

Software Engineering Department  
Braude College of Engineering

# **MITHABTEY - CareerSeeker**

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<https://github.com/MamanDaniel/MITHABTEY-CareerSeekers>

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## Abstract

In today's world, many people are looking for the ideal career path that aligns with their interests and skills. This decision is crucial as it plays a significant role in shaping their future prospects. However, the process can be challenging due to the vast array of job opportunities available and the limited information accessible about each one. Typically, people gather insights about various professions through discussions with friends, conducting online research, or connecting with acquaintances who are already working in a particular field.

In today's world, many people are looking for the ideal career path that aligns with their interests and skills. This decision is crucial as it plays a significant role in shaping their future prospects. However, the process can be challenging due to the vast array of job opportunities available and the limited information accessible about each one. Typically, people gather insights about various professions through discussions with friends, conducting online research, or connecting with acquaintances who are already working in a particular field.

Also, many new career paths are evolving on a daily basis.

This project is intended for a facebook group called 'Mithabtey Miktzoa' (Job seekers) which has 40,000 members who are looking for a solution for this problem.

In our project we utilize genetic algorithm to help the group members in 'Mithabtey Miktzoa' to find jobs that match their character traits in the easiest way.

**Key words:** Character traits, jobs, genetic algorithm, Website development, RAMAK questionnaire.

## 1. Introduction

In today's job market, finding the right career path has become increasingly challenging. With the emergence of new job opportunities and a growing complexity in job roles, individuals often face difficulty in identifying suitable professions.

Not only is it challenging to determine which profession you want, but there are also professions that you may not be aware of but might interest you.

Some people find work with recruiters who analyze their social media profiles but this is ineffective[6].

To address this challenge, a Facebook group named "Mithabtey Miktzoa" (translation: "My Job, My Profession") has been established, managed by Irit Hommsi. The primary objective of this online community is to bridge the information gap by providing its members with valuable insights and details about various unique and lesser-known career opportunities [24].

The group serves as a platform for individuals to explore a wide range of professions, some of which may not be commonly discussed or well-known. By sharing comprehensive information about these unique job prospects, "Mithabtey Miktzoa" aims to empower its members to make well-informed decisions about their future career paths.

Through this Facebook group, members can access a wealth of resources, including detailed job descriptions, educational requirements, necessary skills, and potential growth opportunities within each profession. Additionally, the group facilitates discussions and Q&A sessions with professionals from diverse fields, allowing members to gain first-hand knowledge and guidance from those with real-world experience. Examples for such questions:

- What does a standard working day at work look like?
- How do you start working?
- What technical skills are necessary?
- What experience do you need to get hired?

and more (see appendix [9.1](#))

After choosing this idea for our final project, we were tasked with developing a system for this process of career exploration. The system will operate through a website accessible to all users. Users can complete the RAMAK questionnaire to discover their personality traits. The system will match between users' traits with suitable jobs using a genetic algorithm that collects data from the Facebook page. This group's information is extracted, organized, and then integrated into our database.

## 2. Background

### 2.1. Worldwide job search sites

Searching for a job today involves several key steps, with the internet playing a central role in the process.

Before a person begins his job search process to continue, she should start by understanding what character traits characterize him, what his skills, interests and goals are.

The majority of job search activities on the internet revolve around platforms like Indeed[26], Truity[11] and LinkedIn Jobs [25] where job listings are posted.

These jobs are offered in general and you must match your character to the job.

Instead of individuals promoting themselves in Facebook groups in hopes of getting job offers based on their stated qualifications, there are now numerous websites that take a different approach. These platforms aim to match users with suitable employment opportunities, reversing the traditional model where job seekers had to find and apply for openings themselves.

Some leading tools will be presented in the following subsections.

#### 2.1.1. Truity

Truity [11] is a comprehensive website offering personality assessments, career tests, and related resources to help individuals understand their personality traits and how they relate to various aspects of life, particularly career choices. It provides insights into different personality types, offers career advice based on these types, and suggests potential career paths that align with an individual's strengths and preferences. Additionally, Truity offers a range of articles, forums, and other content related to personal development, relationships, and psychology, making it a valuable resource for those looking to explore and understand themselves better.

The advantages of Truity is its variety of personality tests, including well-known assessments like the Myers-Briggs Type Indicator (MBTI) and the Enneagram. These tests can provide deep insights into an individual's personality, helping them gain a better understanding of themselves and their potential career paths. Truity's career advice and resources are tailored to each personality type, offering personalized recommendations that can be valuable for career exploration and decision-making.

On the other hand, access to approval personality tests and in-depth reports may require payment, which can be a barrier for approval users. In addition, the career advice provided by Truity is based on generalizations about personality types and does not always accurately reflect a person's strengths, preferences and behavior.

Truity can be a useful tool for exploring personality and its relationship to career choices. The wide range of personality tests and personalized career advice can offer valuable insights. However, it is important to use this information as a guide and consider other factors such as qualifications, experience and personal values when making career decisions.

### **2.1.2. CareerExplorer**

CareerExplorer [\[12\]](#) offers a comprehensive set of tools and resources to help individuals explore and find suitable career paths. At the heart of the website is a detailed career assessment that evaluates an individual's interests, personality traits, and values to suggest potential career matches. This assessment covers a wide range of topics, including working preferences, problem-solving abilities, and interests in various subject areas. Based on the assessment results, CareerExplorer provides personalized career matches and detailed career profiles that include information about job duties, required skills and education, salary, and career outlook.

One of the standout features of CareerExplorer is its detailed career profiles, which provide users with comprehensive information about various careers. These profiles not only outline job duties and required skills but also detail education requirements, salary information, and career outlook. This depth of information can be incredibly valuable for individuals seeking to make informed decisions about their career paths. Additionally, the website offers educational resources and articles on career planning, job search strategies, and professional development, further enhancing its usefulness as a career exploration tool.

However, it's important to note some limitations of the site. While CareerExplorer covers a wide range of career options, it may not include every possible profession. Therefore, users should consider supplementing their research with other sources to explore a broader range of possibilities. Additionally, some features of CareerExplorer may require payment, such as accessing detailed career reports or additional assessments, which could be a consideration for some users. In addition, the process of filling out the assessment is very long and may take more than an hour.

## **2.2. Websites in israel**

In the search for sites that would solve the problem presented above we did not find a good solution for sites in Israel.

The most popular sites in Israel that provide options for finding a job are:

### **2.2.1. alljobs**

AllJobs [13] is a job search website that offers a variety of jobs. It serves as a center for employers to post vacancies and for job seekers to find and apply for relevant positions.

Users can search for jobs based on keywords, location, job category and other filters to find relevant job listings. But they are unable to adapt their character and qualities to the jobs offered.

### **2.2.2. jobnet**

This site allows people to search for jobs that are offered [14].

Companies post jobs that require work and accordingly users look for work based on what is available and offered to them.

There are filters for job fields and work areas in Israel.

### **2.2.3. jobmaster**

JobMaster [15] allows individuals to search for job opportunities in various industries and professions. In addition, the site offers a user-friendly interface that allows you to navigate and search for jobs easily based on your preferences. The site also provides resources and tips for job seekers, including advice on resume writing, interviewing and career development.

### **2.2.4. Avodata**

The "Avodata" website [16] is a project of the Israeli Ministry of Labor to provide comprehensive and reliable data on the labor market, employment and wages in a wide variety of professions and study tracks. The site is accessible in Hebrew and Arabic, and offers extensive information on approximately 300 occupations, including average wages, working hours, education levels of employees, main industries and required skills.

One of the main features of the site is the diagnostic questionnaire for those undecided between different fields of occupation, which helps users identify the most suitable career paths for them based on the site's data.

These data are based on the Holland Questionnaire, also known as Holland Codes or the RIASEC model.

These tools evaluate careers and classify people into six personality types: Realistic, exploratory, artistic, social, enterprising and conventional. Each type is suitable for certain careers and work environments. This approach helps match people's interests and abilities with compatible professions and increase job satisfaction.

Website	Advantages	Disadvantages
Truity	Offers a variety of personality tests. Provides career advice based on personality type User-friendly interface with community forums.	Some resources require payment. Career advice based on generalizations. Overemphasis on personality.
CareerExplorer	Comprehensive career assessment. Detailed career profiles. Educational resources and articles. Salary calculator tool.	The matching process is very long Salary estimates may vary in accuracy. Some features require payment.
Websites in Israel (Alljobs, Jobnet, Jobmaster, Avodata)	Large databases of job listings. User-friendly interfaces. Resources and tips for job seekers.	Do not provide a good solution for finding a job based on character traits and preferences. Users must find the job that best suits them based on basic search and filters.

*Table 1 - Comparison between the Israeli and worldwide sites*

In conclusion, it can be seen that the websites in Israel do not provide a good answer for finding a job based on character traits and preferences.

We note that abroad the sites provide a broader solution to the problem, they present options for psychological character analysis and provide an answer based on this analysis. But for the most part the systems are unreliable and cost money, and in addition they are cumbersome and require a long time to provide an answer.



### 3. Personality traits models

#### 3.1. Big Five Model

The Big Five personality traits, also known as the Five Factor Model (FFM) [3], are a set of five broad dimensions that describe human personality. These traits are considered fundamental in psychology and are believed to encompass most of the variability in human personality [9]. The Big Five traits are:

Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism, often referred to by the acronym OCEAN.

- 1) **Openness to Experience:** This trait reflects the degree of intellectual curiosity, creativity, and openness to new ideas and experiences. Individuals high in openness tend to be imaginative, curious, and open-minded, while those low in openness may be more conventional, practical, and prefer routine.
- 2) **Conscientiousness:** Conscientiousness is the tendency to be organized, responsible, and goal-oriented. Individuals high in conscientiousness are often diligent, reliable, and efficient, while those low in conscientiousness may be more laid-back, spontaneous, and less focused on long-term goals.
- 3) **Extraversion:** Extraversion refers to the extent to which someone is outgoing, sociable, and energetic. Extraverted individuals tend to seek out social stimulation, enjoy being around others, and are often assertive and enthusiastic. Introverts, on the other hand, are more reserved, reflective, and prefer solitary activities.
- 4) **Agreeableness:** Agreeableness is the tendency to be compassionate, cooperative, and trusting towards others. Individuals high in agreeableness are empathetic, considerate, and friendly, while those low in agreeableness may be more competitive, skeptical, and less concerned about others' well-being.
- 5) **Neuroticism:** Neuroticism, also known as emotional instability, reflects the tendency to experience negative emotions such as anxiety, depression, and insecurity. Individuals high in neuroticism are more prone to worry, mood swings, and emotional distress, while those low in neuroticism are more emotionally stable and less reactive to stress.

### The effect of traits on finding a job

The Big Five personality traits can have a significant impact on finding a job [6], both in terms of the type of job that may be a good fit for an individual and how they approach the job search process.

Here's how each trait can influence job search and career decisions [1] [4].

- 1) **Openness to Experience:** Individuals high in openness may be more inclined to seek out creative or unconventional career paths. They may be attracted to jobs that allow them to explore new ideas, innovate, and engage in intellectually stimulating work. In the job search process, they may be more likely to consider a wide range of options and be open to trying new approaches to find the right fit.
- 2) **Conscientiousness:** Conscientious individuals are often diligent and organized, traits that can be highly valued in the workplace. They may excel in roles that require attention to detail, reliability, and the ability to meet deadlines. In the job search, they may approach the process in a systematic and thorough manner, ensuring that they are well-prepared for interviews and application submissions.
- 3) **Extraversion:** Extraverted individuals are typically outgoing and sociable, which can be beneficial in networking and building relationships that can lead to job opportunities. They may thrive in roles that involve teamwork, leadership, and interaction with others. In the job search, they may be more proactive in reaching out to contacts, attending networking events, and showcasing their personality in interviews.
- 4) **Agreeableness:** Agreeable individuals are often empathetic and cooperative, traits that can make them valuable team members and leaders. They may excel in roles that require strong interpersonal skills and the ability to work well with others. In the job search, they may focus on building positive relationships with potential employers and colleagues, which can enhance their chances of success.
- 5) **Neuroticism:** Neuroticism is often associated with higher levels of stress and anxiety, which can impact job search behavior. Individuals high in neuroticism may be more cautious in their job search, seeking out stable and predictable roles. They may also benefit from strategies to manage stress and build resilience during the job search process.

Overall, the Big Five personality traits can provide valuable insights into an individual's preferences, strengths, and potential challenges in the job search and career development process. By understanding how these traits influence their approach to work and job search, individuals can make more informed decisions about their career paths and find roles that align with their personality and values.

### 3.2. Holland Questionnaire

The Holland Questionnaire, also known as the Holland Code or the Holland Occupational Themes (RIASEC), is a theory of careers and vocational choice based on personality types. It was developed by psychologist John L. Holland in the late 1950s and has since become a widely used tool in career counseling and vocational psychology.

This questionnaire divides people and work environments into six distinct types: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional. The questionnaire helps people identify their dominant personality types and match them to compatible career paths.

The Holland Questionnaire is often used in career assessments and guidance programs to help individuals understand their personality traits and explore career options that align with their interests and strengths. It emphasizes the importance of finding a career that matches one's personality type for greater job satisfaction and success [10].

#### The six character traits:

- 1) **Realistic (R):** People with a realistic orientation are often practical and hands-on. They prefer physical activities and working with tangible objects. Suitable careers might include engineering, agriculture, and skilled trades.
- 2) **Investigative (I):** Investigative individuals are analytical and intellectual. They enjoy researching, exploring, and solving complex problems. Careers in science, medicine, and academia are often a good fit.
- 3) **Artistic (A):** Artistic types are creative and expressive. They value aesthetics and originality, often thriving in fields like writing, music, design, and the arts.
- 4) **Social (S):** Social individuals are empathetic and cooperative. They enjoy helping others and working in teams. Careers in education, healthcare, and social services are common choices.
- 5) **Enterprising (E):** Enterprising people are persuasive and ambitious. They are natural leaders and enjoy taking risks. Suitable careers include business, management, and entrepreneurship.
- 6) **Conventional (C):** Conventional individuals are organized and detail-oriented. They prefer structured environments and tasks. Careers in administration, finance, and data management are typical choices.

### 3.3. RAMAK

Anne Roe, a clinical psychologist, developed an influential theory categorizing occupations into eight groups based on their required interaction with people versus non-people environments.

Her theory proposed that early childhood experiences and psychological needs shape an individual's orientation toward preferring interpersonal or impersonal settings, which then guides their career choices. Roe's work provided a framework linking psychological development in childhood to eventual vocational preferences and career decisions.

The RAMAK questionnaire, developed in 2011 by Elhanan Meir, is an assessment tool grounded in Anne Roe's Occupational Classification theory, which categorizes individual interests across eight distinct domains:

Business, Organization, General Culture, Service, Arts and Entertainment, Outdoor, Science, and Technology.

The Ramak Interest Inventory is a tool designed to assess an individual's interests based on Roe's classification, aiding in career exploration and decision-making. Ramak also discusses the significance of understanding one's interests in career planning and how tools like the Ramak Inventory can assist in this process[8].

The RAMAK Questionnaire typically includes a set of questions designed to measure:

- 1) **Business:** This category includes interests related to business operations, management, finance, and entrepreneurship. People interested in business may enjoy roles such as business administration, finance management, marketing, or human resources.
- 2) **Organization:** Interests in this category involve activities related to organizing, planning, and coordinating. Careers in project management, event planning, logistics, or administration may appeal to those with a strong organization interest.
- 3) **General Culture:** Interests in general culture involve a curiosity about the arts, history, literature, and other aspects of human civilization. Careers in education, museum curation, journalism, or cultural preservation may appeal to individuals with a strong general culture interest.
- 4) **Service:** This category includes interests related to helping, assisting, and caring for others. People interested in service may enjoy roles such as teaching, counseling, healthcare, or social work.
- 5) **Arts and Entertainment:** This category includes interests in artistic expression, creativity, and entertainment. People interested in arts and entertainment may pursue careers in music, theater, film, visual arts, or writing.

- 6) **Outdoor:** Interests in outdoor activities, nature, and the environment fall into this category. Careers in forestry, environmental science, wildlife conservation, or outdoor recreation might be attractive to individuals with a high interest.
- 7) **Science:** This category encompasses interests in scientific inquiry, research, and experimentation. People interested in science may pursue careers in fields such as biology, chemistry, physics, or environmental science.
- 8) **Technology:** Interests in technology involve a fascination with computers, electronics, and technological innovations. Careers in software development, IT management, cybersecurity, or digital marketing may be appealing to individuals with a strong technology interest.

### The values of the questionnaire

The questionnaire contains 72 questions to which the answers are yes no or unknown. For each question a score is obtained in the following way

Score 2 points for a Yes, 1 point for a question mark, and 0 for a No [8].

The question key is represented as follows:

- 1) **Level 1:** typically indicates a high level of interest in that category. Items listed under Level 1 are those that strongly align with the corresponding interest category.
- 2) **Level 2:** suggests a moderate level of interest. These items are somewhat related to the interest category but may not indicate as strong a preference as Level 1 items.
- 3) **Level 3:** indicates a lower level of interest. Items at this level are less strongly associated with the interest category and may suggest a less interest.

**Business:** Level 1-Items 10,46,55; Level2-items 21, 29, 37;

Level 3-Items 3, 60, 69

**General Culture:** Level 1-Items 22, 31, 52; Level2-Items 5, 11,47; Level3-Items 36, 63, 72

**Arts & Entertainment:** Level 1-Items 4, 28, 53; Level2-Items 14,35,61; Level3-items 24, 45, 68

**Science:** Level 1-Items 8, 16,58; Level2-Items 23, 26, 44; Level 3-items 33, 54, 66

**Organization:** Level 1-Items 13, 19,67; Level2-items 8, 38, 41; Level 3-items 12, 30, 42

**Service:** Level 1-Items 1,34,49; Level2-items 20, 59, 65; Level 3-items 12, 30, 42

**Outdoor:** Level 1-Items 39, 64, 70; Level 2-Items 2, 32, 51; Level3-Items 3, 9, 18

**Technology:** Level 1-Items 25, 40, 43; Level 2-Items 17, 50, 71; Level 3-Items 6, 15, 62

**The questionnaire that was chosen for our project:**

We decided to use the RAMAK questionnaire for the job matching system after examining those options. The reasons behind our decision:

- Ra'anan Hess, a psychology professor specializing in employment psychology, recommended the RAMAK questionnaire during an interview.
- The RAMAK questionnaire allows division of traits to three levels for each representative trait.
- The article on the questionnaire contains the questions that examine the person and classify him into the relevant categories, and as a result the questionnaire is valid.
- The RAMAK questionnaire is the most recent among the options considered.

## **4. Research / Engineering Process**

### **4.1. Genetic Algorithm**

Genetic algorithms are a type of optimization algorithm inspired by the process of natural selection. They are used to find optimal solutions to complex problems by mimicking the process of evolution. In a genetic algorithm, a population of candidate solutions to the problem is evolved over generations through processes such as selection, crossover, and mutation. Each candidate solution, often called an individual, is represented as a set of parameters or genes. These individuals are evaluated using a fitness function, which determines how well they solve the problem. Through successive generations, the population evolves, and better solutions are discovered. Genetic algorithms are particularly useful for optimization problems where traditional methods are impractical or inefficient [5].

### **4.2. Genetic algorithm in our site**

Our website aims to effectively match users with professions that suit their character traits. It employs a genetic algorithm that analyzes the user's character data from the RAMAK questionnaire. The algorithm evolves a population of candidate profession matches, represented as combinations of required character traits. Each candidate's fitness is evaluated by comparing the user's traits to the profession's requirements. Fitter candidates (better matches) are favored to reproduce to the next generation. Variations are introduced through crossover and mutation to explore new trait combinations. Over successive generations, the population converges towards optimal profession matches for the user. Upon convergence, the algorithm outputs a ranked list of professions ordered by their suitability for the user based on their unique character profile. This list empowers users to make informed career decisions aligned with their intrinsic traits.

### **4.3. Genetic algorithm flow**

The genetic algorithm begins by initializing a population of individuals, where each individual represents a potential solution to the problem. In this case, each individual is a list of a predefined amount of random professions. The algorithm then evaluates the fitness of each individual by calculating the average match percentage between the person's traits and the traits required for each profession.

Next, the algorithm enters a loop where it selects two parents from the population based on their fitness scores using a method called roulette wheel selection. It then performs a one-point crossover between the two parents to produce two offspring. Crossover involves combining genetic information from the parents to create new individuals. After crossover, the algorithm mutates the offspring by randomly changing one of their professions.

The algorithm continues this process for a specified number of generations, maintaining a population size that is defined in advance. In each generation, the top two individuals from the previous generation are retained (elitism), and the rest of the population is replaced with new individuals generated through crossover and mutation.

After the specified number of generations, the algorithm evaluates the final population and extracts the top three unique professions from the final sorted population. These professions are considered the best match for the user based on their character traits.

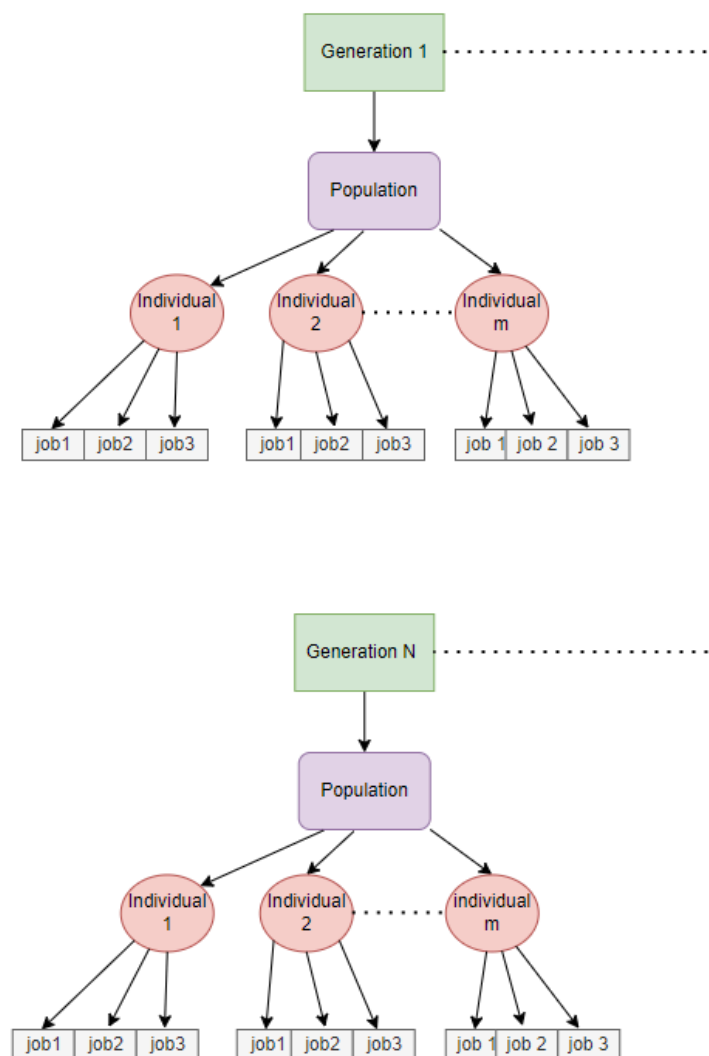


Figure1: Our genetic algorithm hierarchy



#### 4.3.1. Pseudo code

```

analyze_user_traits_by_RAMAK_questionnaire()
    For each question in questionnaire
        responses += get_user_choose
    analyze_by_ramak(responses)
    return user_traits_by_ramak

genetic_algorithm(user_traits_by_ramak, list_of_jobs, num_generations, population_size)
    Population = generate_first_generation()
    While (num_of_generations)
        Population_fitness = fitness(Population)
        parent_1, parent_2 = selection(Population ,Population_fitness)
        New_generation = crossover(parent_1, parent_2)
        New_population = mutation(New_generation)
        Population = New_population
    Return population
    
```

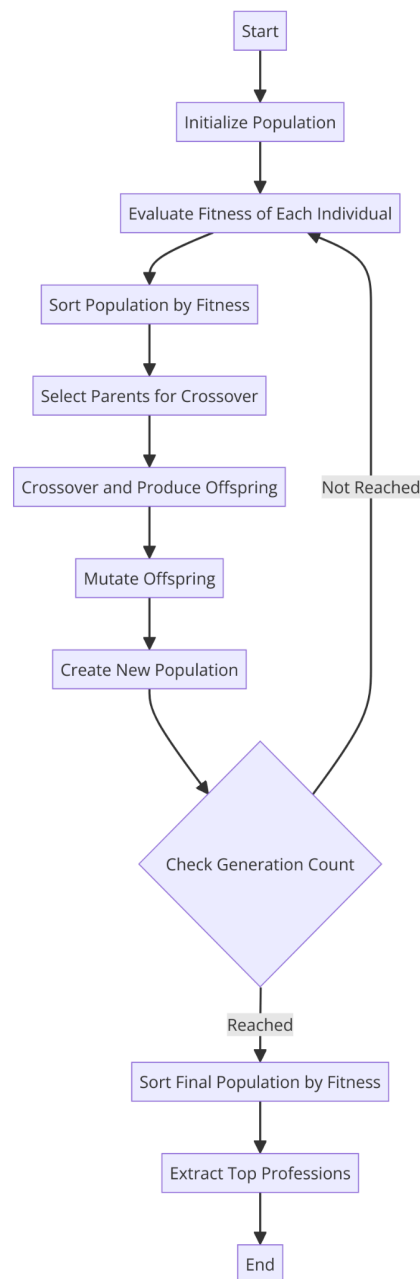


Figure2: Diagram illustrating the flow of a genetic algorithm

#### 4.3.2. Fitness function

Fitness is a key concept in genetic algorithms, representing how well an individual in the population solves the problem at hand. In our code, the `evaluate\_individual` function calculates the fitness of each individual by measuring the match percentage between the person's traits and the traits required for each of the professions in the individual's list. This match percentage is then used as a measure of the individual's fitness.

`evaluate\_individual` function takes an individual (a list of profession indices), the person's traits, and a list of professions with their traits. It then iterates over the professions in the individual, calculates the match percentage for each profession by counting the number of matching traits, and computes the average match percentage for all professions in the individual. This average match percentage represents the fitness of the individual.

For example, if an individual has professions that require traits similar to the person's traits, it will have a higher fitness score. Conversely, if an individual's professions do not match well with the person's traits, it will have a lower fitness score. This fitness score guides the selection process in the genetic algorithm, favoring individuals with higher fitness scores for reproduction and potentially leading to better solutions over time as the algorithm progresses.

```
# Calculate the fitness of an individual
fitness_of_individual(individual, user_traits_by_RAMAK, list_of_jobs):
    match_percentages = []
    for job_index in individual:
        job = list_of_jobs[job_index]
        match = calculate_match_percentage (user_traits_by_RAMAK, job['traits'])
        match_percentages.append(match)
    return sum(match_percentages)/len(individual)

# Calculate the match percentage between a person's traits and a profession's traits
calculate_match_percentage (user_traits_by_RAMAK, job_traits):
    match = sum([1 for trait in person_traits_by_RAMAK if trait in job_traits])
    return match / len(job_traits) * 100
```

#### 4.3.3. Selection

The foundational aspect of the selection process is to stochastically select individuals from one generation to create the basis for the next. The key requirement is that the fittest individuals possess a greater probability of survival compared to weaker ones. This emulates nature, where fitter individuals tend to have an increased likelihood of survival and advancement to form the mating pool for subsequent generations. However, weaker individuals are not entirely excluded. In the natural world, such individuals may harbor genetic coding that could prove advantageous for future generations, contributing to the overall diversity and adaptability of the population.

In our code, the `select\_parents` function implements selection using a method called roulette wheel selection. This method selects individuals with a probability proportional to their fitness scores, giving fitter individuals a higher chance of being selected as parents.

The `select\_parents` function takes the population and their corresponding fitness scores as input. It calculates the total fitness of the population and then computes the selection probabilities for each individual based on their fitness scores. These probabilities are used to select two parents randomly from the population, with fitter individuals having a higher probability of being chosen.

For example, if an individual has a high fitness score, it will have a higher probability of being selected as a parent. Conversely, individuals with lower fitness scores will have a lower probability of being selected. This selection process helps maintain diversity in the population while favoring individuals with better fitness, allowing the genetic algorithm to explore promising areas of the search space and potentially find optimal solutions to the problem.

```
# Select two parents from the population based on their fitness scores
select_parents(population, fitness_scores):
    total_fitness = sum(fitness_scores)
    selection_probs = [score / total_fitness for score in fitness_scores]
    return random.choices(population, weights=selection_probs, k=2)
```

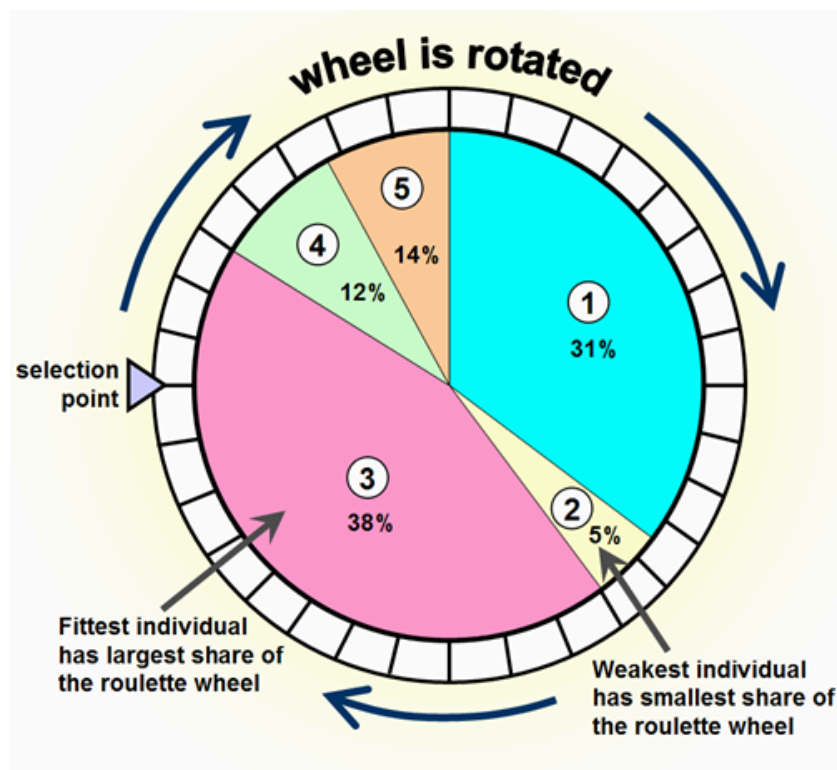


Figure3: Diagram illustrating the probability of select parents [29]

#### 4.3.4. Crossover

Crossover, also known as recombination, is a genetic operator used in genetic algorithms to combine genetic information from two parent individuals to create new offspring. In our code, the `crossover` function implements one-point crossover, a common method where a random crossover point is selected along the length of the parents' chromosomes (in this case, the list of professions). The function then creates two offspring by combining the genetic information from the parents at the selected crossover point.

In our code, the `crossover` function takes two parents (`parent1` and `parent2`) and randomly selects a crossover point (`crossover\_point`) between the first and second-last elements of the parents' lists. It then creates two offspring (`offspring1` and `offspring2`) by combining the genetic information from the parents: `offspring1` consists of the first part of `parent1` up to the `crossover\_point`, followed by the second part of `parent2` from the `crossover\_point` onwards. Similarly, `offspring2` consists of the first part of `parent2` up to the `crossover\_point`, followed by the second part of `parent1` from the `crossover\_point` onwards.

This process of combining genetic information from two parents through crossover helps maintain genetic diversity in the population and can lead to the discovery of new, potentially better solutions to the problem at hand.

```
# Perform one-point crossover between two parents to produce two offspring
crossover(parent_1, parent_2):
    crossover_point = random.randint(1, len(parent_1) - 2)
    offspring_1 = parent_1[:crossover_point] + parent_2[crossover_point:]
    offspring_2 = parent_2[:crossover_point] + parent_1[crossover_point:]
    return offspring_1, offspring_2
```

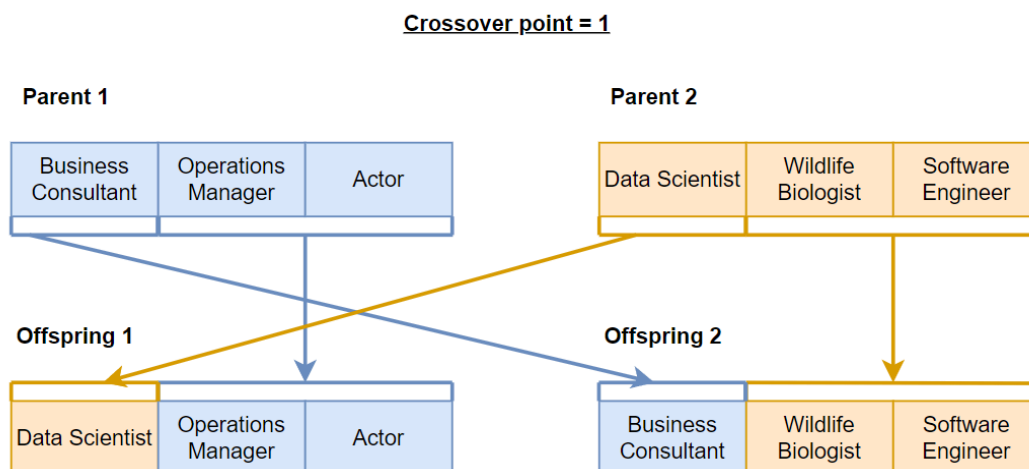


Figure4: Example of crossover process

#### 4.3.5. Mutation

Mutation is a genetic operator used in genetic algorithms to introduce random changes in individuals' genetic information.

The function implements mutation by randomly changing one of the professions in an individual. This random change helps maintain genetic diversity in the population and can prevent the algorithm from converging to a local optimum.

The function takes an individual (represented as a list of professions) and randomly selects a profession to mutate. It then changes the selected profession to a random profession index. This random change introduces variability in the population, allowing the algorithm to explore different solutions in the search space.

The mutation is applied to offspring after crossover, ensuring that each new generation of individuals has some level of genetic diversity [7]. This diversity is crucial for the genetic algorithm to explore a wide range of potential solutions and find the optimal or near-optimal solution to the problem.

```
# Mutate an individual by randomly changing one of their professions
mutate(individual, num_of_jobs):
    mutation_index = random.randint(0, len(individual) - 1)
    individual[mutation_index] = random.randint(0, num_of_jobs - 1)
    return individual
```

#### Individual before mutation

Business Consultant	Operations Manager	Software Engineer
------------------------	-----------------------	----------------------

**Mutation**

#### Individual after mutation

Business Consultant	Operations Manager	<b>Actor</b>
------------------------	-----------------------	--------------

Figure5: Example of mutation process

## 4.4. Web technologies

### Introduction

Modern web development leverages a diverse range of technologies to create dynamic and interactive applications. The core front-end technologies are HTML, CSS, and JavaScript, enhanced by frameworks like React, Angular, and Vue.js for improved UI/UX. On the server-side, Node.js, Ruby on Rails, and Django are popular for building scalable applications. For data storage, relational databases like MySQL and PostgreSQL as well as NoSQL databases like MongoDB are widely used. Cloud platforms such as AWS, Azure, and Google Cloud provide hosting and scalable infrastructure solutions. These platforms offer services for the entire application lifecycle from development to deployment and monitoring. By combining front-end, server-side, data storage, and cloud technologies, developers can build highly functional, scalable, and performant web applications.

### 4.4.1. React

#### Overview

React is a popular JavaScript library developed by Facebook for building user interfaces, especially single-page applications (SPAs). It emphasizes the use of reusable components, making it efficient for developing complex interfaces with dynamic content.

React employs a virtual DOM to optimize rendering, improving performance by updating only what's necessary. Its component-based architecture encourages the development of reusable UI components, promoting modularity and maintainability. Additionally, React allows developers to write HTML-like syntax within JavaScript through JSX, enhancing readability and ease of development.

React introduced hooks that enable functional components to manage state and side effects, a capability previously limited to class components. Concurrent Mode, an experimental feature, aims to improve rendering performance for complex applications by splitting rendering work into smaller chunks.[\[18\]](#)

### 4.4.2. TypeScript (TSX)

#### Overview

TypeScript is a superset of JavaScript developed by Microsoft, adding static typing to the language. It helps catch errors early in development, providing better tooling and enhancing code quality and maintainability.

The static typing allows developers to specify types for variables, functions, and objects, catching type-related errors at compile time. It offers advanced object-oriented programming features, including class and interface support, making

it suitable for large-scale application development. Additionally, TypeScript code compiles to plain JavaScript, ensuring compatibility with existing JavaScript codebases and libraries.

In our website we will use TypeScript 4.0 to use features like variadic tuple types, labeled tuple elements, and improved type inference, among others.[\[23\]](#)

#### **4.4.3. Node.js**

Node.js is an open-source, cross-platform JavaScript runtime environment that allows developers to execute JavaScript code on the server-side. It's built on Chrome's V8 JavaScript engine and enables the development of scalable network applications [\[17\]](#).

Key Features:

- 1) Asynchronous and Event-Driven: Handles multiple connections concurrently without blocking, making it suitable for building scalable applications.
- 2) NPM (Node Package Manager): Provides access to a vast library of packages, simplifying the addition of functionalities to applications.
- 3) Single Programming Language: Allows developers to use JavaScript for both client-side and server-side development, promoting code reusability and efficiency.

#### **4.4.4. MongoDB**

MongoDB is a NoSQL database that provides high performance, high availability, and easy scalability. It uses a document-oriented data model, making it flexible to accommodate changes in data structure [\[21\]](#).

Key Features:

- 1) Document-Oriented Storage: Stores data in JSON-like documents, allowing for varied data structures and dynamic schemas.
- 2) Scalability: Supports horizontal scaling through sharding, enabling the distribution of data across multiple servers.
- 3) Aggregation Framework: Provides powerful tools for data aggregation and analysis.

#### 4.4.5. JSON web token - JWT

##### Overview

JSON Web Token (JWT) is a compact, URL-safe means of representing claims to be transferred between two parties. It is often used for secure authentication and information exchange in web applications. JWTs consist of three parts: a header, a payload, and a signature. The header typically specifies the token type and the algorithm used for signing. The payload contains the claims, which are statements about an entity (usually the user) and additional data. The signature is used to verify that the sender of the JWT is who it says it is and to ensure that the message was not changed along the way.

In our project, JWT is integrated for user authentication and session management. When a user logs in, the server can generate a JWT containing the user's information and send it back to the client. The client can then store this token and send it in the Authorization header of subsequent requests to access protected routes. On the server side, middleware can be used to verify the token's signature and extract the user's information from the payload, granting or denying access based on the token's validity. This approach provides a stateless authentication mechanism, as the server does not need to keep track of active sessions, and it scales well for distributed systems, such as those deployed on cloud platforms [19].

#### 4.4.6. Deployment of the project

Deploying a web application involves several key steps to ensure that our website is accessible to users on the internet. Initially, we need to choose a hosting provider or cloud platform, such as AWS or Vercel, which offers the infrastructure and services required to host our application.

Next, we should configure our domain name, which involves registering a unique domain and pointing it to our hosting provider's servers. This step is crucial for making our website easily accessible via a user-friendly URL.

The hosting provider will then build and serve our application, making it available to users worldwide.

##### Vercel

Vercel is a cloud platform that provides an easy and efficient way to deploy and host web applications, particularly those built with modern frameworks like Next.js, React, and Vue.js. To deploy in Vercel, just need to push the code to the Git repository and connect it to Vercel, which automatically detects the framework, builds your project and deploys it to a unique URL. Vercel offers features such as serverless functions, edge caching, and automatic HTTPS, ensuring high performance and security for your site. The platform seamlessly integrates with popular development tools and supports continuous deployment, automatically updating the site with each git push[20].



#### 4.4.7. Tailwind

Tailwind CSS is a utility-first CSS framework that provides a set of predefined classes, allowing developers to build custom designs directly in their HTML markup. It emphasizes rapid development and encourages a design-first approach, making it easier to create responsive and visually consistent interfaces. By using Tailwind, we can avoid writing repetitive CSS code, leading to cleaner and more maintainable codebases. The framework is highly customizable, enabling users to define their own themes and design systems. Tailwind is high-quality and efficient thanks to its flexibility, ease of use and ability to integrate seamlessly with development tools and modern front-end frameworks [22].

## 5. Product

### 5.1. Main Interviews during the process

#### 5.1.1. Interview with Irit

We started our research by talking to Irit, who manages a Facebook page where interviews are conducted with people who come to present their work.

During these interviews, the interviewees typically face a set of common inquiries. These include questions about the personality traits required for the job, steps to embark on a career in that field, necessary qualifications or prerequisites, and potential earnings. Our initial interview focused on gaining insights into Irit's work revolving around the "Mithabtey Miktzoa" Facebook page and her aspirations for this endeavor. The following is a synopsis of our conversation, highlighting the key points discussed and the primary lessons learned.

There are 302 professionals that have been interviewed for the website project to match individuals' qualities to suitable professions.

Currently, the information is on Facebook covering 80 professions, but significant effort is needed to extract and organize it. There are essential tasks that need to be done.

Website requirements:

- Admin panel for updating information
- Algorithm to calculate matches even with incomplete user data
- User-friendly interface to guide trait selection and view matched professions

Additional features:

- User account creation
- Connection to courses and discounts
- Partnership with Find Me Mentor site for mentorship after job matching

To match between character traits and professions:

- Use the Big Five Model (FFM) of personality traits for classification
- Extract and organize information from Facebook group comments
- Use Facebook API to extract posts
- Allow users to select and arrange their traits.
- Job matching algorithm to find and rank solutions based on trait and background match
- Organize information in a Google Drive Excel sheet by profession and category.

Example of how the information organized in jobs excel:

מקצוע	הצגה עצמית	מה מהות המקצוע	מה התכונות הנדרשות או האופטימליות לעבוד בתחום?	איך נראה יום עבודה סטנדרטי בתחום?
reality developer	היי! אני אסף, מפתח מציאות מדומה בסטודיו peanut button שהקמתי עם אח שלי. אהרון-מן vr, הוא משחק מציאות מדומה שפיתחנו. זה משחק שמכניס אתכם לתוך העולם של הסרט "המוסד". מאוד מרגש לחדש בתרבות הישראלית ולעשות את חזו הראשון בעברית (עם טל פרידמן וצחי הלוי החמודים), ולשתף פעולה עם סרט כל כך מגניב (אלון, הבמאי, כבר התראיינו פה בעבר).	מקצוע הזה חדש, אבל הוא הולך ונהיה נפוץ עם הזמן - מקווה שיהיו יותר אנשים כאלה ככל שהזמן יעבור ותתפתח קהילה של מפתחים. התחום קיים משהות ה-90 אבל קיבל בוסט משמעותי בעשור האחרון כשייצאו לשוק משקפי ויר במחיר הגיוני לצרכן. המקצוע מסייע בזה שהוא מאפשר חוויות חדשות, דרכים חדשות להנות מסיפור או משחק	זה תחום חדש, אז בעיקר דורש יכולת ללמוד ולהתאים את עצמך לשוק משתנה גמישות מחשבתית אני חושב שצריך גם אהבה לתחום כדי יוכלת ללמוד מתחומים משיקים שהצטבר בהם ידע רלוונטי לאורך שנים כמו קולנוע, גיימינג, תאטרון לשרוד בו ידע בעיצוב ואומנות	באמת שאין סטנדרט. כל שלב בפיתוח שונה לגמרי. לפעמים יותר עיצוב, לפעמים רק תכנות. לפעמים ימי הקלטות עם שחקנים, מקראות תסריט. כל שלב כזה הוא סדר יום משל עצמו
איך work-life balance בתחום?	מתי ואיך ידעת שהגעת למקצוע שהוא נכון עבורך?	שכר בתחום?	מה הצד הפחות זוהר במקצוע?	האם יש אתגרים ייחודיים לתחום הזה?
יש עומס אבל אנחנו מאוד מקפידים לשים גבולות, גם מתוך הבנה שעבודה קשה מידי פוגעת בתוצר בסוף. למשל אני מאוד גאה שעבודה בסופשים הייתה נדירה למדי בפיתוח של אהרון-מן	אני עדיין לא יודע אני מאוד אוהב לראות אנשים חווים דברים שיצירתי ומחייכים מאוזן לאוזן. זה סימן בשבילי שבחרתי לא רע	שמשתכרים בו יפה עיצוב, לצערי, קצת פחות. השילוב ביניהם נותן לדעתי ייתרון ענק ואפשרות לנהל צוותים וכדומה, שזה נחמד בהקשר של שכר	כרגע זה שוק קטן ולמוד אכזבות. ככה שהוא מאתגר מבחינה עסקית. מי שנכנס לזה צריך להאמין בזה בטווח הארוך	לראות כדי להבין. בעיקר כשזה נעשה טוב. אתגר ענק הוא להעביר את החוויה במילים או בתמונות לקהל או לשותפים ליצירה. זה פשוט לא אותו דבר כמו להיות בפנים ולחוות את החוויה בגוף ראשון
איך מגיעים לתחום? אפשר להשתלב בו?	צריך תואר בכלל? באיזה תחום?	האם יש צורך בכישורים טכניים למי שעוסק בתחום?	מה הנסיון הדרוש כדי להכנס לעבודה בתחום? (אם יש כזה)	
או דרך עיצוב, או דרך מדעי המחשב. יש מסלולים שמשלבין כלים משני העולמות כמו פיתוח משחקי מחשב, ואז יחסית קל לעשות את ההמרה לוי אר ידע בתיכנות - פיתוח משחקים	תעשייה כל כך קטנה שאני לא יודע מה האחוזים. בסוף לימודים זה רק דרך לרכוש כלים. יש דרכים אלטרנטיביות ברשת, ויש אנשים בתחום שפשוט למדו בעצמם	כדאי שיהיה בצוות לפחות מישור אחד עם יכולת תכנות. התוכנות משתנות כל הזמן, אבל הנפוצות היום הן unity ו-unreal	צוותים גדולים מחלקים את זה להמון תפקידים, וכל אחד צריך ניסיון אחר. אנימציה, עיצוב גרפי, תסריט, סאונד, תיכנות. במקרה כזה כל תפקיד דורש את הרקע שלו. התפיסה שלי היא שזה תפקיד שמשלב קצת מהכל, באופן שמאפשר לשתף פעולה עם אנשים בכל מקצוע ספציפי, אבל גם לשמור על ראייה כוללת של כל האספקטים של החוויה. במקרה כזה כדאי שיהיה רקע מגוון. והעיקר זה הנכונות לעבוד קשה, ללמוד ולהתמיד.	

Figure6: Example of trait from Irit's jobs excel

Figure 6 presents an unstructured Excel file containing information about various professions, which was obtained from Irit. For each profession, the file displays the questions (represented in columns) that were posed to the interviewees, reflecting a set of casual inquiries. The information shown is derived from the general responses provided by the interviewees. However, the data crucial for our algorithm's implementation is the identification of the RAMAK traits that characterize each profession. This information is essential to facilitate the matching process between the user's unique traits and suitable professions, leveraging the genetic algorithm. Extracting these requisite traits from the unstructured data presents a considerable challenge, as there is no discernible pattern or routine that allows for efficient and convenient data mining procedures.

### **5.1.2. interview with Ranan Hass**

In our consultation with Ra'anan Hess, an occupational psychologist specializing in job placement, several salient conclusions were drawn regarding the alignment of personality traits with suitable professions. Firstly, Hess elucidated the limitations of the Big Five personality trait model, describing it as "very theoretical" and necessitating extensive questionnaires, which may prove impractical for the purposes of the website. Secondly, while the Holland questionnaire aligns with the concept of matching traits to occupations, it is considered outdated, and the professions it encompasses may not be relevant to contemporary job markets. Lastly, Ra'anan recommended the RAMAK questionnaire, which tends to focus more on work domains rather than solely on character traits, suggesting that it might be the optimal solution for the website's matching algorithm.

The recommendation to utilize RAMAK was based on several factors:

1. RAMAK employs a three-level scale to describe each trait, providing a more nuanced assessment.
2. The questionnaire has been validated and proven through empirical research.
3. RAMAK represents the most up-to-date questionnaire available.

By incorporating Hess's expert guidance and employing the RAMAK questionnaire, the website can potentially enhance its ability to match individuals with suitable career paths based on their unique personality traits and work preferences.

## **5.2. Requirements**

In alignment with the customer's specifications and the mandated system architecture, we have conducted a comprehensive analysis to delineate the system's outline, encompassing both functional and non-functional requirements. This rigorous assessment ensures that the proposed solution adheres to the client's expectations and meets the desired objectives. The findings are as follows:

### 5.2.1. Functional requirements

1. The system allows registration.
2. The system allows login.
3. The system allows search jobs by it`s field.
4. The system allows users to receive information about jobs.
5. The system allows for matching between the user`s traits to their most suit job by genetic algorithm.
6. The system allows users to edit their profile.
7. The system allows the admin to add / delete / edit jobs.
8. The system allows the admin to send notifications to users.
9. The system allows users to answer the RAMAK questionnaire.
10. The system will alert users if there are new jobs.
11. The system allows giving feedback on the results obtained from the algorithm.
12. The system allows users to save favorite job listings.
13. The system allows users to connect with mentors or industry professionals for career advice and guidance.
14. The system allows users to participate in forums or discussion boards related to job searching and career development.
15. The system allows adding a new post directly to the Facebook group 'Mithabtey Miktzoa' through the website.
16. The system allows users to apply for jobs directly through the website.

### 5.2.2. Non-functional requirements

1. **Usability:** the website should be easy to navigate and use, with clear instructions for completing the survey and viewing results.
2. **Protability:** The system can be used on different platforms/browsers.
3. **Authentication:** To login you must enter username and password.
4. **Management:** Only admin can add/delete/edit jobs.
5. **Scalability:** The website should be able to handle a large number of users simultaneously without significant performance degradation.
6. **Security:** User data should be securely stored and transmitted, with measures in place to protect against unauthorized access.
7. **Scalability:** The algorithm should be designed to easily scale to growth in the number of users and jobs.
8. **Compatibility:** The website should be compatible with a range of browsers and devices to ensure a seamless user experience.
9. **Maintainability:** The website should be easy to maintain and update, with clear documentation for future development.
10. **Performance:** The website should load quickly and respond to user actions.
11. **Accessibility:** The system design will accommodate people with disabilities.

## 5.3. Preliminary software engineering documents

### 5.3.1. The structure of the system architecture

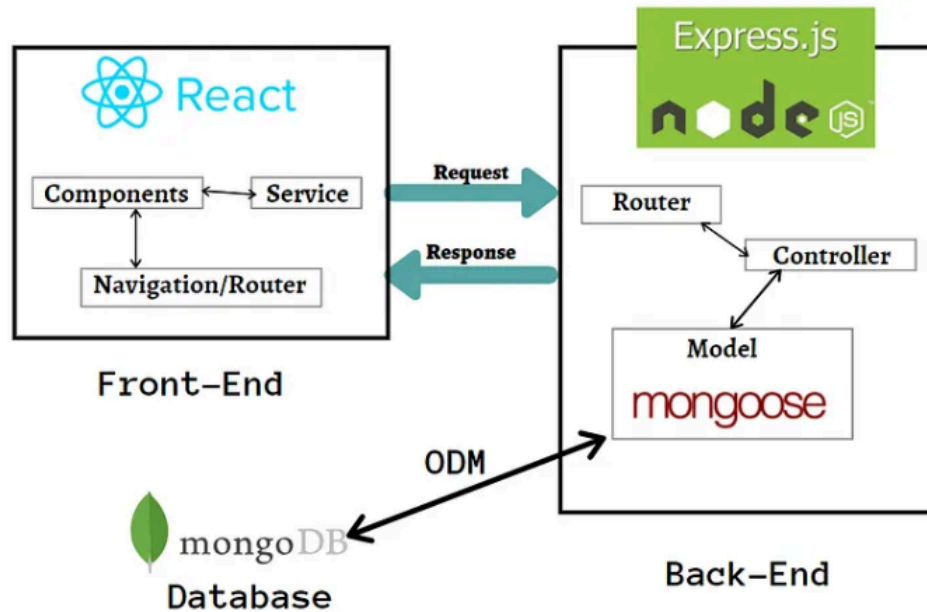


Figure7: Architecture scheme [27]

### 5.3.2. Use Case Diagram

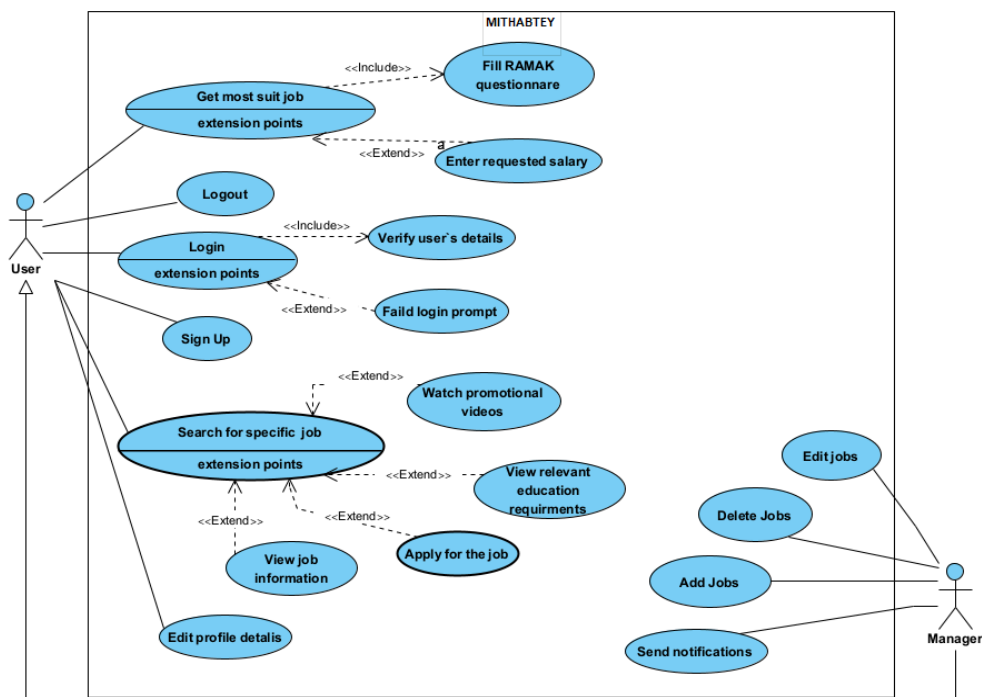


Figure8: Use Case Diagram

### 5.3.3. Activity Diagrams

#### 5.3.3.1. Searching job

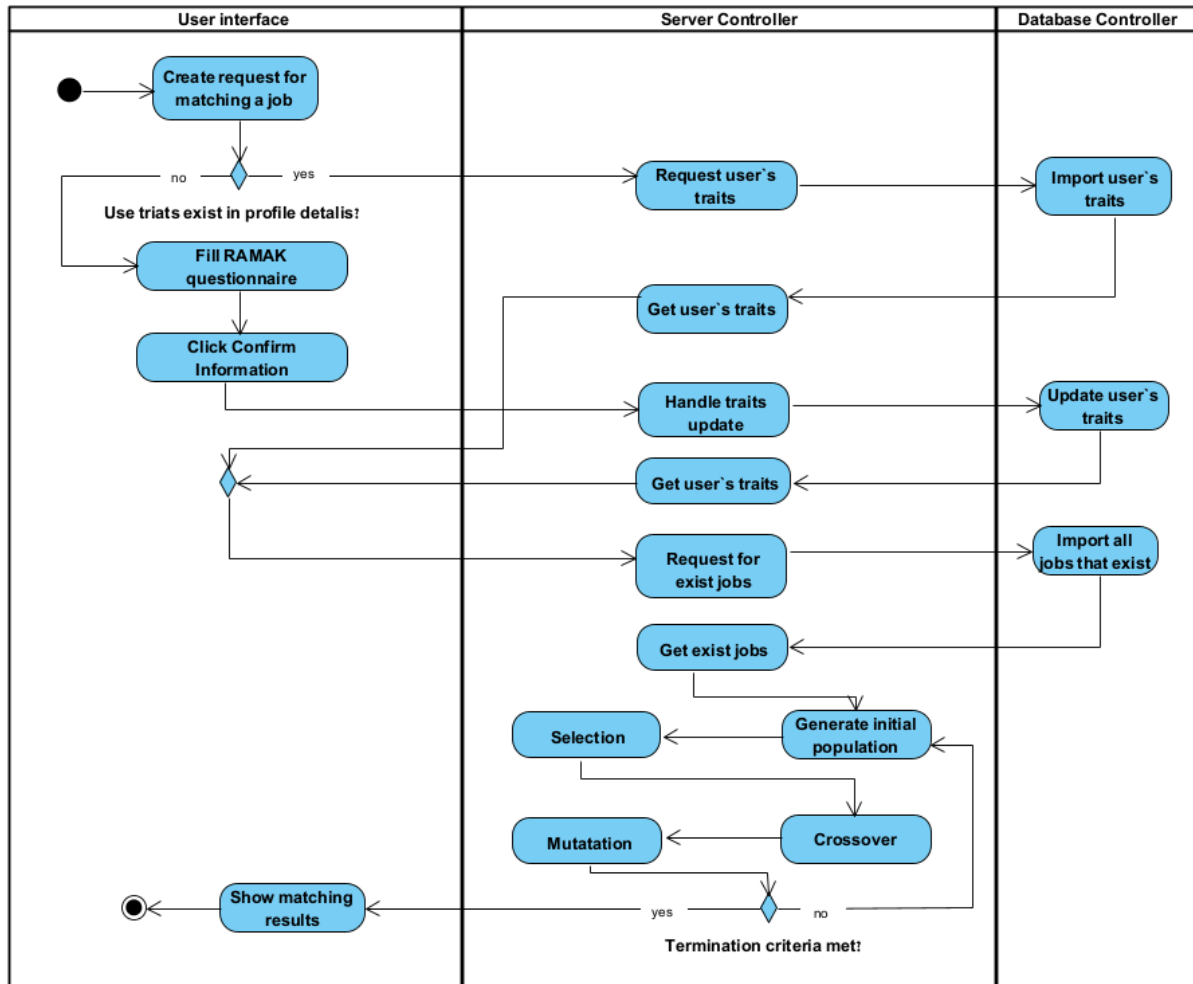


Figure9: Activity Diagram for searching job

### 5.3.3.2. Adding a new job to the database as an admin

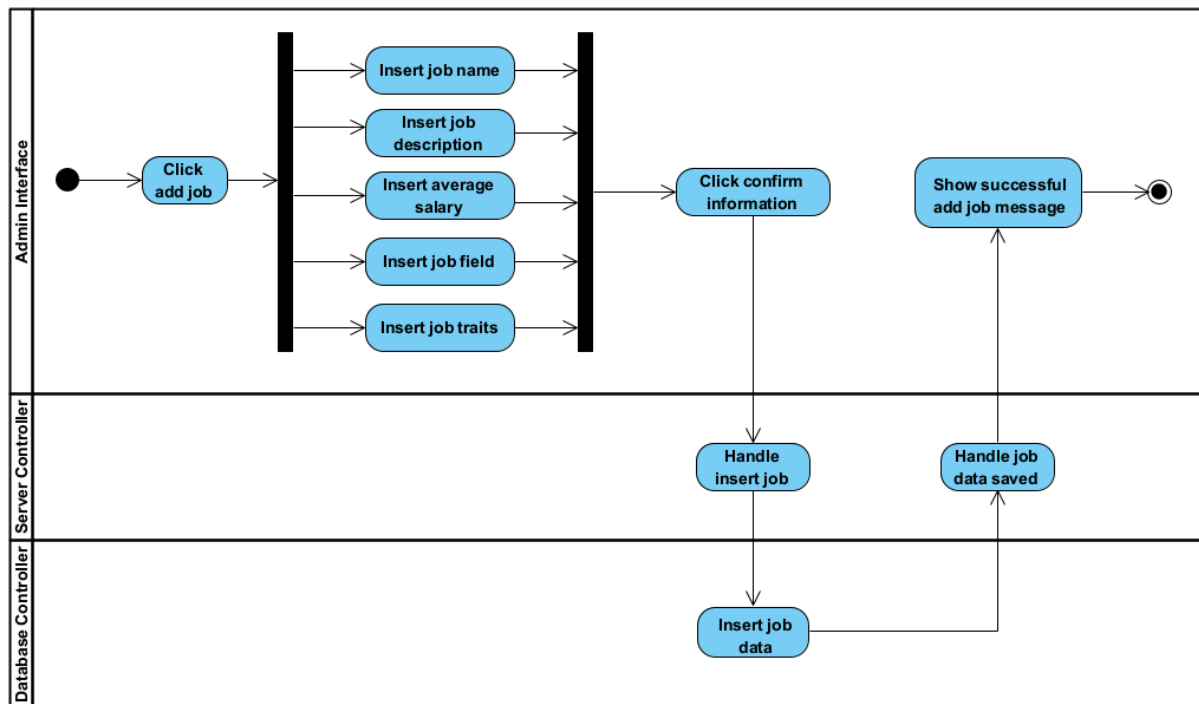


Figure10: Activity Diagram for add job by admin

## 5.4. Testing plan

Test	Module	Tested Function	Expected Result
1	Registration	User Registration	Successful registration with valid user information.
2	Login	User Login	Successful login with registered credentials.
3	Login	Admin Login	Successful login with registered admin permissions.
4	Job Search	Search Jobs	Relevant jobs displayed based on the selected field.
5	Matching Algorithm	Trait Matching	Jobs recommended based on user traits using the genetic algorithm.
6	Users Profile Editing	Edit Profile	Successfully update user profile information.
7	Admin Job Management	Add Job	Successfully add a new job listing to the system.
8	Admin Job Management	Delete Job	Successfully delete a job listing from the system.
9	Admin Job Management	Edit Job	Successfully edit an existing job listing in the system.
10.	RAMAK Questionnaire	Answer Questionnaire	Allow users to answer the RAMAK questionnaire and store their responses accurately.
11.	RAMAK Questionnaire	Answer Questionnaire	Can not submit until the user answers all the questions.
12.	User's profile	Edit profile	Successfully update email

Table 2 - Table of test cases



## 6. Expected achievements

The purpose of the site is to help users who are undecided about a job to achieve the job that suits them most.

This site will have several key themes.

- **Data Organization:** Systematically organize and structure the data obtained from the Facebook group to facilitate efficient processing and analysis.
- **User Accessibility:** Implement intuitive and user-friendly interfaces that enable seamless access to the website's data and functionality, ensuring a convenient experience for users.
- **Jobs character traits:** Analysis character traits required for jobs
- **Administrative Control:** Provide administrators with comprehensive control and oversight capabilities over the database of professions, user management, forum moderation, and other administrative functions.
- **User Trait Evaluation:** Employ state-of-the-art techniques and methodologies to accurately assess and analyze users' character traits, ensuring a precise understanding of their unique profiles.
- **Genetic Algorithm:** Optimal matching between character traits and potential careers

### 6.1. Project metrics

In order to quantify the success of our website and identify areas for improvement, we aim to implement a comprehensive evaluation system that will provide quantitative metrics to assess user satisfaction. This data-driven approach will enable us to refine the website's features and functionality, ensuring that it continues to meet the evolving needs of our users effectively.

User satisfaction will be measured through several strategic methods:

- **Intermittent User Surveys:**  
 All the users will participate in surveys.  
 Surveys will use a rating scale (1-5) to gauge satisfaction with the algorithm's answers and the RAMAK questionnaire.  
 After collating a predetermined number of responses (150), user satisfaction scores will be analyzed.  
 The target is a high percentage (80%) of positive ratings (4 or 5).  
 Feedback will inform website refinements based on identified areas for improvement.
- **Genetic Algorithm Validation:**  
 Collaborate with a group of workers from the 'MITHABTEY' Facebook group who are satisfied with their current occupations.  
 The system compares the algorithm's recommended professions with the workers' actual fields of employment.

90% match of alignment between recommendations and occupations will indicate the algorithm's effectiveness.

- **Longitudinal follow-up:**

After 6 months we will contact some users to provide updates on their career progress.

This long-term feedback will enable assessing the lasting impact of the platform on users' career trajectories.

- **User Growth Targets:**

We anticipate a 30% increase in user registrations within the first three months of the website's launch. This metric will serve as an indicator of the platform's appeal and the effectiveness of our outreach efforts.

- **Surveys and Polls:**

We will organize surveys and polls within the 'MITHABTEY' Facebook group to gather information about users' experiences on the site. Our target is for at least 60% of respondents to recommend the site to others and at least 80% to express an intention to reuse the site when seeking career guidance in the future.

By implementing this comprehensive evaluation strategy, we will gain valuable insights into user satisfaction, the accuracy of our matching algorithms, and the overall impact of our platform on individuals' career journeys. This data-driven approach will inform our continuous improvement efforts, ensuring that our website remains a reliable and effective resource for career exploration and decision-making.

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## 8. AI prompts

- Give me a short paragraph summary of this article:  
 A closer look at psychological diversity within interest types in the Netherlands: construct validation of the Career Insight Questionnaire  
 Ref: <https://chat.openai.com/share/45125a6f-efb7-4ed0-910d-75111b6e5d29>
  
- Sort the article references by A-Z  
 Ref: <https://chat.openai.com/share/d62738c1-f5bb-43f8-928c-ef9b423c1d6b>
  
- Write me 2 paragraph about this article:  
 Five-factor model of personality and job satisfaction a meta analysis.  
 Ref: <https://chat.openai.com/share/bd8feb2a-1c42-481f-af26-0e93a73805a3>
  
- Summarize Judge, T. A., Heller, D., & Mount, M. K. (2002). Five-factor model of personality and job satisfaction: a meta-analysis. Journal of applied psychology, 87(3), 530.  
 Ref: <https://chat.openai.com/share/c2b13e45-cb3f-4623-abf9-20cf4f2fe3c6>
  
- Summarize Kern, M. L., McCarthy, P. X., Chakrabarty, D., & Rizoiu, M. A. (2019). Social media-predicted personality traits and values can help match people to their ideal jobs. Proceedings of the National Academy of Sciences, 116(52), 26459-26464.  
 Ref: <https://chat.openai.com/share/c2b13e45-cb3f-4623-abf9-20cf4f2fe3c6>
  
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 Ref: <https://chat.openai.com/share/c2b13e45-cb3f-4623-abf9-20cf4f2fe3c6>
  
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 Ref: <https://chat.openai.com/share/c2b13e45-cb3f-4623-abf9-20cf4f2fe3c6>

## 9. Appendix

### 9.1. Questions for interviews in the Facebook group

- What are the required or optimal qualities to work in the field?
- What does a standard working day look like in the field?
- How do you get hired to the field? How can you join it?
- Do you need a degree? If yes, in which field?
- Are technical skills necessary to work in the field?
- What experience is needed to get a job in the field? (if there is one)
- How is the work-life balance in the field?
- When and how did you know you arrived at the job that is right for you?
- What is the salary in the field?
- What is the less glamorous side of the job?
- Are there any unique challenges for this field?
- Are there any trends in the field?
- Will the profession disappear with technological advancement?
- Is there a sub-field in your field that is going to overcome it in a decade or two?
- Will the technological advance or the changes in the field of information gathering and AI also affect the field?
- Do you think there will be changes in the criteria for defining the position in the field in the coming decades?
- Is there a close field that may merge with the field?
- Do you see a change in the way they will work in your field in the coming years?
- How do we know how to identify a job in the field?
- Is there a close field that you think will disappear over time due to technological advancement?
- What do you like most about this job? What is it magic?