systems, intelligent career guidance eliminates bias, enhances accessibility, and provides interactive tools for career exploration.

Overall, intelligent systems are more precise, adaptable, and scalable compared to traditional methods. They enhance decision-making by offering data-backed insights and predictive modelling, whereas traditional systems rely heavily on predefined frameworks and expert opinions. The integration of AI ensures continuous updates, allowing individuals to make informed career choices based on relevant market trends and personalized career trajectories.[5]



Chapter 3

3.1 Objectives

The objective of an intelligent career guidance system is to provide personalized, data-driven career recommendations that align with an individual's skills, interests, and evolving industry trends. It aims to overcome the limitations of traditional career counselling by leveraging artificial intelligence and predictive analytics to enhance decision-making. The system is designed to analyse a person's educational background, skill set, job market trends, and future industry demands to offer tailored career paths.

By integrating machine learning and adaptive algorithms, the system helps users identify career opportunities that match their strengths while suggesting relevant skill development programs. It fosters informed career planning by minimizing uncertainties and offering dynamic recommendations that evolve with technological advancements and shifting job landscapes. Additionally, it enhances accessibility by providing interactive tools and guidance to a broader audience, ensuring that career decisions are not solely influenced by subjective opinions but backed by comprehensive, real-time data insights. [6]

3.2 Key goals of the intelligent career guidance system

The key goals of an intelligent career guidance system revolve around providing personalized, data-driven support to individuals seeking career advice. One of its primary objectives is to analyse a person's strengths, skills, and interests to generate tailored career recommendations. By leveraging artificial intelligence and predictive analytics, the system ensures that users receive relevant guidance based on their unique profiles rather than generalized advice.

Another essential goal is to integrate real-time labour market insights, allowing individuals to make informed career decisions based on industry trends and emerging opportunities. The system also aims to identify skill gaps and suggest suitable training programs to enhance employability. In addition to career planning, it focuses on accessibility by offering interactive tools that assist users at different career stages, whether students exploring options or professionals considering career transitions.

Ultimately, an intelligent career guidance system seeks to remove guesswork from career decision-making, minimize biases often present in traditional counselling, and improve career satisfaction by helping individuals choose professions aligned with their aspirations and market demand. [6]

3.3 How it aims to improve career decision-making

An intelligent career guidance system improves decision-making by providing data-driven, personalized recommendations tailored to an individual's skills, interests, and professional aspirations. Unlike traditional career counselling, which often relies on subjective opinions and generalized assessments, this system leverages artificial intelligence to analyse a person's background and match them with suitable career paths based on evolving industry trends.

By incorporating real-time labour market insights, it helps users stay informed about emerging opportunities and skill demands, allowing them to make choices that align with future job prospects. The system also identifies skill gaps and suggests relevant training programs, ensuring individuals enhance their qualifications to meet career requirements. Additionally, it minimizes bias by offering objective guidance rooted in analytical algorithms rather than personal interpretations. Through interactive tools, predictive modelling, and adaptive recommendations, an intelligent career guidance system empowers individuals to make confident, well-informed decisions that maximize career success and satisfaction. [7]

Chapter 4

4.1 Methodology

Frontend

HTML/CSS:

What is HTML?

HTML (Hypertext Markup Language) is the standard language used to create and design webpages. It tells the web browser how to display text, images, links, videos, and other content.

Basic Structure of an HTML Document

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <title>My First Page</title>
</head>
<body>
  <h1>Hello, World!</h1>
  <p>This is a paragraph.</p>
</body>
</html>
```

Advantages of HTML

1. Easy to Learn and Use

- HTML is simple and beginner-friendly. Anyone can start building web pages with just a text editor and browser.

2. Widely Supported

- All web browsers (Chrome, Firefox, Safari, etc.) support HTML, making it universal.

3. No Cost

- It's open-source and free. No need to buy any software or licenses.

4. Platform Independent

- HTML works on all operating systems (Windows, macOS, Linux, etc.).

5. Flexible and Integrates Well

- You can combine HTML with **CSS, JavaScript, PHP, Python**, etc., to create full-fledged web applications.

6. SEO Friendly

- HTML supports semantic tags (<header>, <footer>, etc.), which help search engines understand your page better.

7. Lightweight

- HTML files are generally small in size and load fast.

disadvantages of HTML

1. Static by Nature

- HTML pages are **not dynamic**. You need JavaScript, PHP, or another language to create dynamic features like forms, user interaction, etc.

2. Limited Design Capabilities

- HTML alone cannot style or animate your webpage effectively — you need **CSS** for that.

3. No Logic Handling

- HTML cannot process data, perform calculations, or interact with databases. That's where backend languages (like PHP, Python) come in.

4. Repetitive Code

- For large websites, HTML can become messy and repetitive without the use of templates or frameworks.

5. Security

- HTML doesn't provide any security features. Backend handling is needed to secure user data.

6. Maintenance Can Be Tough

- Pure HTML websites are harder to update and maintain compared to those built with modern frameworks or CMS (like WordPress, React, etc.).

CSS – Cascading Style Sheets

Definition:

CSS (Cascading Style Sheets) is a style sheet language used to control the presentation and layout of HTML elements on a web page. While HTML provides the structure, CSS adds design, color, fonts, spacing, responsiveness, and more.

Purpose of CSS:

- Enhance the **look and feel** of web pages.
- Separate **content (HTML)** from **presentation (CSS)**.
- Make styling **reusable and consistent** across pages.

Types of CSS:

1. **Inline CSS** – Written directly in the HTML tag using the style attribute.
2. **Internal CSS** – Written inside a <style> tag in the <head> section of HTML.
3. **External CSS** – Written in a separate .css file and linked using <link>.

Advantages of CSS:

- Saves time – one stylesheet can be used for multiple pages.
- Easier to maintain and update.
- Enhances appearance significantly.
- Improves website speed and performance.
- Helps in making responsive websites (with media queries).

Disadvantages of CSS:

- Browser compatibility issues may arise.
- Requires proper organization to avoid conflicts.
- Large CSS files can become hard to manage without good practices.

React.js:

React.js is an open-source JavaScript library developed by Facebook used for building dynamic, fast, and interactive user interfaces, especially for single-page applications (SPAs).

Main Purpose:

- React helps developers **create reusable UI components**.

- It handles the **view layer** of web and mobile apps efficiently.
- React updates and renders only the components that change (using a **Virtual DOM**).

Components in React:

There are two main types:

1. **Functional Components** – Simple and used with Hooks.
2. **Class Components** – Older style using class and this.

Advantages of React.js:

- **Reusable components** = faster development
- **Fast rendering** via Virtual DOM
- **Strong developer tools**
- **Cross-platform** (via React Native for mobile apps)
- **Large community and ecosystem**

Disadvantages of React.js:

- Steep learning curve for beginners
- Frequent updates require learning new features (e.g., Hooks)
- Only the view layer – needs integration with routing, state management, etc.

Backend

- Node.js:

Node.js is an open-source, cross-platform JavaScript runtime environment that allows developers to run JavaScript code outside the web browser, typically on the server side.

Use Cases of Node.js:

- REST APIs and Web Services
- Real-time apps (like chat apps)
- Single Page Applications (SPAs)
- Microservices
- Streaming services
- IoT backend systems
- Command-line tools

Architecture of Node.js:

- Node.js uses a **Single Threaded Event Loop** architecture.
- It can handle multiple client requests **asynchronously** without creating multiple threads.

Advantages of Node.js:

Fast performance using the V8 engine
 Suitable for data-intensive real-time apps
 Large community and npm ecosystem
 Uses JavaScript on both frontend and backend
 Easy to scale with microservices

Disadvantages of Node.js:

Not ideal for CPU-intensive tasks (e.g., image processing, heavy computations)
 Callback hell (though modern versions use async/await to solve this)
 Some APIs are still evolving and unstable

Express.js:

A web application framework for Node.js, used for building APIs.

Database

MongoDB: MongoDB is an open-source, document-oriented NoSQL database designed for high performance, scalability, and flexibility. Instead of storing data in tables and rows (like traditional relational databases), MongoDB stores data in JSON-like documents.

Structure of a MongoDB Document:

- Documents are stored in collections.
- Each document is like a row in SQL, but more flexible.

Advantages of MongoDB:

Flexible schema – perfect for unstructured data
 Fast performance and high availability
 Easy horizontal scaling (via sharding)
 Works well with modern apps (Node.js, Express, etc.)
 JSON-style storage is developer-friendly

Disadvantages of MongoDB:

No support for JOINS (though workarounds exist with \$lookup)
 Uses more storage due to document-based structure
 Transactions support is newer and not as robust as in SQL DBs
 Less mature than traditional RDBMS for complex relational queries

Use Cases of MongoDB:

- Real-time analytics
- Content management systems (CMS)
- E-commerce applications
- IoT applications
- Mobile and web app backends
- Social media platforms

Popular Tools/Technologies with MongoDB:

- **MERN Stack:** MongoDB + Express + React + Node.js
- **MEAN Stack:** MongoDB + Express + Angular + Node.js
- **Mongoose:** ODM (Object Document Mapper) for MongoDB in Node.js

Machine Learning

Python:

The primary language for implementing machine learning algorithms. • Scikit-learn: A library for machine learning in Python, used for data analysis and model building. • TensorFlow/Keras: For advanced machine learning and deep learning tasks.

Creator & Release:

- **Creator:** Guido van Rossum
- **First Released:** 1991
- **Current Version:** Python 3.x (e.g., Python 3.12)

Popular Uses of Python:

- Artificial Intelligence & Machine Learning
- Web Development (Django, Flask)
- Data Science & Analytics (Pandas, NumPy)
- Automation & Scripting
- App Development
- Scientific Computing
- Game Development
- Cybersecurity and Hacking Tools

Advantages of Python:

Simple and readable syntax
Rapid development speed
Vast community support
Extensive libraries and frameworks
Cross-platform compatibility
Ideal for beginners and professionals alike

Disadvantages of Python:

Slower than compiled languages (like C or Java)
Not ideal for mobile app development
High memory consumption in some cases
Global Interpreter Lock (GIL) affects multi-threading

Deployment

Docker:

Docker is an open-source platform that enables developers to build, ship, and run applications inside lightweight, portable containers. These containers include everything needed to run an application: code, runtime, libraries, and system tools. Version Control • Git: For version control and collaboration among developers.

Advantages of Docker:

Lightweight – Uses fewer resources than virtual machines

Portable – Works the same on any OS or cloud

Fast Deployment – Start containers instantly

Isolated Environment – Each container runs independently

Microservices Ready – Ideal for breaking apps into smaller services

Disadvantages of Docker:

Not ideal for apps needing full OS (like GUI apps)
Learning curve for complex setups
Security concerns if not configured properly
Not a full VM replacement (no kernel-level isolation)

4.2 Data collection and analysis techniques

Intelligent career guidance systems rely on sophisticated data collection and analysis techniques to provide personalized and data-driven recommendations. The process begins with gathering information from multiple sources, including user-provided details, industry reports, and employment trends.

Data collection involves gathering insights from user profiles, which include skills, interests, qualifications, and career aspirations. Additionally, AI-powered platforms extract real-time data from job postings, market reports, salary trends, and industry developments to align career suggestions with current demands. Some systems also incorporate psychometric tests, aptitude assessments, and feedback mechanisms to refine career recommendations.

Once the data is collected, analysis techniques are used to interpret and process this information effectively. Machine learning algorithms identify patterns in successful career trajectories and match users with professions that fit their strengths. Predictive analytics help forecast future employment opportunities and emerging skill requirements. Data clustering and classification techniques segment users into groups based on similarities in their profiles, ensuring tailored career guidance. Additionally, natural language processing enables AI-driven career assistants to understand user queries and refine recommendations.

To maintain accuracy, these systems use feedback loops where users rate career suggestions, allowing AI models to improve over time. A combination of statistical analysis, AI-driven insights, and continuous learning ensures that intelligent career guidance provides dynamic, evolving career advice that adapts to changing job market trends and individual aspirations.[8]

Would you like a deeper breakdown of any specific technique? I can explain algorithms or methodologies in greater detail

4.3 AI algorithms and models used

1. Algorithm- KNN

K-nearest neighbors (KNN) algorithm is a type of supervised ML algorithm which can be used for both classification as well as regression predictive problems.

The K-NN algorithm assumes the similarity between the new case/data and available cases and puts the new case into the category that is most similar to the available categories.

K-NN algorithm stores all the available data and classifies a new data point based on the similarity. This means when new data appears then it can be easily classified into a well-suited category by using K- NN algorithm.

K-NN is a non-parametric algorithm, which means it does not make any assumption on underlying data.

The K-NN working can be explained on the basis of the below algorithm:

Step-1: Select the number K of the neighbors

Step-2: Calculate the Euclidean distance of K number of neighbors

Step-3: Take the K nearest neighbors as per the calculated Euclidean distance.

Step-4: Among these k neighbors, count the number of the data points in each category.

Step-5: Assign the new data points to that category for which the number of the neighbor is maximum.

Step-6: Our model is ready. [9]

• Advantages of KNN Algorithm:

It is simple to implement.

It is very useful for nonlinear data because there is no assumption about data in this algorithm.

It is a versatile algorithm as we can use it for classification as well as regression.

It has relatively high accuracy but there are much better supervised learning models than KNN.

It is robust to the noisy training data It can be more effective if the training data is large.

• **Disadvantages of KNN Algorithm:**

Always needs to determine the value of K which may be complex some time.

The computation cost is high because of calculating the distance between the data points for all the training samples

High memory storage required as compared to other supervised learning algorithms. [10]

1.It is very sensitive to the scale of data as well as irrelevant features.

2.Dataset

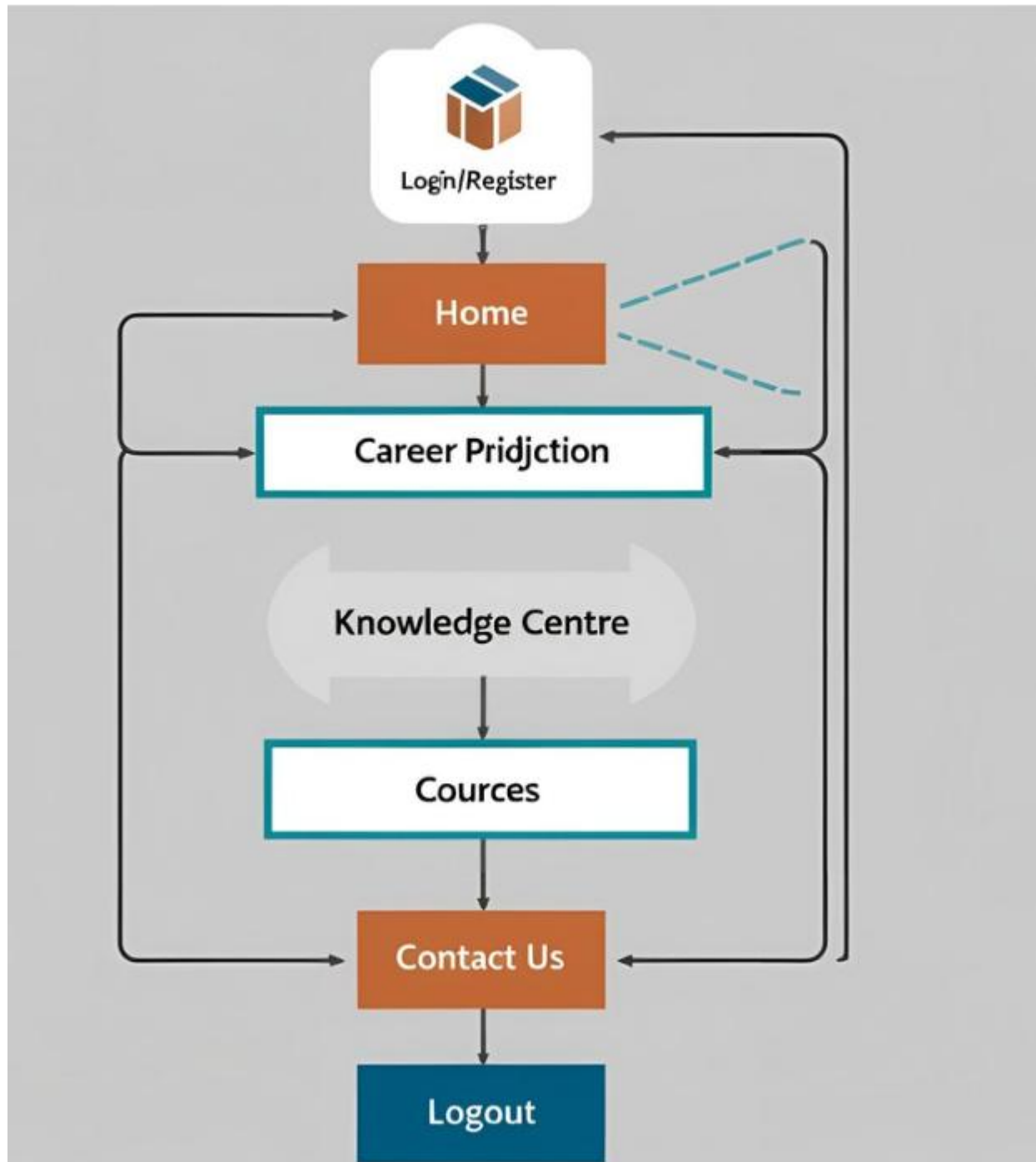
3. Implementation

4. Training testing

5. Accuracy

6. Result

4.4 System architecture and workflow





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Department of Computer Science & Engineering

Chapter 5 :

Result and Discussion:

```
<?php
// Initialize the session https://www.tutorialrepublic.com/php-tutorial/php-mysql-login-system.php
session_start();

// Check if the user is already logged in, if yes then redirect him to welcome page
if(isset($_SESSION["loggedin"]) && $_SESSION["loggedin"] === true){
    header("location:main.php");
    exit;
}

// Include config file
require_once "config.php";

// Define variables and initialize with empty values
$username = $password = "";
$username_err = $password_err = $login_err = "";

// Processing form data when form is submitted
if($_SERVER["REQUEST_METHOD"] == "POST"){

    // Check if username is empty
    if(empty(trim($_POST["username"]))){
        $username_err = "Please enter username.";
    } else{
        $username = trim($_POST["username"]);
    }

    // Check if password is empty
    if(empty(trim($_POST["password"]))){
        $password_err = "Please enter your password.";
    } else{
        $password = trim($_POST["password"]);
    }
}
```

```

// Validate credentials
if(empty($username_err) && empty($password_err)){
    // Prepare a select statement
    $sql = "SELECT id, username, password FROM users WHERE username = ?";

    if($stmt = mysqli_prepare($link, $sql)){
        // Bind variables to the prepared statement as parameters
        mysqli_stmt_bind_param($stmt, "s", $param_username);

        // Set parameters
        $param_username = $username;

        // Attempt to execute the prepared statement
        if(mysqli_stmt_execute($stmt)){
            // Store result
            mysqli_stmt_store_result($stmt);

            // Check if username exists, if yes then verify password
            if(mysqli_stmt_num_rows($stmt) == 1){
                // Bind result variables
                mysqli_stmt_bind_result($stmt, $id, $username, $hashed_password);
                if(mysqli_stmt_fetch($stmt)){
                    if(password_verify($password, $hashed_password)){
                        // Password is correct, so start a new session
                        session_start();

                        // Store data in session variables
                        $_SESSION["loggedin"] = true;
                        $_SESSION["id"] = $id;
                        $_SESSION["username"] = $username;

                        // Redirect user to welcome page
                        header("location: main.php");
                    } else{
                        // Password is not valid, display a generic error message
                        $login_err = "Invalid username or password.";
                    }
                }
            } else{
                // Username doesn't exist, display a generic error message
                $login_err = "Invalid username or password.";
            }
        } else{
            echo "Oops! Something went wrong. Please try again later.";
        }
    }
}

```

```

        // Close statement
        mysqli_stmt_close($stmt);
    }
}

// Close connection
mysqli_close($link);
}
?>

<!DOCTYPE html>
<html lang="en" >
<head>
    <meta charset="UTF-8">
    <title>Login</title>
    <link rel="stylesheet" href="https://stackpath.bootstrapcdn.com/bootstrap/4.5.2/css/bootstrap.min.css">
    <link type="text/css" rel="stylesheet" href="css/s.css"/>
    <style>
        body{ font: 14px sans-serif;
        margin:auto;
        margin-top: 120px;
        width:500px;
        background-color: blueviolet;
        color: black;

        }

        .wrapper{ border-style: solid;
        border-color: blue;
        border-radius: 30px;
        padding: 20px; background-color: white;}
    </style>
</head>
<body>
    <!--Header-->
    <header id="header" class="transparent-nav" style="position: fixed;background-color: rgb(120, 70, 167);
top: 0;">
        <div class="container">

            <div class="navbar-header">
                <!-- Logo -->
                <div class="navbar-brand">
                    <a class="logo" href="main.php" style="padding-bottom: 10px;">Career.ly</a>
                </div>

```

```

        <!-- /Logo -->

    </div>
</div>
</header>
<!-- /Header -->

<div class="wrapper" >
    <h2>Login</h2>
    <p>Please fill in your credentials to login.</p>

    <?php
    if(!empty($login_err)){
        echo '<div class="alert alert-danger">' . $login_err . '</div>';
    }
    ?>

    <form action="<?php echo htmlspecialchars($_SERVER["PHP_SELF"]); ?>" method="post">
        <div class="form-group">
            <label><b>Username</b></label>
            <input type="text" name="username" class="form-control <?php echo (!empty($username_err)) ?
'is-invalid' : ''; ?>" value="<?php echo $username; ?>">
            <span class="invalid-feedback"><?php echo $username_err; ?></span>
        </div>
        <div class="form-group">
            <label><b>Password</b></label>
            <input type="password" name="password" class="form-control <?php echo
(!empty($password_err)) ? 'is-invalid' : ''; ?>">
            <span class="invalid-feedback"><?php echo $password_err; ?></span>
        </div>
        <div class="form-group">
            <input type="submit" class="btn btn-primary" value="Login">
        </div>
        <p style="font-size: 16px;">Don't have an account? <a href="register.php" style="color:blue;">Sign
up now</a>.</p>
        <p style="font-size: 16px;">Forgot Password? <a href="reset.php" style="color:blue;">click
here</a>.</p>
    </form>
</div>
</body>

</html>

```

Logout

```
<?php
// Initialize the session
session_start();

// Unset all of the session variables
$_SESSION = array();

// Destroy the session.
session_destroy();

// Redirect to login page
header("location: main.php");
exit;
?>
```

Register:

```

<?php
// Include config file
require_once "config.php";

// Define variables and initialize with empty values
$username = $password = $confirm_password = "";
$username_err = $password_err = $confirm_password_err = "";

// Processing form data when form is submitted
if($_SERVER["REQUEST_METHOD"] == "POST"){

    // Validate username
    if(empty(trim($_POST["username"]))){
        $username_err = "Please enter a username.";
    } else{
        // Prepare a select statement
        $sql = "SELECT id FROM users WHERE username = ?";

        if($stmt = mysqli_prepare($link, $sql)){
            // Bind variables to the prepared statement as parameters
            mysqli_stmt_bind_param($stmt, "s", $param_username);

            // Set parameters
            $param_username = trim($_POST["username"]);

            // Attempt to execute the prepared statement
            if(mysqli_stmt_execute($stmt)){
                /* store result */
                mysqli_stmt_store_result($stmt);

                if(mysqli_stmt_num_rows($stmt) == 1){
                    $username_err = "This username is already taken.";
                } else{
                    $username = trim($_POST["username"]);
                }
            } else{
                echo "Oops! Something went wrong. Please try again later.";
            }
        }

        // Close statement
        mysqli_stmt_close($stmt);
    }
}

```

```

// Validate password
if(empty(trim($_POST["password"]))) {
    $password_err = "Please enter a password.";
} elseif(strlen(trim($_POST["password"])) < 6) {
    $password_err = "Password must have atleast 6 characters.";
} else {
    $password = trim($_POST["password"]);
}

// Validate confirm password
if(empty(trim($_POST["confirm_password"]))) {
    $confirm_password_err = "Please confirm password.";
} else {
    $confirm_password = trim($_POST["confirm_password"]);
    if(empty($password_err) && ($password != $confirm_password)) {
        $confirm_password_err = "Password did not match.";
    }
}

// Check input errors before inserting in database
if(empty($username_err) && empty($password_err) && empty($confirm_password_err)) {

    // Prepare an insert statement
    $sql = "INSERT INTO users (username, password) VALUES (?, ?)";

    if($stmt = mysqli_prepare($link, $sql)) {
        // Bind variables to the prepared statement as parameters
        mysqli_stmt_bind_param($stmt, "ss", $param_username, $param_password);

        // Set parameters
        $param_username = $username;
        $param_password = password_hash($password, PASSWORD_DEFAULT); // Creates a password
hash

        // Attempt to execute the prepared statement
        if(mysqli_stmt_execute($stmt)) {
            // Redirect to login page
            header("location: login.php");
        } else {
            echo "Oops! Something went wrong. Please try again later.";
        }

        // Close statement
        mysqli_stmt_close($stmt);
    }
}

```



```

    }
}

// Close connection
mysqli_close($link);
}
?>

<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <title>Sign Up</title>
  <link rel="stylesheet" href="https://stackpath.bootstrapcdn.com/bootstrap/4.5.2/css/bootstrap.min.css">
  <link type="text/css" rel="stylesheet" href="css/s.css"/>
  <style>
    body{ font: 14px sans-serif;
    margin:auto;
    margin-top: 120px;
    width:500px;
    background-color: blueviolet;
    color: black;

    }
    .wrapper{ border-style: solid;
    border-color: blue;
    border-radius: 30px;
    padding: 20px; background-color: white;}
  </style>
</head>
<body>
  <!--Header-->
  <header id="header" class="transparent-nav" style="position: fixed;background-color: rgb(120, 70, 167);
top: 0;">
    <div class="container">

      <div class="navbar-header">
        <!-- Logo -->
        <div class="navbar-brand">
          <a class="logo" href="main.php" style="padding-bottom: 10px;">Career.ly</a>
        </div>
        <!-- /Logo -->

      </div>

```

```

    </div>
</header>
<!-- /Header -->

<div class="wrapper">
    <h2>Sign Up</h2>
    <p>Please fill this form to create an account.</p>
    <form action="<?php echo htmlspecialchars($_SERVER["PHP_SELF"]); ?>" method="post">
        <div class="form-group">
            <label><b>Username</b></label>
            <input type="text" name="username" class="form-control <?php echo (!empty($username_err)) ?
'is-invalid' : "; ?>" value="<?php echo $username; ?>">
            <span class="invalid-feedback"><?php echo $username_err; ?></span>
        </div>
        <div class="form-group">
            <label><b>Password</b></label>
            <input type="password" name="password" class="form-control <?php echo
(!empty($password_err)) ? 'is-invalid' : "; ?>" value="<?php echo $password; ?>">
            <span class="invalid-feedback"><?php echo $password_err; ?></span>
        </div>
        <div class="form-group">
            <label><b>Confirm Password</b></label>
            <input type="password" name="confirm_password" class="form-control <?php echo
(!empty($confirm_password_err)) ? 'is-invalid' : "; ?>" value="<?php echo $confirm_password; ?>">
            <span class="invalid-feedback"><?php echo $confirm_password_err; ?></span>
        </div>
        <div class="form-group">
            <input type="submit" class="btn btn-primary" value="Submit">
            <input type="reset" class="btn btn-secondary ml-2" value="Reset">
        </div>
        <p style="font-size: 16px;">Already have an account? <a href="login.php" style="color: blue;">Login
here</a>.</p>
    </form>
</div>
</body>
</html>

```

Main :

```
<?php
// Initialize the session
session_start();
?>

<!DOCTYPE html>
<html lang="en">
<?php include 'header.php'?>
    <!-- Home -->
    <div id="home" class="hero-area">

        <!-- Background Image -->
        <div class="bg-image bg-parallax overlay" style="background-image:url(/img/bg.jpg); width:100%;
height: 656px;"></div>
        <!-- /Background Image -->

        <div class="home-wrapper">
            <div class="container">
                <div class="row">
                    <div class="col-md-8">

                        <h1 class="white-text" style="font-size: 40px;margin-top: 20px;
margin-bottom:50px;">Intelligent Career Guidance System</h1>

                    <?php
                        // Check if the user is logged in, if not then redirect him to login page
                        if(!isset($_SESSION["loggedin"]) || $_SESSION["loggedin"] !== true):?>
```

```

        <p class="lead white-text" style="margin-left: 5px;" ><b>Discover yourself<br>Take
the test to find the perfect role for you after Engineering</b></p>

        <a class="main-button icon-button" href="login.php">Get Started!</a>

        <?php else: ?>
        <p class="lead white-text" style="margin-left: 5px;" ><b>Hi, <?php echo
htmlspecialchars($_SESSION["username"]); ?> !<br><b>Discover yourself,<br>Take the test to find the
perfect role for you after Engineering</b></p>

        <a class="main-button icon-button" href="http://127.0.0.1:5000/">Get Started!</a>

        <?php endif ?>

    </div>
</div>
</div>
</div>

</div>
<!-- /Home -->

<!-- Why us -->
<div id="why-us" class="section">

    <!-- container -->
    <div class="container">

        <!-- row -->
        <div class="row">
            <div class="section-header text-center">

                <h2 style="margin-top: 100px; font-size: 45px;">Welcome to CareerGuide</h2>
                <!--<p class="lead">We all want to fly high and in real time!<br> And in this random pursuit
of success, we end up making wrong career choices.</p>-->
                <p class="lead"><b style="color: rgb(56, 48, 48);">CareerGuide</b> is one stop destination
<br>in helping you understand yourself, the best career for you <br> and providing all the resources in the
process.</p>
            </div>
        </div>
    </div>

```

```

<div class="row">
  <!-- feature -->
  <div class="col-md-4">
    <div class="feature">
      <i class="feature-icon fa " ><span> &#x1F50E;&#xFE0E;</span></i>
      <div class="feature-content">
        <a href="#" >
          <?php
            // Check if the user is logged in, if not then redirect him to login page
            if(!isset($_SESSION["loggedin"]) || $_SESSION["loggedin"] !== true):?>
              <a href="login.php"><h4>Career Prediction</h4></a>
            <?php else: ?>
              <a href="http://127.0.0.1:5000/"><h4>Career Prediction</h4></a>

          <?php endif ?>

          <p>Take the test to find the perfect role for you after Engineering.</p>
        </div>
      </div>
    </div>
  <!-- /feature -->

  <!-- feature -->
  <div class="col-md-4">
    <div class="feature">
      <i class="feature-icon fa " ><span>&#x1F50E;&#xFE0E;</span></i>
      <div class="feature-content">
        <a href="blog.php" >
          <h4>Knowledge Network</h4>
        </a>
        <p>Gain knowledge through various sources, like important informational links, access to
study materials, etc.</p>
      </div>
    </div>
  </div>
  <!-- /feature -->

  <!-- feature -->
  <div class="col-md-4">
    <div class="feature">
      <i class="feature-icon fa " ><span>&#x1F50E;&#xFE0E;</span></i>
      <div class="feature-content">
        <a href="courses.php" >
          <h4>Online Courses</h4>

```

```

        </a>
        <p>Links to relevant Courses.</p>
    </div>
</div>
</div>
</div>
<!-- /feature -->

</div>
<!-- /row -->

<hr class="section-hr">

</div>
<!-- /container -->

</div>
<!-- /Why us -->

<!-- Call To Action -->
<div id="cta" class="section" style="height: 400px;">

    <!-- Background Image -->
    <div class="bg-image bg-parallax overlay" style="background-image:url(/img/bgmid.jpg)"></div>
    <!-- /Background Image -->

    <!-- container -->
    <div class="container">

        <!-- row -->
        <div class="row">

            <div class="col-md-6">

                <?php
                    // Check if the user is logged in, if not then redirect him to login page
                    if(!isset($_SESSION["loggedin"]) || $_SESSION["loggedin"] !== true):?>
                        <h2 class="white-text" style="font-size: 30px; width:700px ;">Hi,</h2>

                        <h2 class="white-text" style="font-size: 25px; width:700px ; margin-top:10px;">Your
Career Path Begins Here</h2>
                        <p class="lead white-text" >We Create Beautiful Experiences
                            That Drive Successful Careers.</p>
                        <a class="main-button icon-button" href="register.php">Get Started!</a>
                    <?php else: ?>

```

```

        <h2 class="white-text" style="font-size: 30px; width:700px ;">Hi, <b><?php echo
htmlspecialchars($_SESSION["username"]); ?> !</b></h2>

        <h2 class="white-text" style="font-size: 25px; width:700px ; margin-top:10px;">Your
Career Path Begins Here</h2>
        <p class="lead white-text" >We Create Beautiful Experiences
        That Drive Successful Careers.</p>
        <a class="main-button icon-button" href="main.php">Get Started!</a>

        <?php endif ?>
    </div>

</div>
<!-- /row -->

</div>
<!-- /container -->

</div>
<!-- /Call To Action -->

<!-- About -->
<div id="about" class="section">

    <!-- container -->
    <div class="container">

        <!-- row -->
        <div class="row">

            <div class="col-md-6">
                <div class="section-header">
                    <h2 style="font-size: 35px;">About CareerGuide</h2>
                    <p class="lead" style="font-size: 18px; font-style: italic; margin-top: 50px;">Education
seekers get a personalised experience on our site, based on educational background and career interest,
enabling them to make well informed course and career decisions. The decision making is empowered with
easy access to detailed information on career choices, courses, exams, colleges, admission criteria, eligibility,
placement statistics, rankings, reviews, scholarships, latest updates etc as well as by interacting with other
CareerGuide users, experts, current students in colleges and alumni groups. We have introduced several
student oriented products and tools like Career Prediction, Knowledge Network, Daily Bytes, Blogs,
Community discussion forum, and various Courses.</p>
                    <!--Education seekers get a personalised experience on our site, based on educational
background and career interest, enabling them to make well informed course and college decisions. The
decision making is empowered with easy access to detailed information on career choices, courses, exams,
colleges, admission criteria, eligibility, fees, placement statistics, rankings, reviews, scholarships, latest

```

updates etc as well as by interacting with other Shiksha.com users, experts, current students in colleges and alumni groups. We have introduced several student oriented products and tools like Career Central, Common Application Form, Top Colleges, College Compare, Alumni Employment Stats, Campus Connect, College Reviews, College Predictors, MyShortlist and Shiksha Café.-->

```

        </div>

    </div>

    <div class="col-md-6">
        <div class="about-img">
            
        </div>
    </div>

</div>
<!-- row -->
<hr class="section-hr">
</div>
<!-- container -->
</div>
<!-- /About -->

<!-- Contact CTA -->
<div id="contact-cta" class="section" style="height: 400px;">

    <!-- Background Image -->
    <div class="bg-image bg-parallax overlay" style="background-image:url(/img/cta2-
background.jpg)"></div>
    <!-- Background Image -->

    <!-- container -->
    <div class="container">

        <!-- row -->
        <div class="row">

            <div class="col-md-8 col-md-offset-2 text-center">
                <h2 class="white-text">Contact Us</h2>
                <p class="lead white-text">Help us to get to know you.</p>
                <a class="main-button icon-button" href="contact.php">Contact Us Now</a>
            </div>

        </div>

    </div>

<!-- /row -->

```



```

    </div>
    <!-- /container -->

    </div>
    <!-- /Contact CTA -->

<?php include 'footer.php'?>
</html>

```

Career Prediction:

```

from flask import Flask, render_template, request
import pickle
import numpy as np

app = Flask(__name__)

@app.route('/')
def career():
    return render_template("hometest.html")

@app.route('/predict', methods = ['POST', 'GET'])
def result():
    if request.method == 'POST':
        result = request.form
        i = 0
        print(result)
        res = result.to_dict(flat=True)
        print("res:", res)
        arr1 = res.values()
        arr = ([value for value in arr1])

        data = np.array(arr)

        data = data.reshape(1,-1)
        print(data)
        loaded_model = pickle.load(open("careerlast.pkl", 'rb'))
        predictions = loaded_model.predict(data)
        # return render_template('testafter.html', a=predictions)

        print(predictions)
        pred = loaded_model.predict_proba(data)

```

```

print(pred)
#acc=accuracy_score(pred,)
pred = pred > 0.05
#print(predictions)
i = 0
j = 0
index = 0
res = {}
final_res = {}
while j < 17:
    if pred[i, j]:
        res[index] = j
        index += 1
    j += 1
# print(j)
#print(res)
index = 0
for key, values in res.items():
    if values != predictions[0]:
        final_res[index] = values
        print('final_res[index]:',final_res[index])
        index += 1
#print(final_res)
jobs_dict = {0:'AI ML Specialist',
             1:'API Integration Specialist',
             2:'Application Support Engineer',
             3:'Business Analyst',
             4:'Customer Service Executive',
             5:'Cyber Security Specialist',
             6:'Data Scientist',
             7:'Database Administrator',
             8:'Graphics Designer',
             9:'Hardware Engineer',
             10:'Helpdesk Engineer',
             11:'Information Security Specialist',
             12:'Networking Engineer',
             13:'Project Manager',
             14:'Software Developer',
             15:'Software Tester',
             16:'Technical Writer'}

#print(jobs_dict[predictions[0]])
job = {}
#job[0] = jobs_dict[predictions[0]]
index = 1

```

```

data1=predictions[0]
print(data1)
return render_template("testafter.html",final_res=final_res,job_dict=jobs_dict,job0=data1)

if __name__ == '__main__':
    app.run(debug = True)

```

Career.ly HOME SERVICES ▼ ABOUT US CONTACT US LOG OUT

Get Started to Discover Yourself!

RATE YOURSELF.....!!


Database Fundamentals	<input type="text" value="Choose option"/>
Computer Architecture	<input type="text" value="Choose option"/>
Distributed Computing Systems	<input type="text" value="Choose option"/>
Cyber Security	<input type="text" value="Choose option"/>
Computer Networking	<input type="text" value="Choose option"/>

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Business Analysis	<input type="text" value="Choose option"/>
Communication skills	<input type="text" value="Choose option"/>
Data Science	<input type="text" value="Choose option"/>
Troubleshooting skills	<input type="text" value="Choose option"/>
Graphics Designing	<input type="text" value="Choose option"/>


DISCOVER YOURSELF!

About:



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About CareerGuide

Education seekers get a personalised experience on our site, based on educational background and career interest, enabling them to make well informed course and career decisions. The decision making is empowered with easy access to detailed information on career choices, courses, exams, colleges, admission criteria, eligibility, placement statistics, rankings, reviews, scholarships, latest updates etc as well as by interacting with other CareerGuide users, experts, current students in colleges and alumni groups. We have introduced several student oriented products and tools like Career Prediction, Knowledge Network, Daily Bytes, Blogs, Community discussion forum, and various Courses.





Contact Details:



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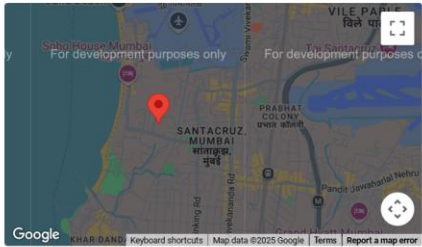
Send A Message

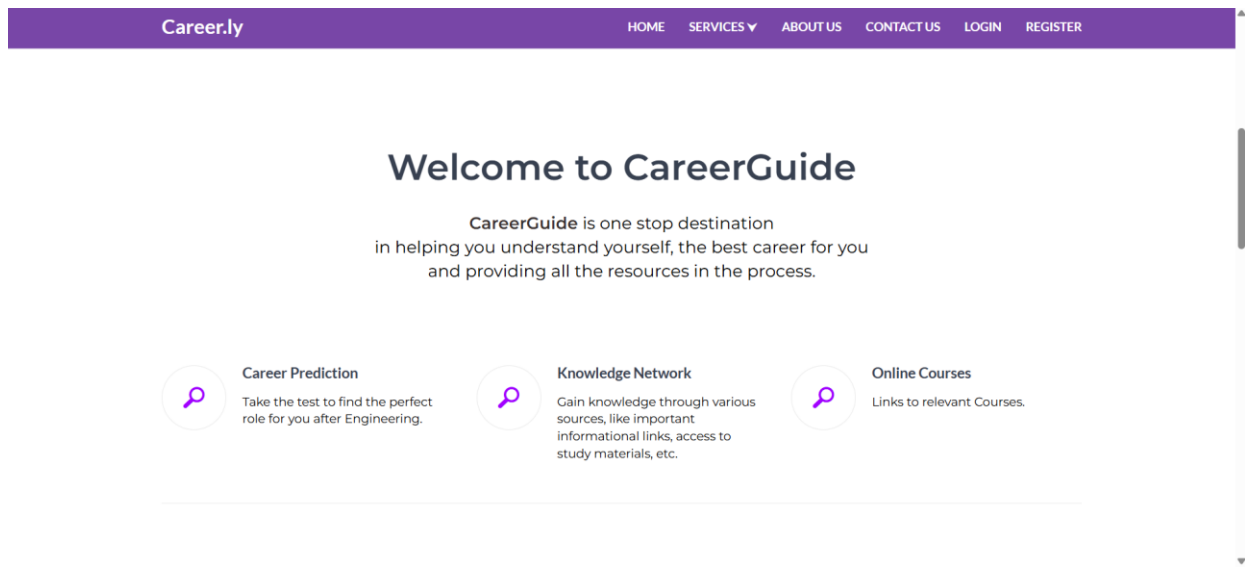
Contact Information


Careerly@gmail.com


122-547-223-45


Santacruz west



Welcome Screen:

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