

# Design Document for O-1A Visa Qualification Assessment Application

## Introduction

This document outlines the design choices made in the development of an AI application to assess how a person is qualified for an O-1A immigration visa. The application evaluates a candidate's CV against eight specific criteria and produces an assessment of their qualifications.

## Design Choices

### 1. Framework Selection:

- **FastAPI:** FastAPI was chosen for its high performance, ease of use, and support for asynchronous operations. It also has excellent documentation and a strong community, making it a reliable choice for building APIs.

### 2. AI Model:

- **OpenAI's GPT-3.5 Turbo:** Using OpenAI's GPT-3.5 Turbo model allows leveraging a powerful language model to analyze the CV and extract relevant information. GPT-3.5 Turbo's capability to understand and generate human-like text is essential for accurately assessing the qualifications based on the criteria. GPT-3.5 Turbo can understand the context of a given prompt and generate responses that are relevant and contextually appropriate. This is crucial for interpreting the instructions provided in the prompt and generating accurate assessments based on the CV input. OpenAI provides robust support and documentation for GPT-3.5 Turbo, making it easy to integrate into applications and troubleshoot any issues that may arise. The availability of pre-trained models and APIs simplifies the development process and accelerates time-to-market for the application. In the future, fine tuning GPT will also enhance the model to make better decisions and take into account each requirement's individual weights in order to output better responses and this can also make the rating more accurate.

### 3. Data Processing:

- **Text Input Handling:** The application accepts a CV in text format, ensuring it can process documents easily without needing complex parsing logic for different file formats. In a future version, adding PDF functionality will also be useful for user uploads with different formats.
- **Prompt Engineering:** A well-crafted prompt is crucial for guiding the AI model to produce the desired output. The prompt provides clear instructions and an expected output format to the model. The definition for each criteria is also given to the model for better understanding.

### 4. Output Format:

- **JSON Response:** The application returns the assessment in a structured JSON format. This format is easy to parse and use in various applications, ensuring compatibility and ease of integration. Output consists of two parts, "criteria\_met", which states which criteria is satisfied, and "qualification\_rating", which states a "low", "medium", or "high" chance for qualifying for an O-1A immigration visa.

### 5. Error Handling:

- **Validation and Parsing:** Proper validation and error handling mechanisms are in place to ensure the application can handle unexpected inputs and produce meaningful error messages.

## Implementation Details

### 1. Endpoint Definition:

- The /assess\_cv endpoint is defined to accept a CV file and return the assessment results. It uses FastAPI's File and UploadFile classes to handle file uploads.

### 2. AI Analysis Function:

- The analyze\_cv function constructs a prompt and sends it to the OpenAI API. The function receives the response and extracts the relevant information.

### 3. Parsing Function:

- The parse\_analysis function processes the AI model's JSON response, extracting and structuring the information into the defined criteria.

### 4. Main Application:

- The application initializes the FastAPI instance and defines the endpoint. It also includes a main entry point for running the server using uvicorn.

## Evaluation of Output

### 1. Accuracy of Criteria Matching:

- Verify that the achievements listed in the CV are correctly matched to the appropriate O-1A criteria. Each criterion in the response should have relevant details extracted from the CV. In future versions, adding more data to train and fine-tune the model will be helpful to decipher which information is relevant towards each criterion.

### 2. Completeness of Information:

- Ensure that all relevant achievements are included in the response. Missing significant achievements can lead to an inaccurate assessment.

### 3. Rating Evaluation:

- The rating (low, medium, high) should correspond to the number of criteria met. Confirm that the logic for determining the rating is consistent with the defined thresholds (0-2: low, 3-5: medium, 6-8: high).
  - In the context of evaluating qualifications for an O-1A visa, the chosen number ranges for the rating (low, medium, high) are based on the number of criteria met. Here's the rationale behind these thresholds:
    - **Low Rating (0-2 Criteria Met):** An individual who meets 0-2 criteria is considered to have a low rating. This indicates that they may not have sufficient evidence or achievements to demonstrate extraordinary ability in their field. They may not meet the minimum requirements for an O-1A visa and would likely need to enhance their qualifications before applying.

- Medium Rating (3-5 Criteria Met): An individual who meets 3-5 criteria is given a medium rating. This suggests that they have demonstrated some level of extraordinary ability, but it may not be sufficient to qualify for an O-1A visa with high certainty. They may have notable achievements in their field, but there may be areas where they could further strengthen their qualifications.
- High Rating (6-8 Criteria Met): An individual who meets 6-8 criteria is assigned a high rating. This indicates that they have demonstrated a significant level of extraordinary ability across multiple criteria. They have a strong case for meeting the requirements of an O-1A visa and are likely to be considered highly qualified for such a visa. Their achievements and contributions in their field are substantial and compelling.
- By defining these thresholds, the rating system provides a straightforward way to assess an individual's qualifications for an O-1A visa based on the number of criteria they meet. It helps in categorizing applicants into different levels of qualification, making it easier for immigration authorities or evaluators to make informed decisions.

#### 4. Format and Readability:

- The JSON output should be well-structured and readable. Ensure there are no formatting issues or extraneous characters.

#### Example Output (High Rating):

```
{
  "criteria_met": [
    {
      "criterion": "Awards",
      "details": "National Science Award, 2009; International Biochemistry Prize, 2012"
    },
    {
      "criterion": "Membership",
      "details": "Member of the National Academy of Sciences; Member of the American Association for the Advancement of Science (AAAS)"
    },
    {
      "criterion": "Press",
      "details": "Doe, J., et al. (2020). Advanced Techniques in Genetic Engineering. Nature Biotechnology; Doe, J., et al. (2019). CRISPR and Its Applications. Science; Doe, J., et al. (2018). Gene Therapy: Current Trends and Future Prospects. Cell"
    },
    {
      "criterion": "Original contribution",
```

```

      "details": "Developed a novel method for gene editing that significantly advanced the
field; Introduced innovative approaches to CRISPR technology, leading to new treatments for
genetic disorders"
    },
    {
      "criterion": "Scholarly articles",
      "details": "Doe, J., et al. (2020). Advanced Techniques in Genetic Engineering. Nature
Biotechnology; Doe, J., et al. (2019). CRISPR and Its Applications. Science; Doe, J., et al.
(2018). Gene Therapy: Current Trends and Future Prospects. Cell"
    },
    {
      "criterion": "Critical employment",
      "details": "Played a critical role in BioTech Innovations' success, contributing to key
projects and patents; Integral member of Genetic Research Lab, driving forward the institution's
research agenda"
    },
    {
      "criterion": "High remuneration",
      "details": "Annual salary of $250,000 at Genetic Research Lab; Consulting fees totaling
$50,000 annually for work with various biotech companies"
    }
  ],
  "qualification_rating": "high"
}

```

This example output shows the criteria met for the 8 categories as well as lists the details of achievements the person has completed that falls under that specific category.

#### **Example Output (Medium):**

```

{
  "criteria_met": [
    {
      "criterion": "Awards",
      "details": "Excellence in Data Science Award - Mar. 2023"
    },
    {
      "criterion": "Press",
      "details": "Published monthly reports on predicting CPI using univariate and multivariate
models for forecasting"
    },
    {
      "criterion": "Original contribution",
      "details": "Developed ongoing accurate demand forecasting and personalized
recommendation models for customers"
    }
  ]
}

```

```
    },  
    {  
      "criterion": "Critical employment",  
      "details": "Employment with Loxz Digital Group as Lead Data Scientist, Abacus.AI as  
Associate Product Manager, and Aerion Supersonic as Software Development Intern"  
    }  
  ],  
  "qualification_rating": "medium"  
}
```

The above output only satisfies 4 out of the 8 criteria which puts this CV into the “medium” rating category. While the CV has met some of the requirements, it may not be enough to qualify for the O-1A visa.

### **Conclusion**

This application provides a streamlined approach to assessing the qualifications for an O-1A visa using AI. The design choices ensure the application is efficient, accurate, and easy to use. The evaluation criteria help maintain the integrity and reliability of the output, making it a valuable tool for preliminary visa qualification assessments.