

Multimodal Mock Interview Analysis and Generation using LLMs and Prosodic Features

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I Problem Description

A Introduction

The current job market is growing increasingly competitive. This is especially true for saturated fields like the tech sector. While there are many online resources to finetune one’s resume and cover letter, as well as resources to improve interviewing skills, none improve interviewing skills in real-time, tailored to each person’s resume and target role. Moreover, the interview process is very opaque, where many students are not given feedback about their performance, or how they are perceived. Some tools use a list of preset questions, however, this lacks personalization to the job post and applicants background that best simulates the job interview environment. We aim to address this gap through using large language models (LLMs) and machine learning (ML) models trained off of existing interview datasets.

Specifically, once an applicant inputs their resume and a specific job post, the LLM will simulate a mock interview, generating interview questions based on the specific job posting and applicant’s background. The model will assess the quality of the interview through the interviewee’s visual and verbal responses. In particular, users will receive feedback on the quality of their responses as well as an overall summary of their interview based on the answers’ semantic and syntactic qualities, along with an analysis of the users fit for their selected role and skills match analysis.

B System inputs and Outputs

1.2.1 System Inputs

Interview Handler Inputs The Interview Handler handles interview topic questions and follow up question generation, which requires the user to input a pdf of their resume and job description into the user interface. As illustrated in Figure 1, the user also sees their previously entered job descriptions and resumes that they can select to use as their inputted resume or job description.

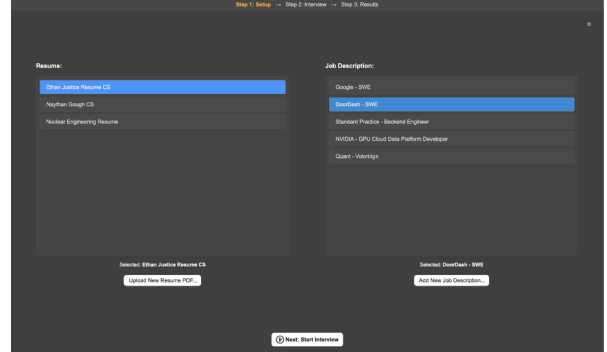


Figure 1: Image of application user interface where the user has selected the resume and job description they would like to use for the interview.

The user will then begin to record their answers to a given question. They will answer verbally. A video recording of their answer is also collected but is not used in the implementation of the solution. Shown below in Figure 2 is the interview screen.

Interview Assessment Inputs The Interview Assessment includes the Content Analysis, Speech

D Achievement Overview

1.4.1 Achievement Overview

We have successfully created a MacOS application that performs an interview by having a verbal conversation with the user, that tailors the interview to the user’s experiences and the role they are applying for, and asks follow up questions for more information on a topic. We created a random forests model to analyze the speech prosody of the users answer, and analyzed the answer structure and content. A job fit and skill analysis was also performed.

1.4.2 Group Member Allocations

Ethan’s contributions were to create the final app user interface, bundle the application into completed app, create the interview handler, and the content and skills analysis. He also helped write and edit the proposal, progress update and final paper. Zach’s contributions were to create the random forests ML speech prosody model, help integrate the model into the application and to help write to the proposal, progress update and final paper. Katie’s contributions were the initial prosody model, literature review, evaluation metrics of the models, helped write and edit the proposal, progress update and final paper. Aniket created the initial Javascript mockup of the UI, collected the overall scores and the MIT dataset for model training, wrote the scripts for plotting score averages, and helped plan the project model structure.

II Related Work

Previous studies have leveraged large language models for interview tasks, such as providing follow-up questions [2] or acting as a virtual interviewer [5]. However, to the best of our knowledge, we have not found a system for job applicants that personalizes questions to a job description and resume, along with creating custom questions and follow up questions. For example, Boudjani et al.’s AI Chatbot for Job Interview employs intent classification and entity extraction to handle French-language interviews

[5], but explicitly states that it neither evaluates skills nor incorporates the applicant’s personal information. This approach differs from our research since we leverage the LLM context window to incorporate a user’s resume and a job description, enabling a level of question specialization that goes beyond the chatbot’s stated capabilities. Previous AI models have also integrated computer vision and natural language processing to assess an applicant’s interview performance [1]. While our work shares the aim of using AI to conduct interviews, Lee and Kim’s study focused on a company-specific setting and is not personalized to each specific role [1]. In contrast, we emphasize personalization based on the user’s resume and job description, particularly for a U.S. student audience, where cultural nuances can affect approaches to both sentiment analysis and visual emotion detection.

III Methodology

A Datasets

We would like to use a dataset of interviews conducted ideally in a school/college environment for job purposes, along with some standard of rating or evaluation to allow the model to improve. For this project, we plan to use the MIT Interview Dataset, which comprises 138 audio-visual recordings (about 10.5 hours) from mock interviews with 69 internship-seeking MIT students. Each video is annotated with detailed ratings on 16 behavioral traits—including overall performance, engagement, and friendliness—collected via Amazon Mechanical Turk, as well as a final ground truth rating calculated using an optimization algorithm [3] [4]. The dataset provides multimodal data, encompassing facial expressions, prosodic features (such as pitch and pauses), and lexical information derived from transcriptions [3]. This allows us to either treat each interview as a unified text or to treat each question as a distinct text, but given the Mechanical Turk ratings, we can train our model to identify structures and sentiments in the interviews that result in higher or lower ratings. This is ideal to assess the

quality of the interview as we lack the resources to manually create a dataset for our model within the given time period. This led to some limitations in our model’s performance and research. Namely, the dataset lacks a large variation of scores. As Figure 4 and 5 illustrate most of the scores cluster around 5.10-5.15 with a max and min score of 6.58 and 3.33 respectively. The left skew in figure 4 illustrates a bias in our dataset that ultimately led to a bias in our model. This caused a condensed score range that the model would output.

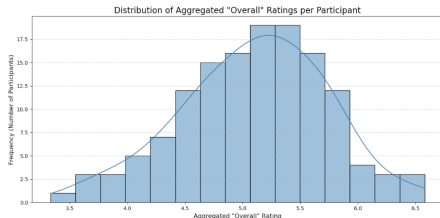


Figure 4: Histogram showing distribution of scores (Likely Figure 4 from text).

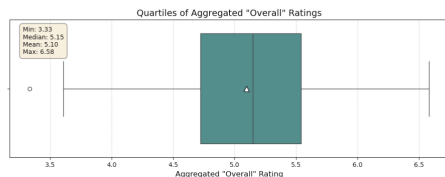


Figure 5: Histogram showing count of scores (Likely Figure 5 from text).

B Preprocessing

The MIT dataset that we are using for this project contains raw interview data and several preprocessed metrics:

- Raw Audio
- Raw Video
- SHORE Facial Features

- PRAAT Prosody Data
- Lexical Data
- Interview Transcripts
- Interview Rating (manually graded)

Of the MIT Dataset’s features, for the Random Forests model, we only used the prosodic features as MIT found that both SVM assigns prosodic features the majority of the weights for the overall performance [3]. We are only trained on the prosodic features to reduce model complexity and model run-time. So the resulting dataset that we are going to use will contain:

- Raw Audio
- PRAAT Prosody Data
- Interview Transcripts
- Interview Rating (manually graded)

The dataset size will be the previously stated metrics for 138 interviews, and a dataset of scores aggregated from 16 workers at Amazon Mechanical Turk. We will randomly split the dataset 80/20 between training and testing data to ensure a proper balance between training data size large enough test dataset to ensure model accuracy. To convert the data into a format our model could use we had to combine the interview rating dataset with the PRAAT Prosody Data. The regular expressions library (RegEx) was created to extract and standardize participant IDs from the prosodic features dataset, these features were then averaged across each interview participant. Similarly, the participant IDs in the Turker dataset were standardized, and only the aggregated sentiment scores were retained. The processed prosodic and sentiment score datasets were then merged using the standardized participant IDs as the common key.

C Overview of Model Architecture

Our model architecture is split into two main components, we have Model 1: Interview Handler

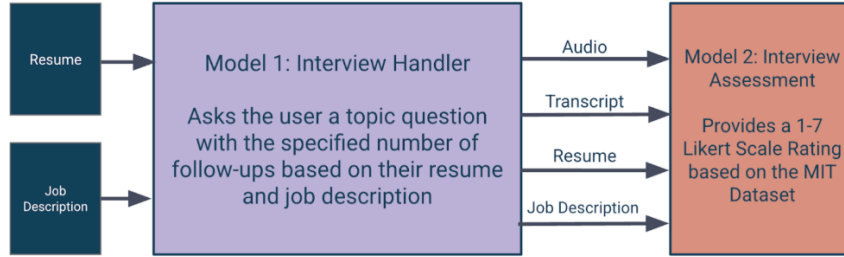


Figure 6: Diagram of system architecture

Model, and Model 2: Interview Assessment Model. We split this project into two parts because the requirements and constraints on each model are fundamentally different. Figure 6 shows a diagram of the model architecture and how the models interact.

3.1.1 Model 1

Model 1 has the goal of asking questions to the user that are relevant to their experience and their resume, along with responding with any follow up questions related to the original question. This model receives an input of a resume and job description that it will use to tailor questions to the user. This model must be able to generate questions quickly and be able to remember previous responses and be able to track long distance dependencies. It was for this reason that we selected an LLM to be used for this model. We selected Google Gemini 1.5 Flash because it was able to quickly generate responses, had a context window that was large enough to fit a job description, user resume, and any needed questions and responses, and for limited scale use it is free, removing any cost barrier. After the questions are generated, the model will then generate a series of follow up questions based on each user response, all questions still generated with Google Gemini 1.5 Flash. User responses are transcribed and saved to a text file. Whenever the model asks a question to the user, the text of the question is sent to OpenAI Whisper, and an audio file that can be played for the user is returned from the API. All user responses are saved to a directory

within the application so the data collected can be leveraged by model 2. All user input passed into this model is recorded, and a transcript, and user audio and video inputs are recorded to be used by Model 2. All prompts used can be seen in Appendix A.

3.1.2 Model 2

Model 2 has the goal of transforming data collected during the interview process, such as the audio and transcript into scores for the quality of the content and speech prosody of the interview along with a content analysis and job fit analysis. To do this we will train a ML model using the MIT interview dataset that we preprocessed to best score each interview. To determine the speech prosody score, we leveraged a random forests model. Since the prosodic data was not taken over several time intervals (only one data point per question per interview), a Random Forest Regressor model was chosen for its ability to capture complex relationships between prosodic features and sentiment with tabular data.

Model 2 also leveraged LLMs for skill analysis where the job description was parsed for key skills, and the interview transcript and user resume was passed into the context window of the Google Gemini 1.5 Flash LLM model to analyze how the user fit each skill, along with analyzing the structure of the users answers and how well the user answered the content of each question, all prompts used can be seen in the appendix.

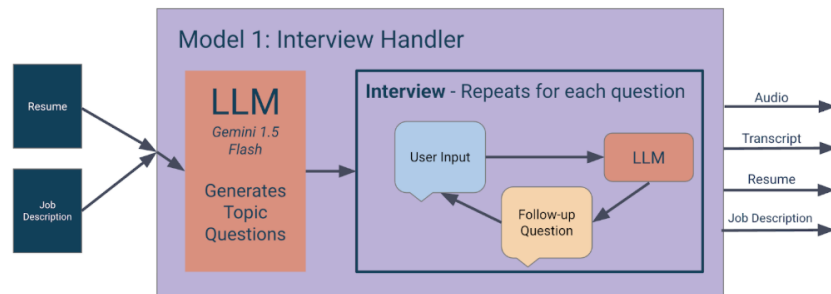


Figure 7: Diagram of Model 1: Interview Handler architecture

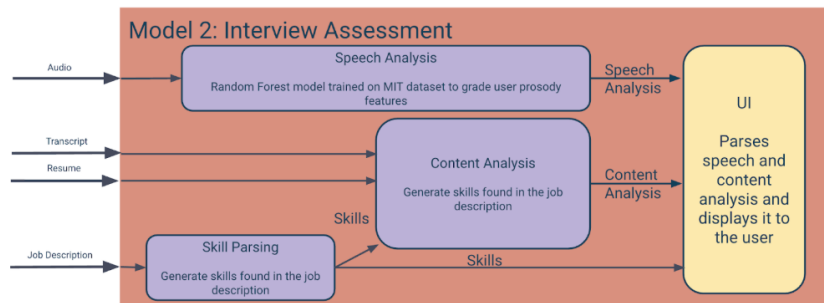


Figure 8: Diagram of Model 2: Interview Assessment Generator Architecture

IV Experiments

A Model Training

The only model that required training was the random forests ML model to analyze the user speech prosody. We randomly split the data into a 80/20 training/testing split. The model was trained using a pipeline that included median imputation to handle any remaining missing values within the selected features and standardization to scale the features, ensuring they contributed equally during training.

B Model Evaluation

4.2.1 Model 1: Interview Handler

We evaluated the interview handler by utilizing a set of 4 graders that were college students from the University of Michigan who were familiar with the job recruitment process to manually grade the output of the question list generated for 5 different job descriptions, 5 questions were generated for each job description. Each grader answered a set of 4 questions for each question in a job description:

1. Are the questions asked specific to the job post?
2. Are the questions asked specific to the resume?
3. Were the questions asked clear?
4. Were the questions asked relevant?

These questions are relevant to our stated goals of having personalized questions, which is measured by questions 1 and 2 relating to the personalization information that we give the model. Questions 3 and 4 evaluate that the questions are relevant and clear relating to the grading of the questions ability to interview the candidate effectively.

Each grader would then count the number of questions (out of 5) that they deemed satisfied criterion. The best score for each criterion is 5.

Each list of interview questions was generated in the following manner:

- Enter resume into program

- Find job description from active job posting on linkedin
- Copy job description into program
- Generate List of 5 questions

The results of the average grades for each job description are shown below in table 1. What we found is that for every single question, our model satisfied each of these attributes, showing strong performance on the metrics we measured. Each job description used along with the generated question list can be found in Appendix B. The resume used can be found in Appendix C. The score for each job posting was then averaged to determine how the overall model performed on each criterion.

Table 1: Average of all grader responses for each attribute of grading for each job description.

Grading Attribute	Average Score (Max 5)
Specific to Job Post?	5
Specific to Resume?	5
Questions Clear?	5
Questions Relevant?	5

4.2.2 Model 2: Speaker Prosody Score

The trained Random Forest Regressor model was evaluated on the unseen test set to assess its predictive performance. The evaluation metrics included Mean Absolute Error (MAE), Mean Squared Error (MSE), Root Mean Squared Error (RMSE), and R-squared (R2). These metrics provided a comprehensive understanding of the model's accuracy and its ability to explain the variance in the manually evaluated interview scores.

Listed are the results of these measures when ran on the trained model:

- MAE: 0.2961
- MSE: 0.1622
- RMSE: 0.4028

Table 2: Selected Turker rating predictions vs. actual predictions on Turker dataset.

Interview #	Actual	Predicted
89	5.578535	5.586299
105	4.719198	5.042190
12	4.964366	5.368097
26	5.762105	5.329575
64	6.452419	5.522504
67	5.626074	5.395713
65	6.045748	5.199648
117	5.110904	5.140674
108	5.224230	5.343792
73	5.771733	5.568955

- R^2 : 0.5617

This data shows that our model has some predictive power to predict the turker score for each interview, however more parameters than just user prosody data are needed to fully capture all variance in the interview grading. However, for the purposes of this application, where exact accuracy is not needed, and only a general trend of performance is needed for feedback purposes, this model is satisfactory for the intended purpose.

4.2.3 Model 2: Content Analysis

We evaluated the content analysis feature by utilizing a set of 4 graders that were college students from the University of Michigan who were familiar with the job recruitment process to manually grade the output of the content analysis for 5 different mock interviews. Each grader answered a set of 3 questions for each question in a job description:

1. Is the content feedback specific to the user’s answer?
2. Is the content feedback specific to the question asked?
3. Is the content feedback accurate?

The grades shown in table 3 below is the average number of outputs that satisfy each question between all graders, 5 is the maximum score:

Table 3: Evaluation of Content Analysis Feature

Question	Avg Rating
Content feedback specific to the user’s answers?	5
Content feedback specific to the questions asked?	5
Content feedback accurate?	4.25

This data shows that our model is extremely successful at creating feedback that is specific to the users answers and the questions asked, and provides accurate analysis the majority of the time, however can make errors or give incorrect advice a small subset of the time. This is sufficient for the purposes of performing mock interviews.

4.2.4 Model 2: Job/Skill Match Analysis

We evaluated the job/skill match analysis by utilizing a set of 4 graders that were college students from the University of Michigan who were familiar with the job recruitment process to manually grade the output of the job/skill match analysis for 5 different mock interviews. Each grader answered a set of 3 questions for each question in a job description:

1. Are the skills correctly identified from the job description?
2. Are the skills correctly assessed?
3. Is the evidence cited relevant to the claim skill level assessment?

The grades shown in table 4 below is the average number of outputs that satisfy each question between all graders, 5 is the maximum score:

This data shows that our model is extremely successful at identifying what skills are mentioned in a job description, and provides accurate analysis the vast majority of the time, and always cites relevant evidence to support its assessment. This is sufficient for the purposes of performing mock interviews.

Table 4: Evaluation of Job/Skill Match Analysis Feature

Question	Avg Rating
Are the skills correctly identified from the job description?	5
Are the skills correctly assessed?	4.75
Is the evidence cited relevant to the claim skill level assessment?	5

C Insights Gained

From this experiment, a key insight that we saw was the effectiveness of a LLM to cite evidence, and analyze different characteristics of source material. This was shown in its ability to analyze the interview transcript during content analysis, and combine evidence in documents during the job fit analysis where the resume, job description, and interview transcript were all needed to create a comprehensive analysis. Another key insight is an LLMs versatility, where the same LLM model was able to be used for both conversational question generation, and analyzing the content of text from various sources.

References

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- [3] I. Naim, M. I. Tanveer, D. Gildea, and M. E. Hoque, “Automated prediction and analysis of Job Interview Performance: The Role of What You Say and How You Say It,” 2015 11th IEEE International Conference and Workshops on Automatic Face and Gesture Recognition (FG), pp. 1–6, May 2015. doi:10.1109/fg.2015.7163127
- [4] I. Naim, Md. I. Tanveer, D. Gildea, and M. E. Hoque, “Automated Analysis and prediction of Job Interview Performance,” *IEEE Transactions on Affective Computing*, vol. 9, no. 2, pp. 191–204, Apr. 2018. doi:10.1109/taffc.2016.2614299
- [5] N. Boudjani, V. Colas, C. Joubert, and D. B. Amor, “Ai chatbot for job interview,” 2023 46th MIPRO ICT and Electronics Convention (MIPRO), pp. 1155–1160, May 2023. doi:10.23919/mipro57284.2023.10159831

A Prompts Used

INITIAL_QUESTIONS_PROMPT_TEMPLATE

You are a hiring manager preparing for a first-round screening interview.

Generate exactly {num_questions} insightful and tailored interview questions based on the candidate's resume and the provided job description.

Your questions should aim to:

1. Assess the candidate's fit for the role described in the job description (if provided).
2. Probe deeper into specific skills, experiences, or projects mentioned in the resume that seem relevant.
3. Identify potential gaps or areas needing clarification.

Avoid generic questions. Phrase them clearly as conversation starters.

Format the output ONLY as a numbered list, with each question on a new line (e.g., '1. Question text').

Do not include any introductory or concluding text, just the numbered questions.

Candidate's Resume Text:

{resume_text}

{job_desc_section}

{num_questions} Tailored Interview Questions (Numbered List Only):

JOB_DESC_SECTION_TEMPLATE

Job Description Text:

{job_desc_text}

FOLLOW_UP_PROMPT_TEMPLATE

You are an interviewer conducting a screening call.

The original topic question was: "{context_question}"

Recent conversation on this topic:

{history_str}

Candidate's most recent answer: "{user_answer}"

Based ONLY on the candidate's *last answer* in the context of the *original topic question*, ask ONE concise and relevant follow-up question to probe deeper or clarify something specific from their answer.

- * If the answer was comprehensive and clear, and no natural follow-up arises, respond with exactly:
 '[END TOPIC]'
- * Do NOT ask generic questions.
- * Do NOT summarize the answer.
- * Generate ONLY the single follow-up question OR the text '[END TOPIC]'.
- * Keep the follow-up question focused and brief.

Follow-up Question or End Signal:

SUMMARY_REVIEW_PROMPT_TEMPLATE

Act as an objective hiring manager critically reviewing a candidate's screening interview performance based ONLY on the transcript below. Your goal is to assess their communication, clarity, and the substance of their answers in this specific conversation. Ignore misspellings or minor grammatical errors in their responses.

Transcript:

{transcript}

Provide the following analysis using simple Markdown for formatting (e.g., ****bold**** for headings, '- ' for list items):

- **1. Overall Communication & Approach:****
 - Communication style: ...
 - Preparedness: ...
 - Answer Structure & Effectiveness: ...
- **2. Strengths in Responses:****
 - Strength 1: ... (Evidence: ...)
 - Strength 2: ... (Evidence: ...)
 - Strength 3: ... (Evidence: ...)
- **3. Areas for Improvement in Responses:****

- Area 1: ... (Evidence: ...)
- Area 2: ... (Evidence: ...)
- Area 3: ... (Evidence: ...)

****4. Overall Impression (from this interview only):****
 - Impression: ...

Ensure the analysis is balanced and constructive based ONLY on the transcript.

CONTENT_SCORE_PROMPT_TEMPLATE

Analyze the structure, clarity, and relevance of the candidate's answers based ONLY on the provided interview transcript. Do not evaluate the **correctness** of the answers, only how well they were presented and if they addressed the questions asked.

Transcript:

{transcript}

Provide the following:

1. A score from 1 to 100 evaluating the overall effectiveness of the candidate's responses in terms of structure, clarity, and directness in answering the questions. Higher scores mean clearer, well-structured answers directly addressing the questions. Lower scores indicate rambling, unclear, or off-topic responses.
2. A brief reasoning section explaining the score, highlighting specific examples from the transcript related to answer format and relevance. Use simple Markdown for formatting the reasoning (e.g., ****bold****, '-' lists).

Output Format (Exactly as follows):

Score: [Your Score from 1-100]

Reasoning:

[Your reasoning text here using Markdown]

QUALIFICATION_ASSESSMENT_PROMPT_TEMPLATE

Act as a meticulous recruiter evaluating a candidate's

potential fit for a specific role. Your task is to synthesize information ONLY from the provided Job Description, Candidate's Resume, and Interview Transcript to assess alignment with the key requirements.

Job Description (JD):

{job_desc_text}

Candidate's Resume (R):

{resume_text}

Interview Transcript (T):

{transcript}

Provide the following assessment using simple Markdown for formatting (e.g., **bold** for headings, '-' or '*' for list items):

****1. Alignment with Key Requirements:****

- * Identify key requirements from the JD.
- * For each requirement:
 - ****Requirement:**** [Requirement text from JD]
 - ****Assessment:**** [Strong Match | Potential Match | Weak Match/Gap | Insufficient Information]
 - ****Evidence:**** [Cite brief evidence from R and/or T, like "(R) Mentions X", "(T) Described Y"]

****2. Overall Fit Assessment (Based on Provided Info):****

- ****Conclusion:**** [Provide ONE concise rating ONLY from: Strong Fit | Potential Fit | Weak Fit/Gap | Insufficient Information | Unlikely Fit]
- ****Reasoning:**** [Provide brief reasoning here, highlighting key strengths/gaps relative to JD requirements based on the evidence above.]

Base your assessment ONLY on the provided text (JD, R, T). Ensure the 'Conclusion' line contains ONLY the rating phrase.

B Job Descriptions and Generated Questions

Job 1: PrismHR - Education Legal Rights Attorney

Job Description: About the job Education Legal Rights – Legal Aid About the Company Our client is a Florida non-profit pro bono law firm. They work to meet the legal needs of a large, diverse, multiethnic community across Broward County. Our client’s mission is to provide high-quality, free civil legal advice, representation, and education to the disadvantaged of Broward County. Our client has more than 125 employees, including more than 50 attorneys, who provide free services and resources across a broad range of civil legal issues that impact health, safety, and self-sufficiency. About the Role In this position you will advocate for children suspected of having disabilities or who are already identified as having a disability. You will assist them in accessing appropriate educational services and public benefits. You will serve both community families and children in the foster care system. The ideal candidate will have litigation experience, a background in children’s law, education, psychology, the medical field, and/or related services. Responsibilities / Qualifications Active membership in the Florida State Bar Experience serving low-income communities preferred but not required A demonstrable awareness and sensitivity to the needs of the populations we serve is necessary Ability to work effectively with a large caseload and function professionally within a highly stressful environment Strong organizational and time management skills Ability to work independently at times and also as an effective part of a team, including other attorneys, support staff, volunteers, and community partners Excellent written and communication skills The ability to speak more than one language is a plus A willingness to, at times, work beyond a minimum seven-hour workday, including evenings and weekends Qualifications Salary: /60k – 65k/ Our salary range is negotiable and will be determined based on your skills and experience. To proceed, we kindly request that you share your salary expectations with us.

Generated Question List

1. Your resume highlights significant experience in embedded systems and robotics, notably your work on robot localization and motion profiling. How do you see the problem-solving skills and technical expertise you developed in those projects translating to the challenges of advocating for children’s educational rights and navigating the complexities of the legal system in this role?
2. Your experience building full-stack applications at United Wholesale Mortgage involved managing a large database and ensuring high code coverage. This role demands strong organizational skills and the ability to manage a substantial caseload. Can you describe a situation where you had to prioritize tasks efficiently under pressure, and what strategies you employed to ensure successful completion of all responsibilities?
3. Your projects, like "Inner Voice AI" and "The Situation Room," demonstrate your skills in AI and natural language processing. While not directly relevant to legal practice, these projects showcase innovative problem-solving. Could you discuss a project that involved overcoming a complex technical challenge, focusing on your approach to breaking down the problem and finding a solution? How does that problem-solving approach translate to a legal context?
4. The job description emphasizes the importance of working effectively within a team and with diverse community partners. Your leadership experience at Hartland Robotics involved managing a team of eight engineers. Describe a situation where you had to manage conflict or differing opinions within your team and how you successfully resolved the issue to achieve a common goal.

5. Your resume showcases a wide range of technical skills. Given the non-technical nature of this legal role, what aspects of your background and skillset are most appealing to you in this position, and why are you interested in transitioning into this field?

Job 2: Google - Student Researcher, BS/MS, Winter/Summer 2025

Job Description: Applications will be reviewed on a rolling basis and it's in the applicant's best interest to apply early. The anticipated application window is open until July 11, 2025, but may close earlier if all available projects are full. Applications submitted after the application window or once role is closed/projects are full will not be considered.

Participation in this program requires that you are located in the United States for the duration of the engagement.

This opportunity is intended for students who are pursuing a Bachelor's or Master's degree program in Computer Science or a related field. Our Student Researcher opportunities are flexible in time commitment, length of opportunity, and onsite/remote nature, depending on the specific project and host needs. Start dates for this role are typically January through August.

This program is intended for students who will not be seeking full time employment following this role, as this program is non-conversion eligible.

Google is a global company and, in order to facilitate efficient collaboration and communication globally, English proficiency is a requirement for this internship program.

To start the application process, you will need an updated CV or resume and a current unofficial or official transcript in English (PDFs preferred).

Please ensure your anticipated graduation dates (in MM/YY) and any proficiency in coding languages are listed on the resume.

Note: By applying to this position you will have an opportunity to share your preferred working location from the following: Mountain View, CA, USA; Ann Arbor, MI, USA; Austin, TX, USA; Cambridge, MA, USA; Chicago, IL, USA; Irvine, CA, USA; Kirkland, WA, USA; Los Angeles, CA, USA; Madison, WI, USA; New York, NY, USA; Palo Alto, CA, USA; Princeton, NJ, USA; Pittsburgh, PA, USA; San Bruno, CA, USA; Seattle, WA, USA; San Francisco, CA, USA; Sunnyvale, CA, USA; Washington D.C., DC, USA; Atlanta, GA, USA. Minimum qualifications: Currently enrolled in a Bachelor's or Master's degree in Computer Science, Linguistics, Statistics, Biostatistics, Applied Mathematics, Operations Research, Economics, Natural Sciences, or related technical field. Experience in one area of computer science (e.g., Natural Language Understanding, Human Computer Interactions, Computer Vision, Machine Learning, Deep Learning, Algorithmic Foundations of Optimization, Quantum Information Science, Data Science, Software Engineering, or similar areas). Preferred qualifications: Currently enrolled in a full-time degree program and returning to the program after completion of the internship. Currently attending a degree program in the United States. Experience as a researcher, including internships, full-time, or at a lab. Experience contributing research communities or efforts, including publishing papers in major conferences or journals. Experience with one or more general purpose programming languages (e.g., Python, Java, JavaScript, C/C++, etc.).

About The Job The Student Researcher Program fosters academic collaborations by hiring students onto research projects aligned to company priorities in scientific advancement. The program offers placements on teams across Google, for research, engineering, and science roles. As a Student Researcher, you will have the opportunity to participate in research projects focused on developing solutions for real-world, large-scale problems.

Student Researcher projects are exploratory and hands-on experiences that drive scientific advancement across a multitude of research areas. Students will work collaboratively on projects that explore innovative

research challenges and support the creation of breakthrough technologies.

Projects vary in duration and location based on team and student requirements. It is required that you are located in one of the specific country locations identified for this role for the full duration of the engagement. When you apply, you will be considered for Student Researcher positions across all of Google's research teams including Google DeepMind, Google Research, Google Cloud and more. This allows us to find the right project match for your skills and interests.

Researchers across Google are working to advance the state of the art in computing and build the next generation of intelligent systems for all Google products. To achieve this, we invest in foundational research and work on projects that utilize the latest computer science techniques developed by skilled software developers and research scientists. Whether we're shaping the future of sustainability, optimizing algorithms, or pioneering AI systems, our teams strive to continuously progress science, advance society, and improve the lives of billions of people.

The US base salary range for this full-time position is \$95,000-\$126,000. Our salary ranges are determined by role, level, and location. Within the range, individual pay is determined by work location and additional factors, including job-related skills, experience, and relevant education or training. Your recruiter can share more about the specific salary range for your preferred location during the hiring process.

Please note that the compensation details listed in US role postings reflect the base salary only, and do not include bonus, equity, or benefits. Learn more about benefits at Google .

Responsibilities Participate in research to develop solutions for real-world, large-scale problems. Google is proud to be an equal opportunity workplace and is an affirmative action employer. We are committed to equal employment opportunity regardless of race, color, ancestry, religion, sex, national origin, sexual orientation, age, citizenship, marital status, disability, gender identity or Veteran status. We also consider qualified applicants regardless of criminal histories, consistent with legal requirements. See also Google's EEO Policy and EEO is the Law. If you have a disability or special need that requires accommodation, please let us know by completing our Accommodations for Applicants form.

Generated Question List:

1. Your resume highlights several projects involving AI and machine learning, such as "Inner Voice AI" and "The Situation Room." Could you describe one of these projects in more detail, focusing on the challenges you faced, your approach to problem-solving, and the outcomes you achieved?
2. The job description mentions experience in areas like Natural Language Understanding or Computer Vision. Considering your coursework in Computer Vision and your experience with Llama 3 in your research assistant role, how do you see these skills translating to a research environment at Google?
3. Your experience at United Wholesale Mortgage involved building full-stack applications in Salesforce. While this is different from research, it demonstrates software engineering skills. Can you share a specific example of a technical challenge you overcame during this internship and how you approached the solution?
4. Your resume shows diverse programming language proficiency. The preferred qualifications mention experience with general-purpose programming languages like Python, Java, or C++. Considering your experience across languages like C++, Python, and Java, which one do you feel most confident in and why? How would this choice impact your ability to adapt to the specific technologies used in a Google research project?

5. The job description emphasizes collaboration and working on large-scale problems. Your experience leading a team of eight engineers at Hartland Robotics seems relevant. Describe a situation where you had to collaborate effectively with a team to solve a complex problem, highlighting your communication and teamwork skills.

Job 3: Amazon-2025 Software Dev Engineer Intern - Compiler, Annapurna ML

Job Description: Amazon Web Services (AWS) internships are full-time (40 hours/week) for 12 consecutive weeks. By applying to this position, your application will be considered for all locations we hire for in the United States.

Are you excited about Machine Learning, chip acceleration, compilers, storage, systems or EC2? Are you passionate about delivering high quality services that affect hundreds of thousands of users? We are the dubbed the "secret sauce" behind AWS's success with development centers in the U.S. and Israel, Annapurna is at the forefront of innovation by combining cloud scale with the world's most talented engineers.

The Annapurna team hires for multiple disciplines Software and Hardware engineers including but not limited to compiler engineer, machine learning engineer, runtime engineer, performance engineer and ML chip accelerator, ASIC, physical designs, SDE in Test. Because of our teams' breadth of talent, we've been able to improve AWS cloud infrastructure in networking and security with products such as AWS Nitro, Enhanced Network Adapter (ENA), and Elastic Fabric Adapter (EFA), in compute with AWS Graviton and F1 EC2 Instances, in machine learning with AWS Neuron, Inferentia and Trainium ML Accelerators, and in storage with scalable NVMe.

If this sounds exciting to you - come build the future with us!

Key job responsibilities Innovating and delivering creative SW Designs to develop new services, solve operational problems, drive improvements in developer velocity, or positively impact operational safety Writing requirements capturing documents, design documents, integration test plans, and deployment plans Communicating status and progress of deliverables to schedule, and sharing learnings/ innovations with your team and stakeholders

Basic Qualifications Currently enrolled in a Bachelor's degree program or higher Computer Science, Computer Engineering, Electrical Engineering, in these fields are considered with a graduation conferral date between December 2025 and September 2026 Programming experience in internship or coursework with programming language such as Python and/or C or C++ Candidates with strong interests and academic qualifications/research focus in two of the following: 1. Knowledge of code generation, compute graph optimization, resource scheduling, 2. Data structure and algorithms, 3. Compiler - Optimizing compilers (internals of llvm, clang, etc), 4. Machine Learning - Experience with XLA, TVM, MLIR, LLVM, 5. Deep learning models and algorithms, 6. Tensorflow, PyTorch, or MxNET frameworks Preferred Qualifications Knowledge of code generation, compute graph optimization, resource scheduling Previous technical internship(s), if applicable. Experience in optimization mathematics such as linear programming and non-linear optimization. Ability to effectively articulate technical challenges and solutions. Adept at handling ambiguous or undefined problems as well as ability to think abstractly.

Amazon is committed to a diverse and inclusive workplace. Amazon is an equal opportunity employer and does not discriminate on the basis of race, national origin, gender, gender identity, sexual orientation, protected veteran status, disability, age, or other legally protected status.

Los Angeles County applicants: Job duties for this position include: work safely and cooperatively with other employees, supervisors, and staff; adhere to standards of excellence despite stressful conditions; communicate effectively and respectfully with employees, supervisors, and staff to ensure exceptional customer service; and follow all federal, state, and local laws and Company policies. Criminal history may have a

direct, adverse, and negative relationship with some of the material job duties of this position. These include the duties and responsibilities listed above, as well as the abilities to adhere to company policies, exercise sound judgment, effectively manage stress and work safely and respectfully with others, exhibit trustworthiness and professionalism, and safeguard business operations and the Company's reputation. Pursuant to the Los Angeles County Fair Chance Ordinance, we will consider for employment qualified applicants with arrest and conviction records.

Our inclusive culture empowers Amazonians to deliver the best results for our customers. If you have a disability and need a workplace accommodation or adjustment during the application and hiring process, including support for the interview or onboarding process, please visit <https://amazon.jobs/content/en/how-we-hire/accommodations> for more information. If the country/region you're applying in isn't listed, please contact your Recruiting Partner.

Our compensation reflects the cost of labor across several US geographic markets. The base pay for this position ranges from \$47.84/hr in our lowest geographic market up to \$96.15/hr in our highest geographic market. Pay is based on a number of factors including market location and may vary depending on job-related knowledge, skills, and experience. Amazon is a total compensation company. Dependent on the position offered, equity, sign-on payments, and other forms of compensation may be provided as part of a total compensation package, in addition to a full range of medical, financial, and/or other benefits. For more information, please visit <https://www.aboutamazon.com/workplace/employee-benefits>. This position will remain posted until filled. Applicants should apply via our internal or external career site.

Company - Amazon.com Services LLC Job ID: A2794068

Generated Question List:

1. Your resume highlights several projects utilizing AI and ML, including "Inner Voice AI" and "The Situation Room." Considering the job description's emphasis on machine learning and potential work with frameworks like TensorFlow or PyTorch, can you describe a specific challenge you encountered in one of these projects and how you approached solving it, emphasizing the relevant technical skills you employed?
2. The job description mentions "code generation, compute graph optimization, and resource scheduling." Your experience at United Wholesale Mortgage involved building backend applications and optimizing testing procedures. Can you elaborate on any instances where you had to optimize code for performance or resource utilization, and what techniques you used?
3. You've demonstrated proficiency in embedded systems through your work at Hartland Robotics, particularly in optimizing robot localization. How do you believe this experience translates to the challenges of developing software for large-scale cloud infrastructure, as described in the job description?
4. Your coursework includes "Computational Linear Algebra," a subject relevant to optimization techniques mentioned as preferred qualifications. Could you share an example from your coursework or a personal project where you applied linear algebra principles to solve a problem, and discuss how your understanding of this topic could be beneficial in this role?
5. The job description emphasizes the importance of effective communication and collaboration. Your experience leading a team of eight engineers at Hartland Robotics suggests strong teamwork skills. Can you describe a situation where you had to effectively communicate a complex technical concept to a non-technical audience, or perhaps a situation where you had to resolve conflict within your team?

Job 4: Voloridge Investment Management - Quantitative Research Intern

Job Description: Voloridge Investment Management implements bleeding edge machine learning techniques to solve the extremely challenging problems of modeling and predicting financial markets. We build predictive models using propriety software as well as open-source tools, which we use to drive and execute trade decisions. We are seeking enthusiastic, mathematically gifted, intellectually curious, highly analytical and detail-oriented Quantitative Research Interns to work collaboratively with our data scientists to conduct complex research projects to meet the Voloridge mission of delivering superior risk-adjusted returns using proprietary modeling techniques.

Summary Of Job Functions Work with large, real-world datasets using intuition, statistics, and machine learning methodologies Collect, clean, and analyze unconventional datasets Collaborate with world-class data scientists on research projects that have meaningful company impact Present research to a large group of researchers

Minimum Requirements Ability to work onsite in our Jupiter, Florida office (not a remote role) Completion of at least three years of an undergraduate or graduate degree program in Math, Statistics, or equivalent field of study Experience with at least one programming language, such as Python Demonstrated aptitude in Math and Statistics Extremely detail-oriented and self-motivated Highly curious with a deep problem-solving attitude

Compensation And Benefits Exceptionally high compensation Free housing provided, if needed Free transportation to and from office, if needed Free breakfast, lunch, snacks, coffee, and soft drinks Free Gym membership Five minutes from the beach

Additional Information Voloridge Investment Management is an SEC registered investment advisor. A private investment company founded in 2009, our mission is to deliver superior risk-adjusted returns for qualified investors, using advanced proprietary modeling technology, conservative investment tactics and sophisticated risk management. Our market neutral equities strategy takes both long and short positions in the most actively traded equities, and is designed to capture alpha while limiting exposure to directional markets risks. Our futures strategy takes both long and short positions in the most actively traded global futures and is also built to maximize alpha captured across all futures markets traded while capping exposure to any sector at a given time.

Voloridge Investment Management is an Equal Opportunity Employer. All qualified applicants are encouraged to apply and will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, disability, protected veteran status, or any other legally protected characteristic or status.

Generated Question List:

1. Your resume highlights several projects involving AI and machine learning, particularly your "Inner Voice AI" project using the OpenAI API and your experience with Llama 3. Can you describe a specific challenge you encountered in one of these projects, how you approached solving it, and what you learned from the experience that you believe would be directly applicable to quantitative research in financial markets?
2. The job description emphasizes working with large, real-world datasets. Your internship at United Wholesale Mortgage involved managing a database of 50,000+ entries. Could you walk me through your approach to working with that scale of data, including any challenges you faced in terms of data management, processing, or analysis?

3. Your experience at Hartland Robotics involved significant work in embedded systems and control systems. While seemingly different from quantitative finance, these experiences require a systematic and precise approach to problem-solving. Could you discuss a complex problem you solved in that context, emphasizing the methodical steps you took and the skills you utilized that translate to a research environment?
4. The role requires presenting research findings to a group of researchers. Your resume mentions several hackathon projects. Choose one project and describe how you presented your work, the feedback you received, and how you adapted your presentation based on that feedback.
5. This internship is based in Jupiter, Florida, and is not a remote position. Given your current location and academic commitments, how do you plan to manage the relocation and ensure a successful and fully engaged internship experience?