

Extending the Value of User Feedback Infinitely: A Look into the World of Entropi

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ABSTRACT

User feedback is a pillar of any company; However, the time and cost of eliciting and analyzing feedback can be prohibitive. With the help of Artificial Intelligence (AI) and Large Language Models (LLM), Entropi serves as a platform where companies can configure custom interviewer agents that represent them in a text-based interview with a user. As users complete interviews, Entropi derives a user profile, enabling companies to simulate future interviews on a new topic between their interviewer agent and an agent constructed from the derived user profile, giving companies long term use of the user's original feedback. Combining the concept of interviews with the asynchronous nature of surveys, Entropi facilitates the flow of feedback and analysis, saving businesses time and money. With a beta launch in January 2024, we aim to foster a strong user base and gather data towards an open launch.

1. INTRODUCTION

The Agile Methodology has been adopted rapidly. As a cornerstone of the product development cycle, Agile encourages iteration based on user feedback to mitigate losses incurred in developing features with low adoption and utilization. Traditionally, this feedback is collected through synchronous user interviews that are expensive and time consuming, requiring

extensive manual intervention in scheduling and conducting interviews, or asynchronous methods like surveys or questionnaires. While asynchronous methods are more convenient, they do not offer the same quality of insight one can obtain from an interview. Entropi stands at the intersection of these two methods, allowing companies to not only conduct interviews asynchronously, but also to improve the quality of feedback they receive.

While many user research products on the market provide insights on aggregated data, their users are still left with questions about next steps they should take in development. Entropi provides actionable feature suggestions to help guide development along with the opportunity to validate new ideas or features by simulating interviews with the audience they cultivate through the platform. This bypasses the need to manually interview the same users repeatedly.

2. RELATED WORKS

The idea for Entropi stemmed from researching solutions to pain points expressed by our team and professionals across industries that we interviewed. Considering the qualitative nature of feedback, we first turned to reviews. As Du, et. al. (2020) found; reviews can serve as an effective basis for feature prioritization. In

this study, researchers extracted and resolved user reviews into quantitative weights to rank features in a backlog. This method proved useful in the smart speaker products that were tested, but our team wanted to pursue a solution that leveraged LLMs.

A core element of Entropi is the ability to accurately define LLM Agents (agents) as qualitative proxies of users. The study by Park, et. al. (2020) inspired this element and examined simulating human behavior in agents. The study consisted of a world, similar to *The Sims*, in which agents were introduced with the ability to interact, converse, form opinions, and even perform daily activities like brushing their teeth. Park and the research team found that their context architecture was highly effective in serving as the basis of believable human interactions. In July 2023, our team attended the Scale AI Generative AI Hackathon in San Francisco and saw creative applications of Park’s study, including a project titled *Love Aisland* that supplied agents with dating profiles and determined matches via simulated conversation between them. This gave us the conviction to apply the same process towards user research and begin developing Entropi.

3. SYSTEM DESIGN

Our team began designing Entropi by determining the best tech stack that was scalable and quick to set up. We settled on a Python Flask server to support our backend, ReactJS to visualize the frontend, and MongoDB to host our database.

3.1 Frontend

With prior experience using ReactJS, our team wanted to avoid the learning curve of selecting a different framework. We then turned to designing a great user experience. Entropi serves two distinct groups: businesses configuring interviews on our

platform and users providing feedback to those businesses. As such, we wanted to create unique frontend experiences for both groups.

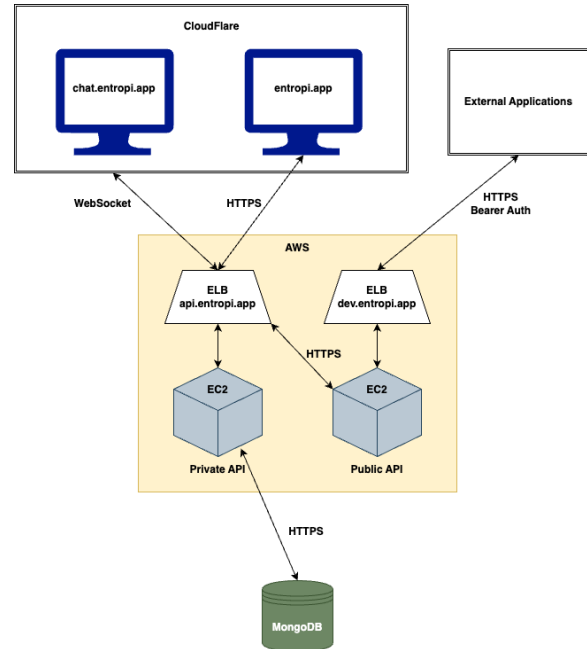


Figure 1: System Architecture

We started by purchasing the domain entropi.app and managed the Domain Name System (DNS) records through CloudFlare. These records allowed us to create subdomains like chat.entropi.app and api.entropi.app that point to our chat interface and our REST API respectively. CloudFlare also made it easy to deploy our websites through their Pages service by connecting our GitHub repositories. The Pages service watches the ‘main’ branch of the repositories for updates and deploys new versions as the branch is updated. This allowed us to continuously deliver updates without affecting the uptime of the live sites.

Prior to development on the frontend, we used Figma to mock up designs for the core web pages of our platform including the landing page (Figure 2), dashboards for businesses (Figure 3), and the chat experience for their customers. These served

as a basis for implementation, allowing the team to focus on providing functionality.

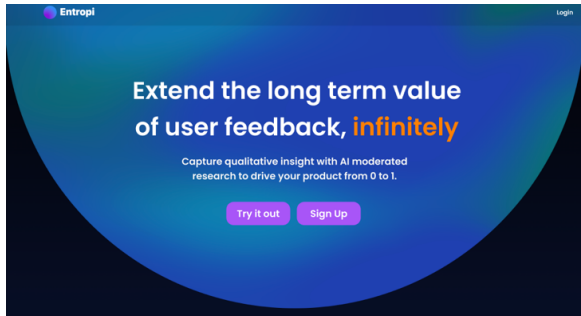


Figure 2: Landing Page Mockup

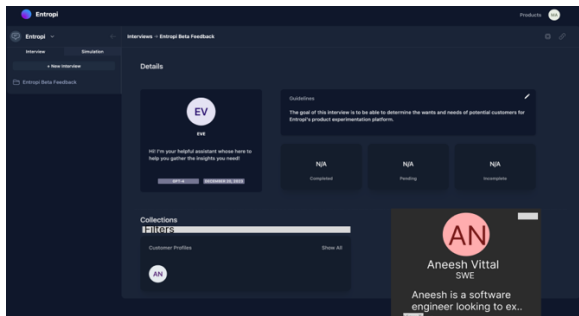


Figure 3: Dashboard Mockup

3.2 Backend

Hosting our servers in Amazon Web Services (AWS) allowed us to make them available across geographic regions while prioritizing security and reliability. Specifically, we decided to use Elastic Compute Cloud (EC2) instances to house our servers, and Elastic Load Balancers (ELB) to regulate requests to the instances. As demand varies, ELB spins up additional servers to distribute requests over them rather than overload a single server. Our team also recognized that integrations into other enterprise software platforms was crucial in encouraging businesses to bring Entropi into their existing user research ecosystem. Outside of our private API, this meant designing a public API that businesses could connect other software platforms to.

We considered different authentication mechanisms to ensure data security and prevent unauthorized disclosure and settled

on Bearer Authorization. This method would require that any request to our API include a valid token in its headers that can identify the user making the request. To promote further security, Entropi's private API is configured to only serve requests directly from our webpages (*.entropi.app) or from the public API server. As shown in Figure 1, authenticated requests to the public API are forwarded to the private API. This ensures that only authorized traffic flows to the private API, and thus, to our database.

4. LLM INTERACTION

LLMs provide much of the core functionality of Entropi. Our team decided to use OpenAI's APIs instead of developing in-house models to ensure we could go to market quickly. LLMs produce responses based on a provided context that serves as the model's immediate source of knowledge, followed by a prompt that requests the model to perform a specific task using the context as its knowledgebase.

Our first attempt at facilitating text-based interviews applied these concepts to fill the model's context window with the interviewer's goals and insights they hope to extract and prompting the model to generate a new question based on the current conversation. However, this method provided inconsistent results, often resulting in off topic questions. Our team looked to GPT4 Function calling to solve this issue. Given a context and descriptions of available functions, GPT can essentially act as a brain, and decide the best function to call based on the prompt, removing the need to implement the conversation flow logic ourselves. We began by researching conventional interviews and the topics interviewers probe and created functions that mirror these topics, including demographics, pain points, and user experience questions among others. This allows us to guide the interview experience

along a predefined line of questioning, leading to more controlled outputs from GPT4.

5. RESULTS

Initial testing of Entropi yielded promising results. Simulated interviews between agents representing customer profiles and Entropi's interviewer agents yielded new feedback that was ~60% similar to the feedback provided by the same customers when interviewed manually. Assuming a 45-minute duration for a single in-person interview, Entropi was able to simulate interviews with 20 customer profiles in 5 minutes, yielding over 99% in time savings. Concurrently, the asynchronous initial interviews allow businesses to interview customers en masse, without needing to manually supervise the process, resulting in further time and cost savings. While these results are comparable to widely adopted feedback elicitation methods like surveys and questionnaires, results obtained from simulated interviews indicate that Entropi's promise of validation prior to deployment is feasible and credible.

6. CONCLUSION

As we enter the age of AI, solutions like Entropi will become the norm, leveraging new technology to streamline and enhance traditional processes. By bridging the gap between qualitative and quantitative feedback elicitation, Entropi offers businesses of all sizes the ability to iterate rapidly towards offering solutions their customers want and will use. Entropi's value proposition of validation prior to deployment has the potential to save businesses millions of dollars throughout the development process, helping companies dive into creative solutions while prioritizing the most important stakeholder: the customer. Working on Entropi has exposed our team to the product development process, and exploring and

applying new technology as it evolves in real time has been a delight.

7. FUTURE WORK

Moving forward from our beta launch, we hope to make progress toward developing in-house LLMs that are trained and tuned to excel at interviews. Data is king when it comes to AI and much of the future work involves effective data collection and refinement. Further, in the next phase of Entropi we look forward to delegating tasks across specialized models to produce stronger and more accurate results. Ultimately, we hope to be the hub of enterprise research, facilitating sales, product, and market validation.

8. ACKNOWLEDGMENTS

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