Developing Design Features to Facilitate AI-Assisted User Interactions

Analysis of the Failure of Google Glass: Google's wearable augmented reality device

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Introduction

Businesses rely on enterprise software such as enterprise resource planning (ERP) and business intelligence (BI) platforms to obtain data-driven insights and streamlined workflow processes, which bolster company competitiveness and productivity. By 2026, Gartner predicts that 75% of organizations will adopt a cloud platform foundation for a digital transformation model (Gartner, 2023). As a result of growing expectations, Software as a Service (SaaS) products are continuously scaling, becoming progressively complex and challenging for the average IT professional to use without extensive training (van Dijke & Scheele, 2013). By prioritizing user-centric design and accessibility for individuals of varying technical literacies, technologies can minimize barriers to entry and allow users to fully leverage the product's capabilities.

To address the increasingly complex and overwhelming user experience (UX) in advanced business intelligence software, I will propose the interface design of a new, AI-driven querying workflow for a cloud-based log management and security monitoring platform. The feature will revolutionize the log analysis process by replacing the query syntax needed to search business data and derive insights with conversational natural language search prompts. The envisioned design will allow users to retrieve intelligent, context-aware responses that rapidly accelerate the data analytics workflow. It will also bridge the technical knowledge gap between users of varying expertise levels to remove friction in the current data querying process.

The current constraints in platform interaction result from the developers' assumptions about the technical abilities and other characteristics of end-users. To further examine how designers' ideas and biases regarding users become embedded in technology design, I will apply the STS framework of user configuration to evaluate the failure of Google Glass, a wearable

headset offering a hands-free and voice-activated augmented reality (AR) experience. The interactions between numerous social and technical factors contributed to the poor product decisions made for Google Glass that narrowed its user base. Overlooking both elements of a software product's success results in a system rarely utilized to its full technological capability due to a misalignment between designers' and users' understanding of the platform.

Because the concepts of accessibility and learnability in product design are sociotechnical in nature, they require attention to both technical and social aspects. In the following section, I will expand upon two related research proposals: a technical project reinventing the user experience of a business intelligence platform using AI technology and an STS project examining the sociotechnical factors inhibiting the large-scale public adoption of Google Glass. The insights derived from the study of Google Glass will allow me to create an interface that alleviates the impact of designer biases surrounding users for a more comprehensive and inclusive interaction experience for users of differing technical backgrounds.

Technical Project Proposal

Website logs are computer-generated, time-stamped records of events that provide information on an application or operating system's usage patterns, hardware/software activities, and system states. Businesses must strategically collect and analyze their log data to compete and consistently innovate in demanding markets. In 2021, the global market for log management was valued at $2.3 billion and is estimated to rise to $4.1 billion by 2026 (MarketsandMarkets, 2021). Numerous cloud-based log management platforms allow businesses to gain actionable insights regarding incident response/resolution, potential inefficiencies, and key business performance metrics (Phillips, 2022).

Log management/ analytics services are difficult to scale due to the volume and variety of log data. Conventional data aggregation and correlation methods are insufficient, forcing organizations to employ multiple tools for different phases and issues that introduce complexity. Many log management platforms also have their own custom query language used to search, filter, and analyze logs. Log analysts must be able to quickly learn and actively recall the query syntax to perform relevant data searches and generate reports. This requirement favors those with the technical background and time to dedicate to learning the query language. Small and medium-sized companies become disadvantaged by their limited IT staff, forcing them to spend thousands of dollars on external assistance. Without a solution to the current process, users will struggle to get value from the software, rendering an otherwise powerful system useless and quickly overrun by competitor platforms.

This technical project aims to redesign the user experience of a log search workflow in a log management and analytics platform. The proposed system will allow users to input a natural language prompt, such as “show popular website visitor regions” and receive relevant data, informative visualizations, and suggestions for related searches. Artificial intelligence and machine learning will translate the user’s input into system query language and tailor results to the user’s needs while presenting data in a user-friendly way (Genius ERP, 2019). Beginners will get a guided search experience requiring little coding knowledge, while expert users will have the same assistive features with the flexibility to customize the query for advanced use. Clients can maximize the productivity of IT staff and spend more time on strategy rather than technical complications. The project will invoke principles of effective UI/UX design practices and processes because it focuses on designing a user-centric experience. My team and I will gather research on the current platform’s workflows to gain an understanding of pain points and

frequent use cases. We will also research the wider log analytics industry in combination with client feedback to determine the requirements for the feature design. After developing a holistic understanding of the current and envisioned product, we will create low-fidelity, hand-drawn wireframes to visualize potential layout, navigation, and user flows. This will be an iterative process of getting client and instructor feedback, improving draft designs, and repeating to reach the desired experience. Next, we will create a high-fidelity prototype with finalized visual details and working functionality to present to the client and stakeholders. To conclude, we will perform a usability evaluation to ensure the product meets user needs and expectations.

STS Project Proposal

In 2013, Google released an optical, head-mounted display known as Google Glass, which combined the functionality of a wearable computer with augmented reality (AR) features (Sharma, 2018). AR is defined as technology that combines three-dimensional, interactive digital graphics with a physical environment (Liao, 2016). Google Glass was the first AR device designed for the public in everyday use cases. Instead of pulling out a phone, Glass wearers could simply swipe the touchpad on the side of the headset or use voice-control activation to access digital content such as text messages, emails, and navigation directions. Despite the leaps of technological advancement made by Google Glass, Google announced that it would stop prototype production due to underperforming sales and poor consumer reception by 2015 (Edwards, 2015).

The recall of Google Glass can be attributed to several factors, including consumer privacy concerns, unattainable costs, and poor aesthetics. Non-users were skeptical of being the subject of Glass wearers' private views. For example, it was difficult to tell if a Glass user was

viewing navigation versus recording another person unsolicited. Several businesses and institutions banned Glass usage due to the potential for privacy violation, reflecting a societal rejection of the device (Liao, 2016; Weidner, 2023). Ultimately, users failed to embrace the technology due to low differentiation in value between existing technologies such as smartphones (Yoon, 2018).

While these factors are commonly associated with the failure of Google Glass, a contributor often overlooked is the role the designers' misguided ideas and assumptions about users played in the product's demise. For example, though marketed as a product for a broad range of users, the developers' envisioned audience was likely developers and professionals in industries who could benefit from hands-free access to information and AR capabilities based on the device's purpose, operation, and aesthetics. A main assumption made was that innovation alone could spark market demand; this was reflected in the design having identical features to a smartphone camera without consideration for the difference in public perception and privacy. Additionally, the clunky and unappealing physical appearance for wearers further reveals the designers' bias towards tech-savvy users, leading to prioritization of technical capabilities over aesthetics. Exploring both the software and hardware features engineered for Google Glass can help identify the ideas, assumptions, and biases about users that the designers embedded into its design. Drawing on the STS framework of user configuration, I argue that creators of Google Glass held the assumptions that users 1) prioritize novelty and capability of technology over aesthetics, 2) embrace and desire digital assistance in everyday tasks, 3) will willingly relinquish certain public privacy for advanced technology. I maintain that the manifestations of the end-user biases in Glass' designers largely contributed to the public's discontent towards the technology.

The framework I will draw upon to conduct my analysis is the concept of user configuration developed by British sociologist Steve Woolgar. The theory states that engineers impose limitations on technology based on their ideas, assumptions, and biases about users – which they consciously and/or unconsciously ingrain within the technologies they design (Woolgar, 1990). The "configured user," or the designers' imagined end-user, becomes a point of reference engineers develop the product around. To support my argument, I will analyze evidence from primary sources such as media articles from the time of product release and Google's marketing materials for Google Glass, including promotional videos, digital and print advertisements, and sponsorships of online content creators. I will also examine resources on external factors such as the general landscape of AR technologies during the time period and the public consensus towards it.

Conclusion

Constantly evolving markets and emerging technologies necessitate the growth of business intelligence platforms. As SaaS products scale, they must manage the complexities introduced to users and maintain inclusivity, primarily through an intuitive and easily navigable interface. To improve the technical barriers associated with a log management and analytics platform, I propose a new user interface design/ experience that utilizes AI capabilities to help log analysts retrieve significant insights for business functions. I will work with a team of six to iterate on low-fidelity prototypes that will evolve into the final production of a high-fidelity prototype submitted to the client with the potential for public release.

The technical portion addresses the current system's inefficiencies due to assumptions made on the technical aptitude and resources of users by the platform designers. To better

understand how similar social factors influence the design of technologies, I will be using the STS theory of user configuration to explore the designers' biases and end-user ideas that led to the failure of Google Glass. Research on the sociotechnical factors impacting Google Glass' success will inform how we can reduce the chance of misalignment in expectations of our interface as designers and end-users. The technical section will present how technologies today can leverage new technologies like AI to manage software complexity and promote accessibility and learnability for users of varying technical abilities. In contrast, the STS section will investigate the factors contributing to such technological constraints.

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