5-2024

AI-Powered Information Retrieval in Meeting Records and Transcripts Enhancing Efficiency and User Experience

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Enhancing Efficiency and User Experience

by

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Bachelor of User Experience Design
Design
Avantika University - India
2022

A Thesis
submitted to the name of College of Engineering and Science
at Florida Institute of Technology
in partial fulfillment of the requirements
for the degree of

Master of Science
in
Human-Centred Design

Melbourne, Florida
May, 2024

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Enhancing Efficiency and User Experience by Srushti Nitin Ghadge

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Abstract

Title:

AI-Powered Information Retrieval in Meeting Records and Transcripts

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This study compares the traditional search methods, which is to search from video recordings of the meetings by moving the slider back and forth or by keyword search in transcripts versus integrated AI video plus transcript search. Based on the previous test results, we introduced some human-centric design features to the AI and built a new enhanced AI search tool for information retrieval. For search technique efficiency testing, the method had two set of experiments. The first results of the experiment showed that AI-based search algorithms were more accurate and faster than conventional search approaches. Participants were also happier with the AI-powered search experience, praising the system's ability to find relevant material and make targeted recommendations quickly. The second experiment showed what features, if used, can improve the information retrieval process.In summary, this study offers useful insights into the relative effectiveness of conventional search methods, artificial intelligence (AI)

search, and advanced AI search strategies. The findings contribute to the continuing discussion about improving information retrieval systems and the possible uses of artificial intelligence to enhance the search for fast, useful, and user-friendly information Retrieval. Keywords: Artificial intelligence, Information retrieval, Meeting recordings, Transcripts, User satisfaction.

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List of Symbols, Nomenclature or Abbreviations

AI: Artificial Intelligence

NLP: Natural Language Processing

ML: Machine Learning

PRF: Pseudo-Relevance Feedback

UI: User Interface

UX: User Experience

p: p-value in statistical hypothesis testing.

sd: Standard deviation.

W: Test statistic in normality test.

df: Degrees of freedom.

Ambient Technology: Ambient technology refers to an environment where technology is seamlessly integrated, becoming an ambient part of our surroundings. This technology is contextually aware, adapting to user needs without requiring explicit commands.

Acknowledgements

I would like to express my sincere gratitude to all those who have contributed to the completion of this thesis. Their support, guidance, and encouragement have been invaluable throughout this research journey.

First and foremost, I am deeply thankful to my thesis advisor, Thomas Eskridge PhD., for their unwavering support, invaluable guidance, and insightful feedback at every stage of this research project. Their expertise, patience, and mentorship have been instrumental in shaping the direction and quality of this thesis.

I am also grateful to the members of my thesis committee, Dr. Troy Weekes and Dr. Louis Otero, for their valuable insights, constructive criticism, and encouragement throughout the thesis process. Their expertise and feedback have significantly enriched the quality of this research.

I extend my heartfelt appreciation to the participants of this study, whose willingness to volunteer their time and share their experiences contributed immensely to the data collection process. Their insights and contributions are deeply appreciated.

I would like to acknowledge the support of my family and friends, whose unwavering encouragement, understanding, and love sustained me during the challenges and triumphs of this research journey.

I am grateful to the staff and resources provided by Florida Institute of Technology, whose support facilitated the completion of this thesis.

Dedication

This thesis is dedicated to my beloved father, Nitin Ghadge.

To the man whose unwavering support, encouragement, and guidance have been the cornerstone of my journey. Your wisdom, strength, and endless sacrifices have shaped me into the person I am today.

Thank you for believing in me, for instilling in me a passion for knowledge, and for always being my greatest source of inspiration. Your love and unwavering faith in my abilities have propelled me forward, even in the face of challenges.

This thesis is a tribute to your unwavering love, sacrifice, and commitment to my success. I am eternally grateful for everything you have done for me, and I dedicate this work to you with all my heart.

With love and gratitude, Srushti Ghadge

Chapter 1

Introduction

1.1 Background

In the era of digital technology, the quantity of multimedia material, such as recordings and written records of meetings, has reached an overwhelming scale. Students and professionals who want to find specific material in these archives have found the traditional techniques of navigating to be tedious, time-consuming, and often frustrating [46]. Combining artificial intelligence (AI) with ambient technology is a promising approach to enhancing learning and knowledge production by improving the search and use of meeting recordings and transcripts in this age of abundant information.

The proliferation of digital recording technology has resulted in the extensive acquisition and conservation of meetings, lectures, seminars, and conferences in various multimedia formats. Approximately 328.77 million terabytes of data is created each day. Videos account for over half of internet data traffic [11]. These recordings function as archives of knowledge, capturing insights, conversations, and crucial information. However, effectively retrieving and extracting specific information from these archives continues to be a significant obstacle [ref].

Conventional search techniques heavily rely on human-generated keyword searches. This possesses notable constraints [ref]. Furthermore, the emergence of ambient technology, which continuously records the environment, intensifies the need to address this matter promptly.

1.2 Problem Statement

Students and professionals who utilize meeting transcripts and recordings need a way to swiftly retrieve necessary information because they may require specific details from the meeting in order to complete the task that was discussed during the meeting.

1.3 Purpose of the Study

The primary purpose of this study is to examine and assess the influence of AI-powered integrated transcript and video search approaches on the effectiveness of locating precise information within videos. This research aims to evaluate the time savings and improved information retrieval performance provided by AI technology by comparing the performance of AI-driven search engines with traditional search approaches.

The results of the study are then used to discover and propose enhancements that may be utilized to improve the search and utilization of meeting recordings and transcripts. The results of the enhancements to the search process will minimize the usual problems of annoyance and time loss that students and professionals experience while accessing multimedia archives.

Furthermore, this study acknowledges the revolutionary capacity of ambient technology, which continuously collects and documents the environment. If these technologies are going to prove to be worthwhile, they will require significant improvements

in processing and in the user interface for search and utilization of the recordings. This study seeks to enhance our comprehension of how digital surroundings impact information access and user engagement by recognizing the consequences of ambient computing.

The main objective of this thesis is to provide practical insights and propose promising solutions that utilize AI technology and ambient computing paradigms to transform the retrieval and use of meeting recordings and transcripts. This work addresses a crucial limitation in today's information-rich environment.

1.4 Research Objective

The objectives of this thesis are:

1. To evaluate the increased efficiency obtained by using AI-powered combined transcript + video search mechanisms compared to standard approaches for finding specified information from movies. assess the degree to which AI-powered search solutions decrease the duration needed for users to get specific material from meeting recordings and transcripts.
2. To analyze and assess the tactics that may be employed to improve the search and utilization of meeting recordings and transcripts, emphasizing minimizing user frustration and time expenditure.
3. To analyze the influence of ambient technology on the process of accessing and retrieving information, taking into account the consequences of a digital environment that consistently collects and documents the surroundings.
4. To offer practical suggestions and valuable insights that may guide the creation and application of AI-driven search solutions and ambient computing technologies, with the aim of enhancing the retrieval of information from multimedia

archives.

1.5 Research Questions

To tackle this difficulty, this study aims to provide answers to the following questions:

How much more efficient is it to use AI-powered integrated transcript + video search vs traditional methods of either transcript/video search?

What strategies can be implemented to enhance the search and usage of meeting recordings and transcripts, thereby reducing irritation and time consumption for students and professionals?

1.6 Hypothesis

Using an integrated artificial intelligence-powered mechanism to search meeting recordings and transcripts will significantly enhance the efficiency of retrieving information from meeting recordings and transcripts compared to traditional methods.

1.7 Significance of the Study

This research has substantial consequences for several stakeholders and makes significant contributions to the progress of knowledge and technology in numerous ways:

1. Improving the efficiency of retrieving information: The results of this study might significantly improve the effectiveness of extracting information from meeting recordings and transcripts. The practical uses of this are evident in the fields of education, professional development, research, and knowledge management, where the ability to access particular material in a timely manner is of utmost

importance.

2. Enhancing User Experience: This research seeks to enhance the user experience for students and professionals by tackling the issues of aggravation and time consumption commonly associated with traditional search methods. Improved information accessibility can result in heightened efficiency and less frustration.
3. Enhancing AI-Powered Search Mechanisms: The study's assessment of AI-driven combined transcript + video search algorithms leverages the continuing advancement and enhancement of AI technology. It provides valuable information about the practical efficiency of AI-powered methods for retrieving multimedia material.
4. Investigating Ambient Technology: This research investigates the consequences of continuous environmental recording, taking into account the increasing impact of ambient technology on our digital existence. This elucidates the influence of ambient computing on information retrieval and user engagement, with prospective implementations in intelligent surroundings and Internet of Things (IoT) systems.
5. Facilitating Decision-Making: The research findings from this study can provide valuable guidance to decision-makers, educators, technology developers, and organizations who are interested in implementing or enhancing AI-driven search methods and ambient computing solutions. Demonstrating the effectiveness of these technologies in improving efficiency and user satisfaction will ultimately help them contribute to organizational efficiency and competitiveness in the digital age.
6. Enhancing Academic Discourse: This paper contributes to the academic conversation by examining a critical problem in the domains of information science, human-computer interaction, and technology-enhanced learning. It aids in comprehending techniques for improving access to multimedia material.

The research has great importance as it has the ability to propel the domains of information retrieval, AI technology, and user experience forward while also tackling the practical difficulties encountered by students and professionals. It provides useful perspectives on the potential of ambient technology and contributes to the continuing discussion about improving access to multimedia archives.

1.8 Summary and Organization of the Study

The arrangement of this thesis is structured as follows:

1. Chapter 2: We review the existing literature on AI-powered information retrieval systems, meeting recordings, and transcripts. Here, we explore methods to improve information retrieval, the impact of AI-driven search systems, and the limitations of integrating AI search retrieval tools into the current system.
2. Chapter 3: explains the study technique, encompassing the procedures for gathering data, conducting analysis, and implementing the experimental strategy to validate the hypothesis.
3. Chapter 4: provides a thorough examination of the study results, demonstrating the outcomes of trials carried out to assess the efficacy of AI-driven combined transcript + video search.
4. Chapter 5: provides a discussion of the pragmatic consequences of the findings, providing suggestions and delineating possible avenues for further research.
5. Chapter 6: is the last section of the thesis, providing a concise overview of the main discoveries, their relevance in solving the research issue, and the wider consequences for the field of meeting recording and transcript access.
6. This introductory chapter is an entry point to a forthcoming extensive examination of tactics designed to transform the search and application of meeting

recordings and transcripts. Through the exploration of the incorporation of AI-driven technologies and the acknowledgment of the influence of ambient technology, our goal is to unleash the capabilities of these archives, making them easily accessible, efficient, and user-friendly. The primary objective of this research is to enable students and professional knowledge workers to quickly find and use information in the vast and expanding set of multimedia archives and to do so with a minimum amount of frustration and annoyance.

Chapter 2

Literature Review

2.1 Introduction

The efficient retrieval and utilization of information from meeting recordings and transcripts are crucial in many fields, such as business, academia, and research. [26]. Meetings are important for cooperation, decision-making, and information sharing. The recordings and transcripts of meetings are significant resources for future reference and analysis. [49] [35] Nevertheless, the traditional techniques utilized for accessing and extracting information from meeting recordings can require a significant amount of effort and time. When the user needs to look back on particular information from the meeting recording, they cannot recall where exactly it is located or what exact keyword they have to use to search for it.[34], resulting in difficulties when trying to navigate through extensive amounts of content to find specific insights or debates. [34]

Historically, people have depended on manual methods like keyword searches to sort through meeting recordings and transcripts [33]. Although, these technologies have somewhat improved access to information because of technologies like semantic search, voice, and multi-modal search [25]. Their effectiveness is constrained by their

reliance on user input and the sequential structure of the search process. Users may not always provide accurate or comprehensive input because they completely rely on user input, leading to irrelevant search results or missed information [25]. Consequently, users may have challenges in effectively recognizing pertinent material in the middle of a large amount of data, resulting in irritation and inefficiency in retrieving information [26].

Recent breakthroughs in artificial intelligence (AI) have significantly transformed the field of information retrieval, providing potential answers to the difficulties presented by conventional approaches [90]. AI-driven systems, in contrast to traditional search tools, do not depend on predetermined criteria. Instead, they have the ability to learn from data independently, adjust to user behavior, and make ongoing improvements [78]. Through the analysis of extensive volumes of organized and unstructured data, artificial intelligence systems have the ability to discover concealed patterns, connections, and valuable information that traditional search approaches may fail to identify. In addition, search engines driven by artificial intelligence may offer customized suggestions, results that are contextually appropriate, and comprehension of natural language, thus facilitating more intuitive and efficient retrieval of information [21]. AI search fundamentally transforms the way we access and engage with digital material, providing unmatched capacities to fulfill the changing requirements and demands of users in today's digital world[58].

2.1.1 The Traditional Methods of Information Retrieval

Traditional search encompasses the established approaches and methodologies employed to extract information from many sources, including databases, libraries, and the Internet. These approaches usually depend on users manually inputting keywords or phrases into a search interface to meet their information requirements. The search

system subsequently finds pertinent documents or resources by utilizing algorithms that correlate the keywords with indexed information in response to the user's query [51] [69].

Here are some of the classical models of information retrieval:

1. Boolean model: Matches the terms in a query to the terms in a document. It's straightforward, efficient, and user-friendly to implement, but it does have some limitations. For instance, it struggles with handling synonyms, polysemy, and context. [48]
2. Keyword-Based Queries: Users enter precise keywords or phrases into a search engine to locate relevant data. The search engine correlates these keywords with indexed content in order to provide relevant results. [61]
3. Ranking Algorithms: Search engines employ ranking algorithms to prioritize search results based on criteria such as relevancy, popularity, and authority [23].
4. Page-Level Indexing: Conventional search engines categorize web pages or documents based on individual pages, treating each page as a distinct item in the search index [14].

Initial information retrieval approaches were centered around enhancing IR systems through query expansion techniques. Here are some common approaches to query expansion:

- Synonym Expansion: This method entails the identification of synonyms or associated phrases for the words in the initial query and subsequently broadening the search to encompass pages that contain these synonyms. Utilizing synonym expansion might enhance the retrieval of pertinent materials that may employ diverse language yet express equivalent significance.[81]
- Thesaurus-based Expansion: Thesauri, like WordNet, offer organized compilations of synonyms and hierarchical connections among terms. Thesaurus-based

expansion refers to the use of these resources to find terms that are semantically related and then expanding the query based on this information [89].

- Term Weighting: phrase weighting options include assigning a weight to each phrase in the query based on its value or relevance to the entire question. Terms that are commonly found in important documents or have a greater ability to distinguish between different documents may be given higher weights, whilst terms that provide less useful information may be given lower weights or disregarded [54].
- Relevance Feedback: Relevance feedback approaches entail the iterative process of improving the query by incorporating input from the user about the relevance of the obtained items. Users have the ability to designate papers as either relevant or irrelevant, and as a consequence, the system modifies the query to get more pertinent results in later cycles [40].
- Statistical Expansion: Statistical expansion approaches examine the patterns in which terms appear together in relevant documents in order to uncover new terms that are likely to be relevant. These approaches frequently depend on measurements like mutual information or term co-occurrence statistics to determine significant phrases for query extension [56].
- Concept-based Expansion: Concept-based extension strategies surpass the scope of individual phrases and strive to encompass the fundamental concepts or themes that exist in the user's question. This process may entail the identification of crucial terms, entities, or subjects in the query and broadening the search to encompass papers that address comparable ideas [82].
- Cross-language Expansion: Query expansion techniques can be employed in multilingual or cross-language information retrieval (IR) systems to either translate the user's query into several languages or broaden the search to encompass ma-

terials in other languages. This can facilitate the resolution of language barriers and access pertinent information from a wide range of sources [87].

Although traditional term-based retrieval methods have their limitations, they continue to be extensively utilized in practical applications, particularly in small-scale IR systems [59]. Continual research is focused on enhancing IR systems by integrating advanced techniques such as reinforcement learning, contextual embedding, and attention mechanisms [88].

To summarize, there are several traditional methods of information retrieval that are commonly used. These methods include the Boolean, probabilistic, and vector space models. Additionally, techniques such as query expansion, document expansion, and language modeling are also employed. These are the building blocks of current IR systems and are still a topic of ongoing research [35] and [76].

2.1.2 Strengths and Weakness of Traditional Search and Need for Better Solution

Here are the strengths of the traditional IR systems:

1. Familiarity: Users frequently have knowledge of conventional search interfaces and approaches, such as keyword-based searches and Boolean operators [28].
2. Control: Conventional search tools empower users by giving them the ability to have control over the search process. This includes the ability to define search criteria and improve search queries step by step [36].
3. Wide Adoption: Conventional search techniques have been extensively utilized in several fields and sectors, thereby making them available to a large variety of consumers [86].
4. Established Metrics: Conventional search algorithms commonly employ known

criteria, such as accuracy and recall, to assess search performance [12].

Here is the list of weaknesses that traditional IR systems have:

1. Reliance on User Input: Conventional search technologies mainly depend on human input, necessitating users to create exact queries and meticulously browse through search results [19].
2. limited Contextual Understanding: Conventional search engines may have difficulties in comprehending the contextual subtleties of user queries and information, resulting in search results that are irrelevant or incomplete [64].
3. Sequential Search Process: Conventional search methods often involve a step-by-step procedure, where users have to repeatedly improve their search queries depending on the results obtained at each stage. This can result in inefficiencies and mental strain [6].
4. Lack of Adaptability: Conventional search engines may not possess the capacity to adjust to evolving user preferences, search patterns, or changes in information over time, leading to less-than-ideal search experiences [32].

AI search technologies can enhance the information retrieval (IR) process in the following ways:

1. Enhanced Contextual Understanding: AI-powered solutions utilize natural language processing (NLP) and machine learning algorithms to enhance comprehension of the contextual intricacies of user queries and content, resulting in more precise and pertinent search outcomes [52].
2. Personalization: AI-powered solutions have the ability to customize search results by taking into account user preferences, behavior, and past interactions. This allows users to receive personalized suggestions and insights [48].
3. Automation: AI-powered solutions have the ability to automate many parts of the search process, including query creation, result prioritization, and content

summarizing. This helps to lessen the workload on users and enhances overall productivity [91].

4. Adaptive Learning: AI-powered solutions have the ability to acquire knowledge from user interactions and feedback, gradually enhancing search performance and relevance by adapting to changing user demands and preferences [57].
5. Advanced Analytical Capabilities: AI-powered systems have the capability to evaluate vast amounts of unorganized data, extract valuable information, and reveal concealed patterns and connections. This empowers users to make well-informed decisions and discoveries [72].

2.1.3 Artificial Intelligence in Information Retrieval

IR systems, commonly referred to as search engines, are now widely prevalent in contemporary society. These systems enable users to retrieve a vast amount of information. The recent rise of generative artificial intelligence (AI), fueled by large language models (LLMs), has had a substantial influence on the field of information retrieval (IR). According to a study led by Jacob Nileson, user productivity increased by 158% when utilizing ChatGPT to respond to queries as opposed to Google. AI users achieved much greater satisfaction levels compared to search users. Similar to other studies, the utilization of AI has reduced the gap in abilities across individuals with different levels of education [67].

2.1.3.1 The significance of generative AI in the field of information retrieval

Generative artificial intelligence (GAI), as demonstrated by systems such as ChatGPT, can offer features that assist in the information retrieval (IR) process [22]. GAIs have the capability to assist users in crafting more accurate searches, extracting pertinent

information from search results, and even producing summaries or synthesizing content using the obtained information. [20]. Users, especially those in academia, express apprehensions over the credibility, currency, and contextualization of knowledge produced by generative AI systems.

The integration of artificial intelligence approaches, such as neural networks, with conventional information retrieval (IR) methods can greatly boost the efficacy and capabilities of IR systems. Artificial intelligence (AI) tools provide enhanced skills in identifying patterns, processing natural language, and comprehending meaning, which supplement the structured and rule-based procedures used in traditional information retrieval (IR) approaches [8]. Scientists are investigating methods to efficiently integrate these technologies in order to tackle a range of information requirements, ranging from basic to intricate.

There are still difficulties in identifying the suitable AI approaches for specific information retrieval (IR) challenges and assessing the effectiveness of AI-based IR systems in comparison to traditional methods [7]. It is essential to set practical objectives and devise effective tactics for the development of intelligent information retrieval (IR) systems.

The introduction of generative AI has had a substantial influence on the field of information retrieval (IR), providing novel capabilities that can assist in the search process. Nevertheless, the persistent requirement for conventional search engines and the constant pursuit to enhance them remains crucial, especially for academic users who prioritize credibility, up-to-date nature, and contextual understanding of the material. The combination of AI techniques and conventional IR procedures shows potential, but there are still difficulties in selecting suitable methodologies and assessing their success [71]. The role of human involvement in the information retrieval (IR) process remains essential since user engagement and judgment are fundamental to achieving effective

information seeking and retrieval.

2.1.4 Exploring the Factors that Contribute to Efficiency Gains in AI-Powered Search

The exponential proliferation of scientific literature has presented a mounting difficulty for researchers in effectively discerning and amalgamating pertinent sources [38]. The emergence of AI-powered search tools presents a promising solution to tackle this particular challenge. These AI-powered tools are enabled by several key factors that contribute to their efficiency gains:

1. Time-saving: The utilization of AI-powered tools enables the expeditious scanning of extensive collections of information, facilitating the swift identification of the most pertinent sources. This capability significantly reduces the time required for researchers compared to the traditional method of manual searching [9].
2. Enhanced Efficiency: Through the utilization of sophisticated natural language processing and machine learning algorithms, AI-driven tools have the capability to manage and process vast quantities of data effectively. These tools are able to extract pertinent information from abstracts and full-text articles, enabling a comprehensive analysis that significantly enhances the efficiency of the literature review process. According to previous studies [37].
3. Comprehensive Coverage: The utilization of AI-powered tools enables the thorough examination of a vast number of articles, thereby minimizing the likelihood of overlooking any pertinent body of literature during the review process [73]. The extensive scope of this coverage helps researchers acquire a comprehensive understanding of the current advancements in their respective domains.

Although AI-powered search tools provide notable advantages, it is crucial to acknowledge that they also possess certain limitations. The scope of these tools is typically limited to open-access archives, and the precision of their search algorithms and full-text extraction technologies may not be flawless [47]. It is recommended that users utilize these tools as a foundation and verify the credibility of it. [43].

2.1.5 Limitations and Challenges in the Implementation of AI-Powered Search Systems

The integration of Artificial Intelligence (AI) into search engines has indeed brought about a substantial transformation in the manner in which information is retrieved and processed [79]. The design of AI-powered search engines is centered around their ability to comprehend natural language, anticipate the intentions of users, tailor search results to individual preferences, and deliver a search experience that is more user-friendly and intuitive. Nevertheless, notwithstanding these notable advancements, it is imperative to acknowledge that AI-powered search engines encounter various limitations and challenges that necessitate attention and resolution in order to guarantee their efficacy and dependability. The present literature review aims to delve into the existing constraints and difficulties encountered by AI-powered search engines. This investigation draws upon the findings of recent scholarly research, industry analyses, and expert viewpoints in order to gain valuable insights [3].

2.1.5.1 Limitations of AI-Powered Search Engines

Inherent biases in AI algorithms have become increasingly prevalent in numerous domains, ranging from healthcare to finance. In fact, AI algorithms can inherit biases from the data they are trained on or the assumptions made.

AI algorithms undergo training using extensive datasets, which have the potential to include biases. These biases, if present, can be unintentionally acquired and subsequently perpetuated by the AI system. The presence of biases in search results has the potential to give rise to outcomes that are unfair or discriminatory [25]. It has been observed that AI-powered search tools, such as BingAI, which are equipped with GPT-4, have faced criticism for their tendency to produce biased outcomes. This bias is believed to stem from the training data that is utilized during the development process [23].

The Reliability and Accuracy of Information: AI-powered search engines have been observed to generate inaccurate or deceptive information occasionally, a phenomenon commonly referred to as "hallucination" [35]. The phenomenon being described here is commonly referred to as the generation of deceptive information by artificial intelligence (AI) systems. This deceptive information is generated by the AI based on the contextual knowledge it has acquired through its training data. It is important to note that while the generated information may appear plausible, it is ultimately false and lacks factual accuracy.[23].

AI search engines necessitate significant computational resources for both training and inference, resulting in potentially high costs [12]. The financial implications of operating an AI chatbot are comparatively greater in magnitude than those of traditional search engines. This is primarily due to the expenses incurred in training models and generating responses [27].

2.1.5.2 Trust and Perception in User Studies

The trust that users place in search engines is of paramount importance for the widespread adoption of these platforms. Nevertheless, it is important to note that the trustworthiness of AI-powered search engines may be compromised due to their

inclination to produce answers that sound confident but lack variability. [3]. The misplaced trust in alternative search engines can result in a set of results that is less diverse and more biased when compared to traditional search engines [31].

2.1.5.3 Challenges in the Field of AI-Powered Search Engines

Even though AI search tools have tremendous potential, they do come with a set of challenges when integrated into the current system. These challenges are as follows.

1. Addressing Ambiguity and Uncertainty in User Queries: AI-powered search engines face challenges when it comes to dealing with ambiguity and uncertainty in user queries. AI tools frequently display a tendency to hesitate when expressing doubt, a behavior that has the potential to impact the dependability of search outcomes. This is particularly relevant in cases where queries are known to yield no results on conventional search engines [77].
2. Ethical and Regulatory Concerns: It is crucial to ensure that there are regulations for concerns that encompass a wide range of issues like privacy and data security, transparency and explainability, accountability, and liability. These factors need to be carefully considered and addressed to safeguard the well-being of users [30].
3. Integration with existing systems: It involves the seamless incorporation of the new system into the existing infrastructure, ensuring compatibility and efficient data exchange. This process requires careful planning, analysis, and coordination to minimize disruptions and maximize the benefits of the integration [75].

The integration of artificial intelligence (AI) into current search technologies presents a set of technical challenges. It is imperative to prioritize the compatibility and smooth functioning of current systems in order to promote user adoption and enhance user satisfaction [34].

It is worth noting that various domains may possess distinct search requirements

that are not sufficiently addressed by generic AI-powered search engines. The presence of domain-specific search engines, exemplified by Consensus and SciSpace, suggests a growing demand for AI-powered search solutions tailored to specific fields [79].

2.1.5.4 The Evolution of User Behavior

The advent of search engines powered by artificial intelligence (AI) is anticipated to bring about a notable transformation in user behavior. It is of utmost importance to comprehend the manner in which users engage with these novel systems, encompassing alterations in the way they formulate queries and seek information. This understanding is vital for the ongoing advancement and enhancement of artificial intelligence search technologies [63].

As the field of AI technology progresses, it becomes increasingly crucial for all relevant parties to engage in collaborative efforts aimed at developing solutions that effectively tackle the limitations and challenges associated with this technology [77]. This collaborative approach is necessary to ensure that AI-powered search engines are able to cater to the needs of all users in an efficient and fair manner [39].

2.1.6 User Experience and Interface Design for Information Retrieval

The field of information retrieval (IR) has undergone significant advancements as a result of the emergence of digital technologies. The role of user interfaces (UI) and user experience (UX) in facilitating effective information search and retrieval cannot be overstated. The design of UI elements and the overall UX significantly impact users' ability to locate and access desired information [45].

Relevance, user query understanding, and feedback clarity are among the common

challenges encountered in search interfaces from a user experience (UX) perspective [41]. These challenges often arise due to the complex nature of search algorithms and the need to interpret and respond to user queries accurately. Ensuring that search results are relevant to the user's intent and understanding the nuances of their queries are critical factors in delivering a satisfactory search experience. Additionally, providing clear and informative feedback to users, such as error messages or suggestions for refining their search, can help improve the overall usability and effectiveness of search interfaces. According to Muhammad Salman [44], it is important to highlight the significance of result presentation in the field of user experience (UX) design. He proposes that by implementing effective result ranking and layout strategies, the overall user experience can be enhanced. Search tools can enhance search results by employing result ranking algorithms that include both relevancy and user preferences. This ensures that the most pertinent and valuable information is displayed at the top of the search results, facilitating efficient and expedient information retrieval for users. Furthermore, improving the arrangement of search outcomes, for instance, by employing succinct and unambiguous summaries, visual indicators, and interactive components, can also augment usability and user involvement [74]. According to Manos Chainakis, it is recommended that search interfaces be designed with clarity in mind, incorporating minimal visual elements. This approach enables users to concentrate on their search activities [3].

2.1.6.1 Research on User Interface Design Guidelines for Search Interfaces

According to the Interaction Design Foundation [18], renowned experts Jakob Nielsen and Rolf Molich have outlined a comprehensive set of user interface guidelines [55]. These guidelines are designed to address crucial aspects of user experience and provide valuable insights for interface design [46]. The aforementioned guidelines encompass

several key principles that are crucial for the design and development of user-friendly systems. These principles include ensuring the visibility of system status, establishing a seamless connection between the system and the real world, granting users control and freedom in their interactions, maintaining consistency and adhering to established standards, implementing error prevention measures, prioritizing recognition over recall, facilitating flexibility and efficiency of use, employing aesthetic and minimalist design principles, enabling users to easily recognize, diagnose, and recover from errors easily, and providing comprehensive help and documentation resources [53].

2.1.6.2 Recommendations to Improve UX for AI Search Tools

UX principles play an integral part in the design of AI search tools by ensuring usability, user-centered design, transparency, error management, and accessibility. Designers boost satisfaction with and trust in the system by prioritizing these concepts, resulting in intuitive, trustworthy, and inclusive experiences. Here are the factors one needs to consider while designing such tools:

1. Differentiate AI Content Visually: It is important to explicitly differentiate AI-generated material, such as search suggestions or forecasts, from content curated by humans. This distinction helps consumers comprehend the origin and trustworthiness of the information. Tools like Zendesk and Firebase employ visual indicators, like as icons, to designate artificial intelligence-generated material [68].
2. Explain How the AI Thinks: Offering consumers transparency about the inner workings of the AI algorithm and the data it utilizes might enhance their comprehension and confidence in the search outcomes. This does not need intricate technical information but instead calls for comprehensive explanations of the AI's capabilities and constraints [15].

3. Avoid Anthropomorphize the AI: Developing AI search tools with a personality that resembles that of a human might lead to unreasonable expectations and misunderstanding. On the contrary, AI should effortlessly incorporate itself into the entire product branding and user experience [51].
4. Prototype with Real Data and Fake AI: Utilizing real user data at the early stages of prototyping can assist in validating the AI model's foundational assumptions. Additionally, the "wizard-of-oz" technique can be employed to evaluate the user experience before the actual implementation of the AI.
5. Involve a Diverse Team: Effective AI search tool design necessitates collaboration among UX specialists, data analysts, developers, and domain experts. This aids in converting intricate technological functionalities into a unified and seamless user interface [50].
6. Ensure Transparency and Accountability: Users should be provided with information regarding the collection and utilization of personal data by the AI, as well as the rationale behind important design choices. Offering this level of openness helps establish confidence and enables consumers to make well-informed decisions [42].
7. Know What Not to Automate: Not all elements of the search experience should be fully automated. UX designers should do a thorough assessment to determine which duties are most appropriate for AI and which tasks should continue to be managed by humans [65].

2.1.7 Findings and Implications

The existing body of literature pertaining to UX and UI design in information retrieval systems emphasizes the significance of adopting a user-centered approach, the complexities associated with presenting pertinent information, and the necessity of interfaces

that facilitate efficient communication between the system and the user. The principles and guidelines established by experts in the field of Human-Computer Interaction (HCI) serve as a fundamental basis for the design of interfaces that aim to improve the user experience in Information Retrieval (IR) systems. With the continuous evolution of technology, it is imperative to conduct ongoing research and development in the field of UX/UI design in order to effectively address the ever-changing needs of users in the context of information retrieval.

2.2 Conclusion

To conclude, the literature research has offered significant insights into the efficacy of search tools, specifically in the realm of retrieving information from meeting recordings and transcripts. The reviewed research has emphasized the importance of effective search methods in aiding decision-making, improving productivity, and supporting learning and knowledge management processes.

The literature has presented several important insights, one of which is the acknowledgement of the constraints of conventional search algorithms that depend on user input and follow a step-by-step search procedure. The presence of these limitations, such as restrictions on user input and the incapability of search tools to adjust to evolving user requirements, emphasizes the necessity for more sophisticated and flexible search processes.

Although the literature has demonstrated encouraging progress in AI-powered search systems, there are still gaps and limits that require more exploration. These encompass challenges pertaining to comprehending context, designing with the user as the central focus, and incorporating AI technology into current work processes. Subsequent studies should focus on filling these knowledge gaps and investigating novel methods

to improve the efficiency of retrieving information.

The knowledge acquired from the literature review has influenced the formulation of research inquiries and hypotheses for the present investigation. This research aims to enhance information retrieval techniques and assist decision-makers, educators, and organizations in their search for more efficient and effective solutions by utilizing AI-driven search systems and expanding on existing knowledge.

In a nutshell, the literature analysis has provided insight into the intricate nature and difficulties involved in retrieving information in contemporary digital settings. This study establishes a strong basis for future empirical research by combining and examining previous studies. It lays the groundwork for further examination into the effectiveness of AI-powered search algorithms in managing meeting recordings and transcripts.

Chapter 3

Method

3.1 Research Design

In this research the we conducted three experiments.In experiment one we employed a between-groups design to investigate the impact of an AI-powered integrated transcript plus video search mechanism on information retrieval efficiency compared to traditional search methods. The between-groups design involves two distinct groups of participants, each exposed to a different search condition: the treatment group with access to the AI-powered search tool and the control group using traditional search methods. By comparing the outcomes of these two groups, this research aimed to assess the efficiency of the AI-powered system. Here, efficiency will be calculated by comparing the total time spent searching and completing the task.

After completing the experiment one. Based on its results, observation, and participants' feedback, we designed a newly enhanced AI search tool. The objective of this second experiment was to assess the efficiency of added features in an enhanced AI tool for information retrieval. This was a within-subject design. The participants in this study were the same individuals from Experiment 1. In this experiment, we

first compared the time taken to complete the task by enhanced AI search vs. existing AI search tool. We additionally compared the time taken to complete the task by enhanced AI search vs. traditional search tools.

3.1.1 Experiment One Participants

A G-power analysis was conducted using the G-power software. According to the G-power test, it was concluded that each group should consist of 51 participants. The effect size (d) is 0.5, the significance level is 0.05, and the power is 0.8 (see Figure 3.1). The research involved a group of 36 participants randomly selected from the Florida Tech student community. The selection criteria encompass individuals who regularly utilize meeting recordings and transcripts for academic or professional purposes. Since this was a between-subject design experiment, each group had 18 participants in it. This resulted in a confidence level of 58% (see fig 3.2). Participants were assigned in random order to either a treatment group, which uses AI-powered search, or a control group, which uses traditional search. The criteria for selecting participants and their demographics were established based on the pre-experiment survey A.0.1 that was done. The survey yielded the following results:

1. Students account for 57 percent of the surveyed population. In addition, 13 percent are both students and working professionals, while the remaining 30 percent are only working professionals.
2. 43 percent of individuals utilize video conferencing methods every day. While 22 percent of them utilize it on a weekly basis, only 9 percent use it every two weeks.

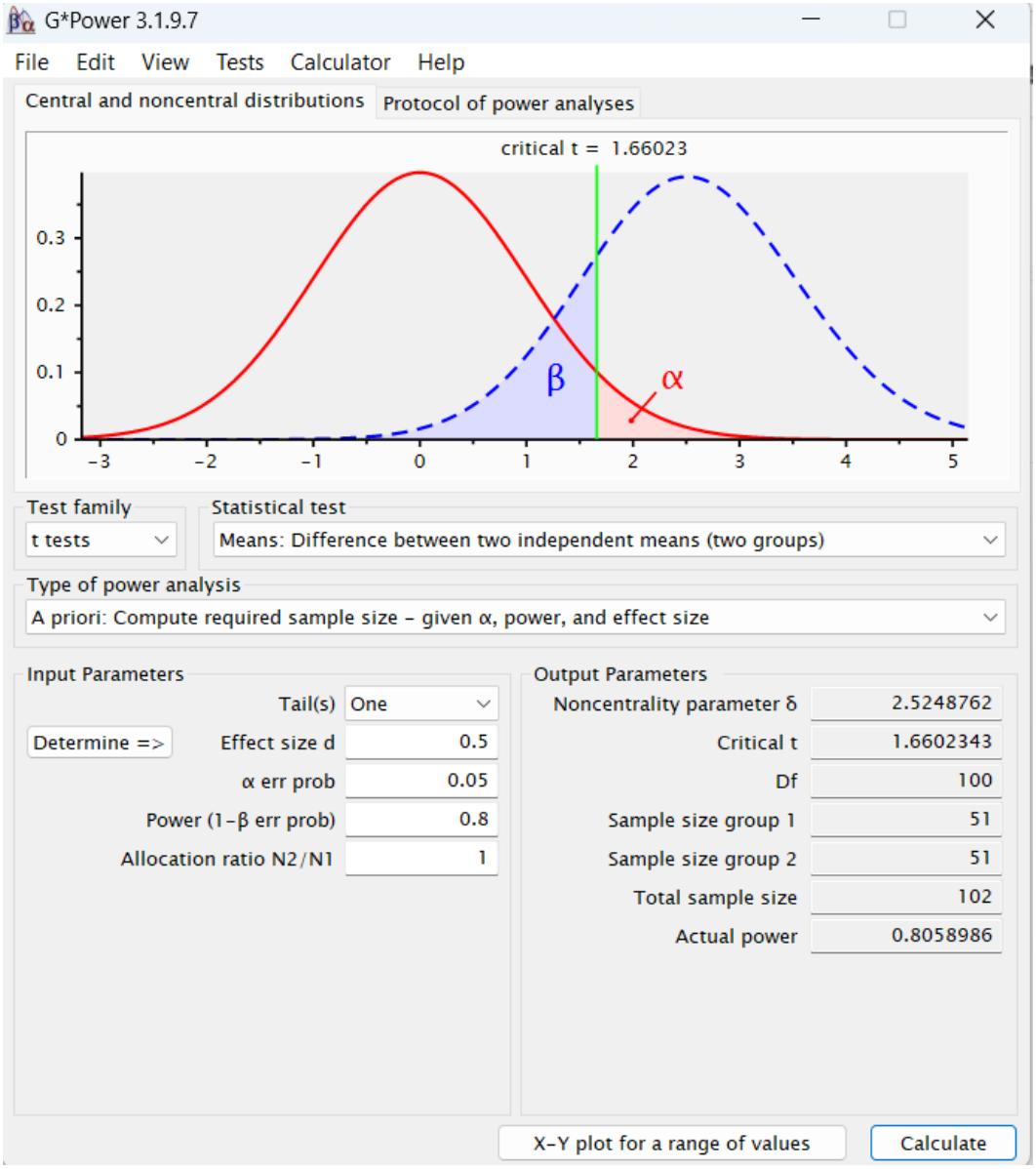

Figure 3.1: This is the G-power test results. This test was done using GPower Software. The findings indicated that in order to achieve a confidence level of 80 %, it is necessary to have a total of 51 participants in each group.

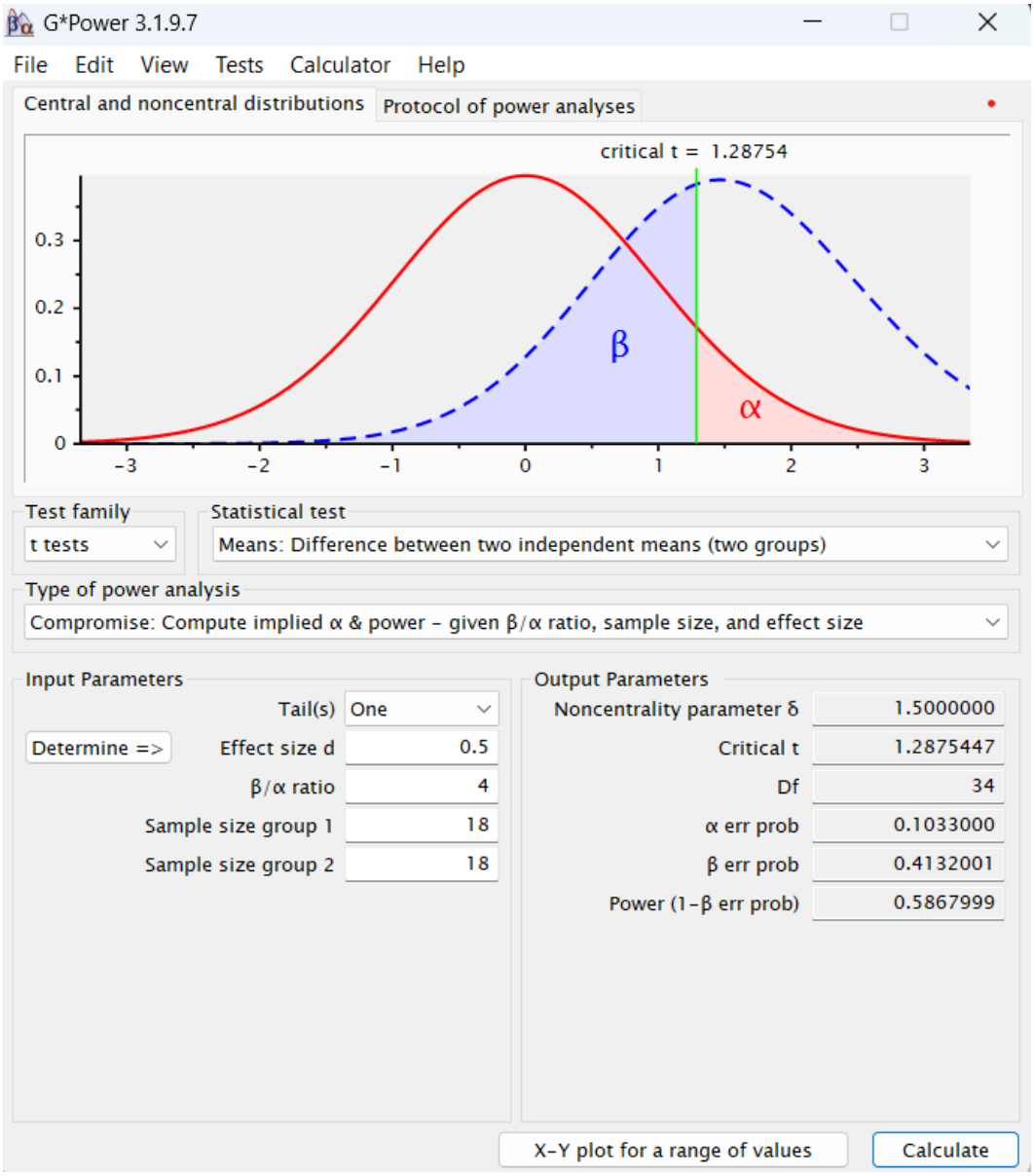

Figure 3.2: These are the G-power test results for determining the confidence level with 18 participants in each group. The results suggested that the level of confidence is 58%.

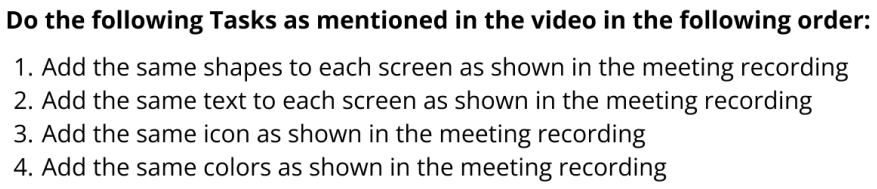

Figure 3.3: This was the Standardized Task given to all the Participants

3.1.2 Standardized Tasks

Both groups were provided with a series of standardized information retrieval tasks. The purpose of such tasks is to motivate participants to revisit the information shown in the provided meeting recordings and transcripts. Refer to Figure 3.3. The following must be executed by the participant in the specified order:

1. Add the same shapes to each screen, as shown in the meeting recording.
2. Add the same text to each screen as shown in the meeting recording
3. Add the same icon as shown in the meeting recording
4. Add the same colors as shown in the meeting recording

3.2 Search Tools for Experiment 1

3.2.1 Traditional Search Tools

Control group participants used a traditional search tool. They had access to the meeting recording and transcript that was generated using Google Meet (refer fig 3.5 and 3.4). They can search for the information from the meeting recording by moving the slider back and forth. In addition, users had been provided the option to manually search the transcript using a keyword search function.

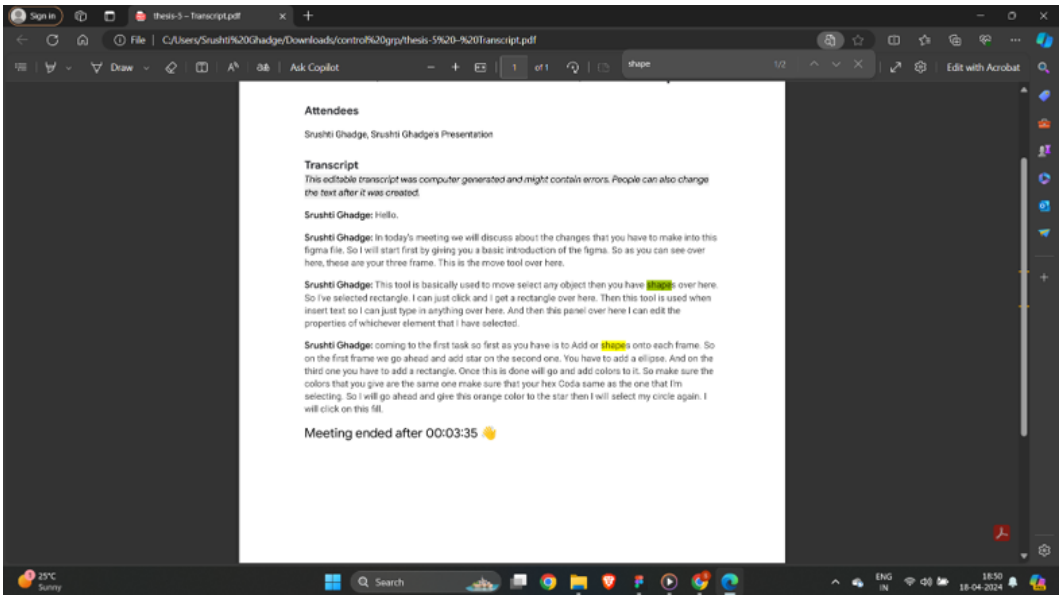

Figure 3.4: Meeting Transcript: This is a Screenshot of a Meeting Transcript Generated Using Google Meet. This was Provided to the Participants in the Traditional Group

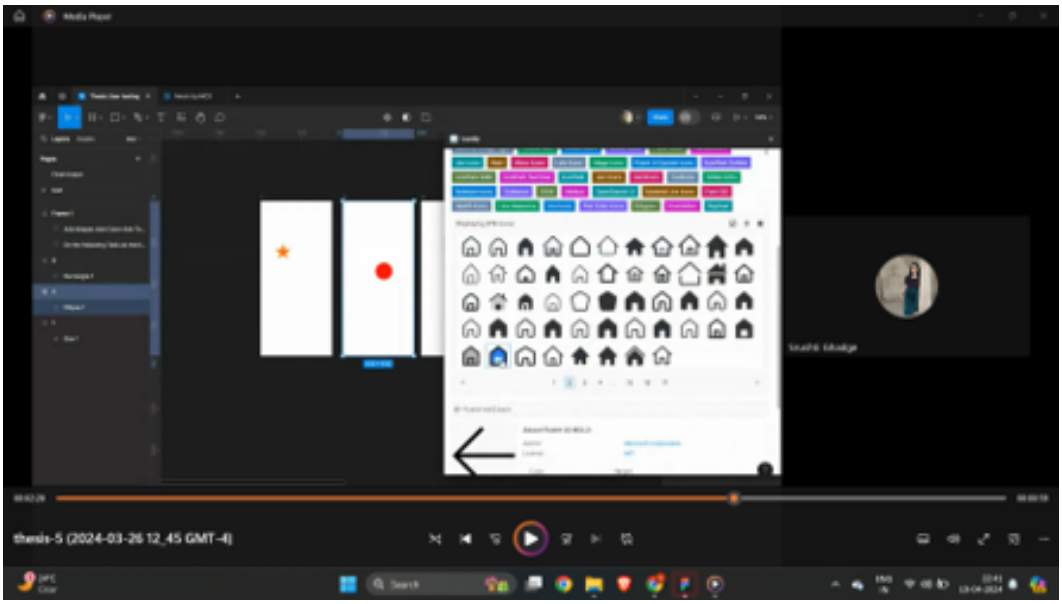

Figure 3.5: This is a Screenshot of the Meeting Recording. The Participants in the Traditional Group Used This Recording to Retrieve Information By Moving the Slider Back and Forth

3.2.2 AI-Powered Search Tool

The participants in the treatment group used a simulated AI-powered combined transcript + video search tool designed for this research. This tool was created with the 'Wizard of Oz' technique. The tool utilizes natural language processing and machine learning techniques to evaluate and retrieve information (Refer to Figure 3.6). We utilized a web-based software known as Colibri.ai [4]. This tool offers a written transcription of the meeting's audio recording that enables keyword search. This user interface (UI) consists of a search box and a transcript. The participants have the ability to input a search query using natural language. The technology will thereafter identify and emphasize any pertinent portions of the transcript where the participants may potentially locate the solution. Since this is a wizard of oz experiment, this is how it works. Once the participant enters the search query section, the appropriate answer will be highlighted By Wizard. Participants have the option to click on the highlighted region that they deem significant. By doing so, a wizard who is utilizing Anydesk Software [5] from another laptop will take them directly to that specific moment in the meeting recording.

3.2.3 Post Experiment Survey

Upon completing all of the tasks assigned, participants were asked to complete a user satisfaction survey to offer feedback on their search experience encompassing perceived efficiency, user satisfaction, and any suggestions they may have (see Sections A.0.3 and A.0.2.

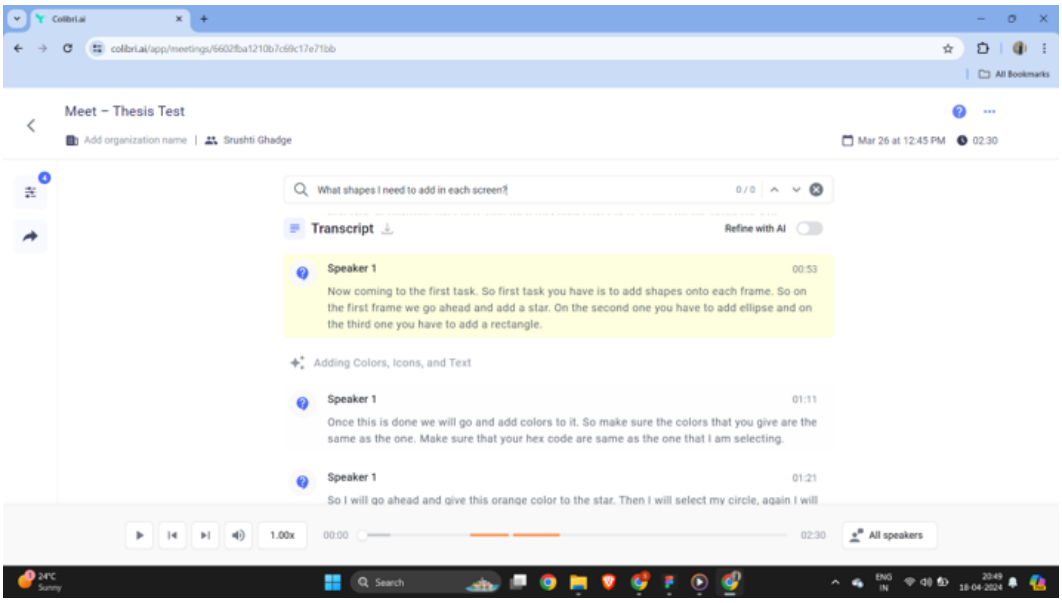

Figure 3.6: This is the AI-Powered Search Tool. Here you can see a search box where a participant has entered a search query, and the correct answer is highlighted. By clicking on this highlighted section user will then be taken to this particular point in the video

3.3 Procedure

3.3.1 Participant Recruitment:

The research recruited participants from the Florida Institute of Technology university community. The university community was chosen as the target group since it is easily accessible and directly related to the research issue. The recruitment attempts targeted students who are studying at the university.

3.3.2 Experiment Setup and Location

The experiment took place in a specifically assigned study room situated in the college library of the Florida Institute of Technology. The study room offered a serene and regulated setting that facilitated the execution of research tasks while reducing disturbances and interruptions (see fig 3.7). The study room was furnished with neces-

Figure 3.7: fig: This was the experiment setup

sary facilities, such as tables, seats, and sufficient light, to guarantee the comfort and convenience of participants during the experiment.

3.3.3 Informed Consent:

Participants were given an informed consent form to sign.

3.3.4 Random Assignment:

Participants are randomly assigned to either the treatment group or the control group to ensure the groups are comparable in terms of relevant characteristics.

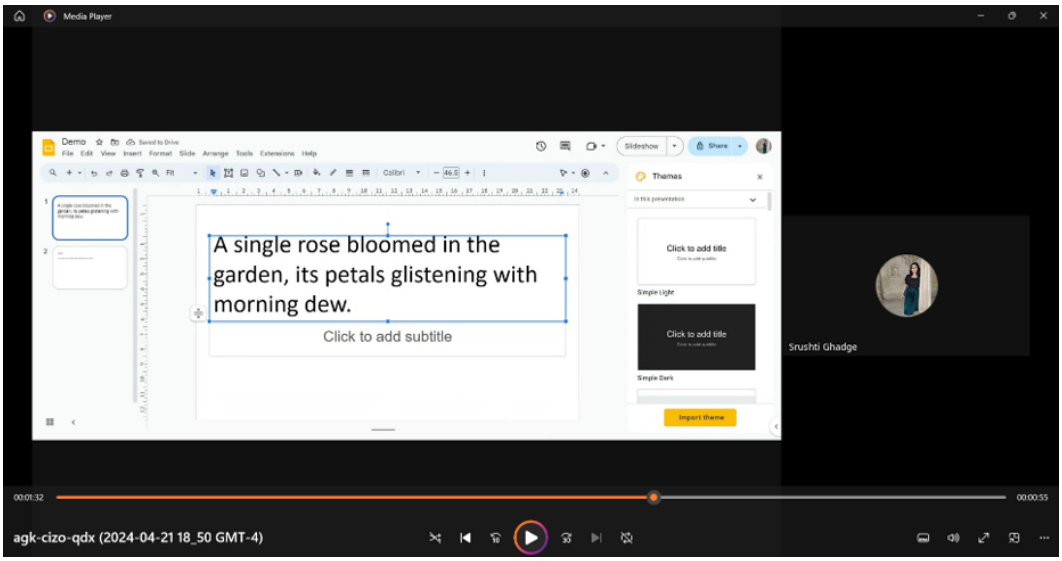

Figure 3.8: fig: This is a demo meeting recording

3.3.5 Training for Experiment 1

Participants in both groups receive brief training sessions on effectively using the assigned search tool A.2. Treatment group participants were trained in using the AI-powered search tool, while control group participants were trained in the traditional search tool (see fig.3.8).

3.3.6 Watching the Video Recording

Participants from both groups watched a meeting recording that was recorded using Google Meet. It is a 3-minute and 30-second video recording. In the recorded video, they were instructed on how to use Figma to add shapes, colors, text, and icons to existing frames (see fig. 3.9).

3.3.7 Task

They were then provided tasks that required them to make basic modifications to the three provided frames. Participants must modify the frames they were given according

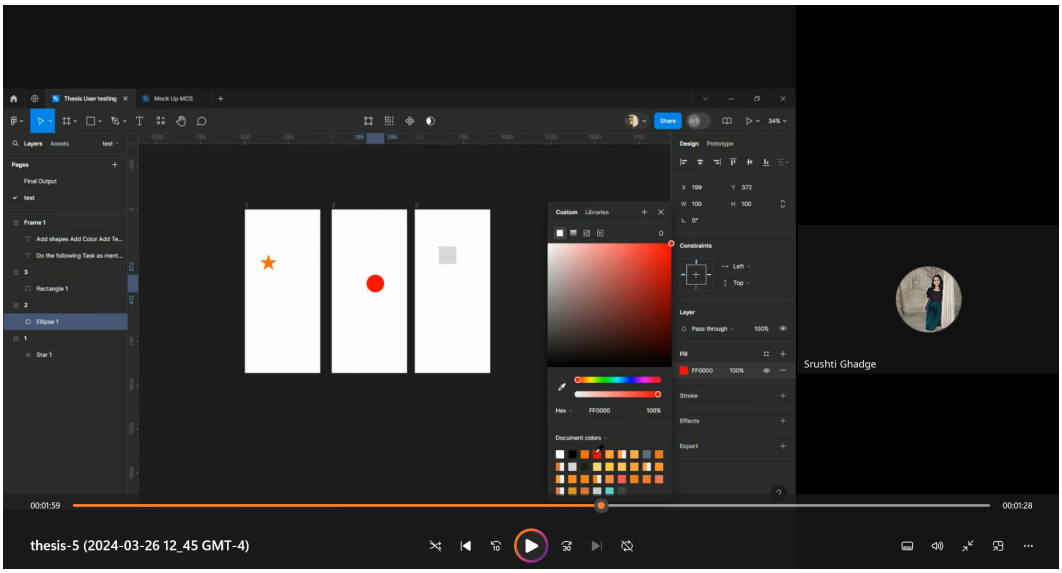

Figure 3.9: fig: This is Video Recording That the Participants Watched

to the directions in the meeting recording after watching the video. The task given to them was as follows (refer to the fig: 3.10): Your task is to make these three frames look as shown in the video. Complete the task in the following order:

1. Add the same shapes to each screen as shown in the meeting recording
2. Add the same text to each screen as shown in the meeting recording
3. Add the same icon as shown in the meeting recording
4. Add the same colors as shown in the meeting recording

Fig: 3.11 shows how the final outcome should look. Each step in the given task involves locating particular information within a given meeting recording and/or transcript. Once they complete watching the meeting recording, they are given these task. The participants had to carry out each step of the task in the given order. This is because the same steps are presented in a different order in the meeting recording. This way, participants will be encouraged to search for the information, as some of the participants might assume that the video has followed the same order as the steps and might not make efforts to locate the information. Participants will be timed, and their

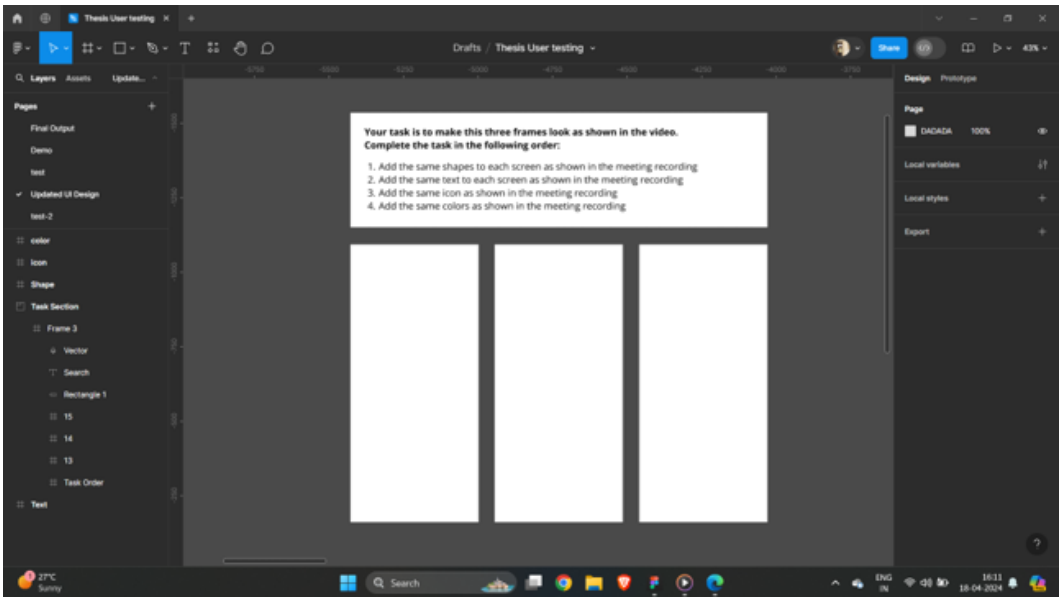

Figure 3.10: This is the Screenshot of the Figma Window in Which Both Groups of Participants have to Execute the Task. They are provided with the 3 Blank Figma Frame and a Task They have to Execute.

method of searching for the information will be recorded.

3.3.8 Control Group Participants Journey

Control group participants were given the recording of the meeting and the transcript. Here is what their journey looked like once they started doing the task.

1. Read and understand the task (see fig: 3.10).
2. Goes to the meeting recording tab by clicking on its icon in the taskbar. In the video recording, they guess where they might find the information, and keep moving forward and backward in the timeline until they find the exact detail they were looking for (see fig. 3.12).
3. Users also had access to the transcript generated by Google Meet. However, none of the users used it (see fig 3.4).
4. In the transcript, they can simply do the keyword search by clicking control +

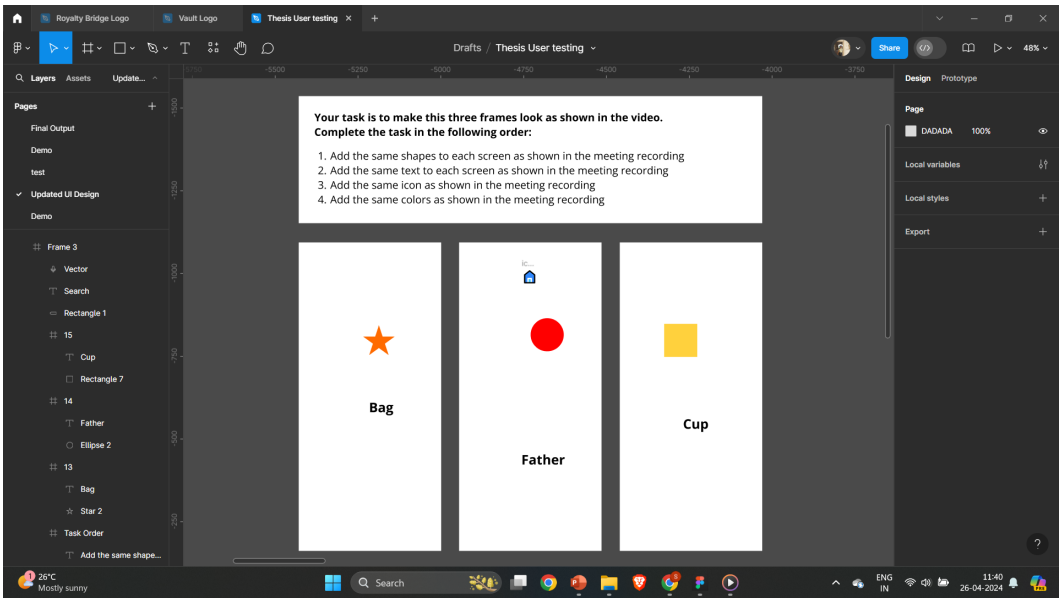

Figure 3.11: This how it will look after participant has completed the task.

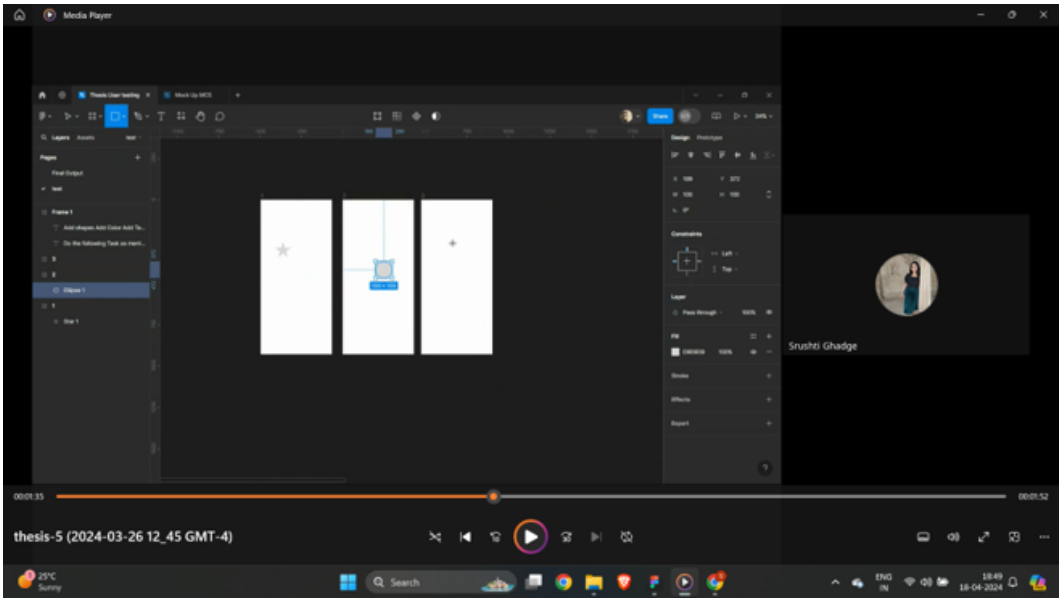

Figure 3.12: The participant from the control group is searching for the information to complete the step-1

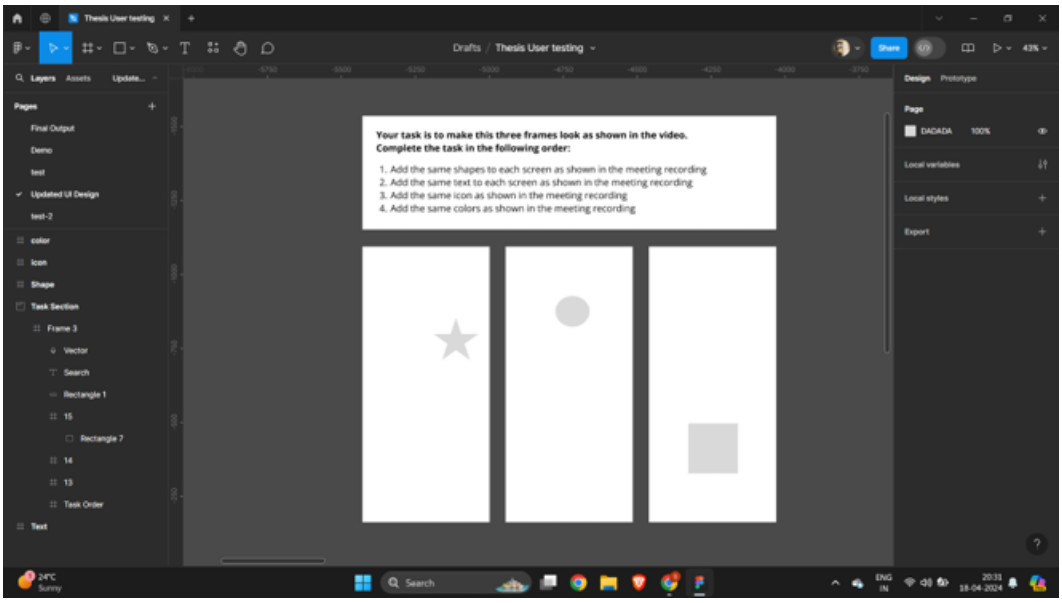

Figure 3.13: Here you can see the participant has executed the step-1

F on the keyboard or reading through the sections to find the information they were looking for (see fig: 3.4).

5. After locating where the information is in the meeting recording, they will watch that particular section and then come back to the Figma tab by clicking on its icon on the taskbar and complete that particular step (see fig: 3.13).

3.3.9 Treatment Group Participants Journey

After watching the video, here are the steps participants took to retrieve information and complete the task. Fig 3.14 shows the task window that the participants see.

1. For example, the participant is doing the first step, i.e., to add shapes. They will go to the AI tool and, in the search box, type the question. Refer to the fig 3.15
2. As shown in the fig 3.15.The section of the transcripts that the system thinks is relevant will be highlighted.
3. On clicking on the highlighted section, the participant will be taken to that particular point into the video recording by a wizard accessing the system using

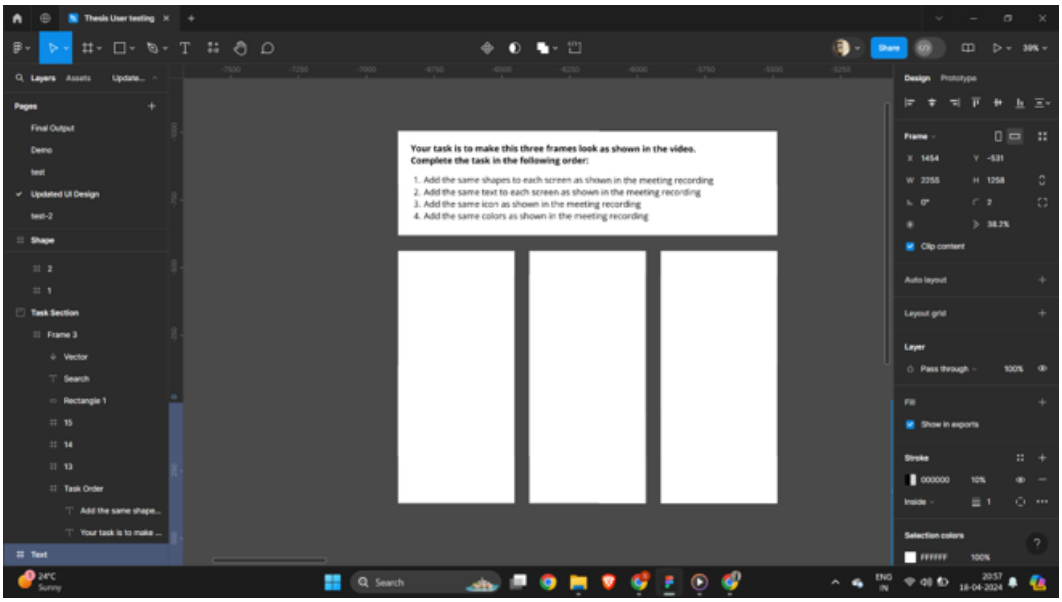

Figure 3.14: In this Figma window, users read and understand the task and then execute it.

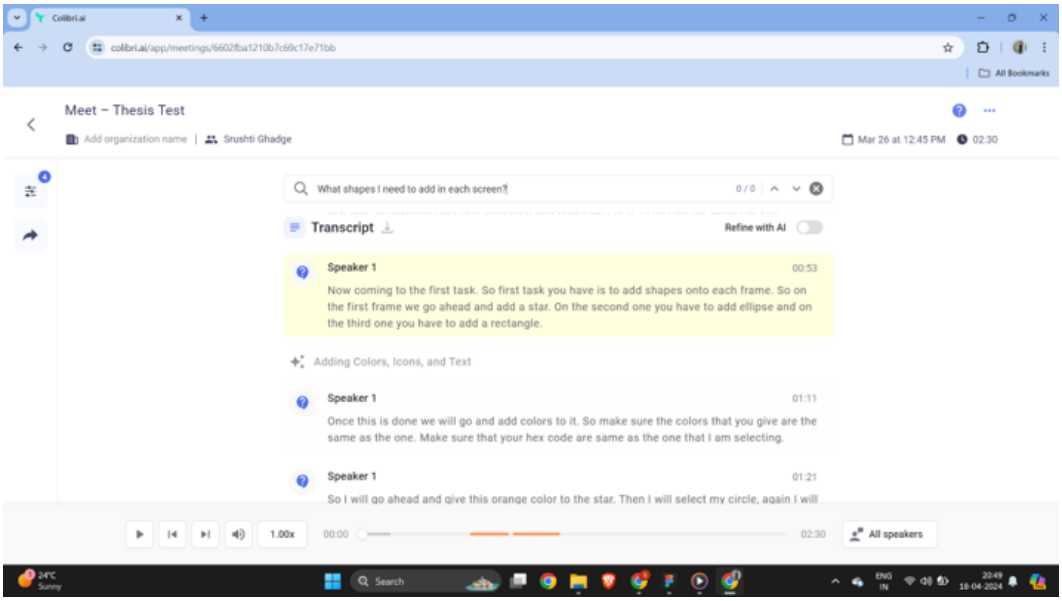

Figure 3.15: AI Information Retrieval Tool. Here in the Searchbox, the Participant has Entered the Search Query. The System has Highlighted the Relevant Answer in Yello

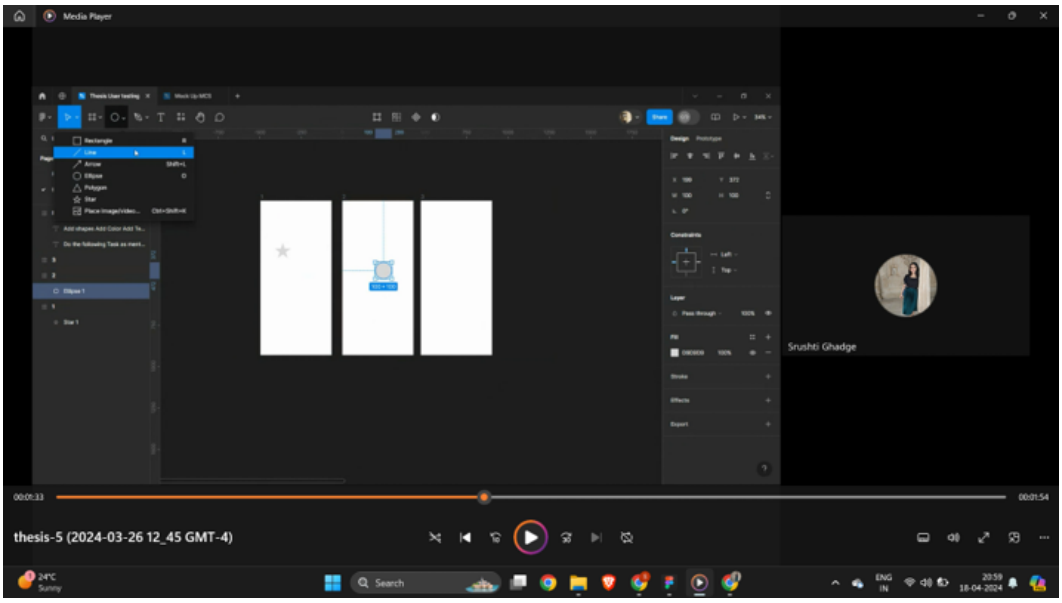

Figure 3.16: Here, the Participants are taken to the Point in the Video Where they can See All the Shapes (Information to Complete 1st step).

Any Desk software. Refer to the fig. 3.16

4. The participant will then just watch that particular part of the video and then again go to Figma and add the same shapes to the respective screens. Refer to fig: 3.17.

3.3.10 User Satisfaction Survey

After completing the tasks, participants from both groups complete a user satisfaction survey, rating their satisfaction and perceived efficiency of the search method they used.

3.4 Part 2

After conducting the experiment based on its results, observations, and feedback, We designed a new user interface with additional capabilities to enhance the effi-

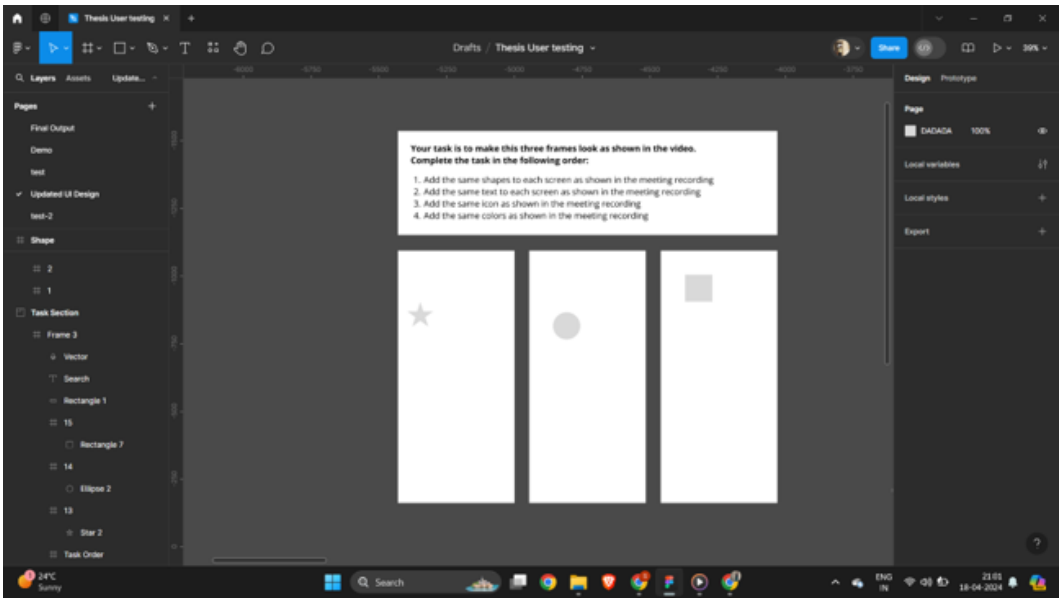

Figure 3.17: This is the Figma Window. here You can see that the Participant has Completed the 1st Task Given to Them.

ciency of information search. The objective of experiment two was to assess the efficiency of added features in an enhanced AI tool for information retrieval. We used the within-group method for the experiment with participants from Experiment 1. The tool deployed for the was an enhanced AI Tool. In this experiment, we wanted to evaluate the time taken to complete the task by enhanced AI search vs. existing AI search tool. Additionally we also wanted to evaluate the time taken to complete the task by enhanced AI search vs. traditional search tool. Participants were timed to search and complete the task.

3.4.1 Participants for Experiment 2

7 participants, each from the AI search group and traditional search group, who had participated in experiment one, did experiment two. Initially, we wanted to give all 36 participants from experiment One to test this enhanced AI search tool. However, not all participants from Experiment 1 were available for Experiment

2

3.4.2 Enhanced AI Search Tool

Based on the findings of the experiment in Part 1, we designed a new AI search tool with UI and features. Here are its features:

(a) Since it was time-consuming always to type the search query and switch between the windows, we provided a voice interface with a button that is always present on the window in which the user is working (see Figure 3.18).

(b) The search results are displayed as an overlay on top of the same window that the user is working (see Figure 3.19).

(c) Most accurate search results are highlighted with a video thumbnail of that part, and the ones that have the same keywords are highlighted with a text highlighter (see Figure 3.19).

3.4.3 Enhached AI Serch Tool Participants Journey

Refer to 3.4.2 for the features introduced into this AI Tool. We have explained the journey of the Participant Using an example of 1st task, which is to add shapes to each frame. The shapes have to be the same as used in the video for respective frames:

(a) Participant watches the video recording.

(b) Then they read and understand the task (see fig: 3.20).

(c) Then, to search for the information, they click on the search with voice command button on the bottom of the screen 3.20.

(d) They speak out loud their search query then.

(e) Then, an overlay screen appears on top of their current screen with the

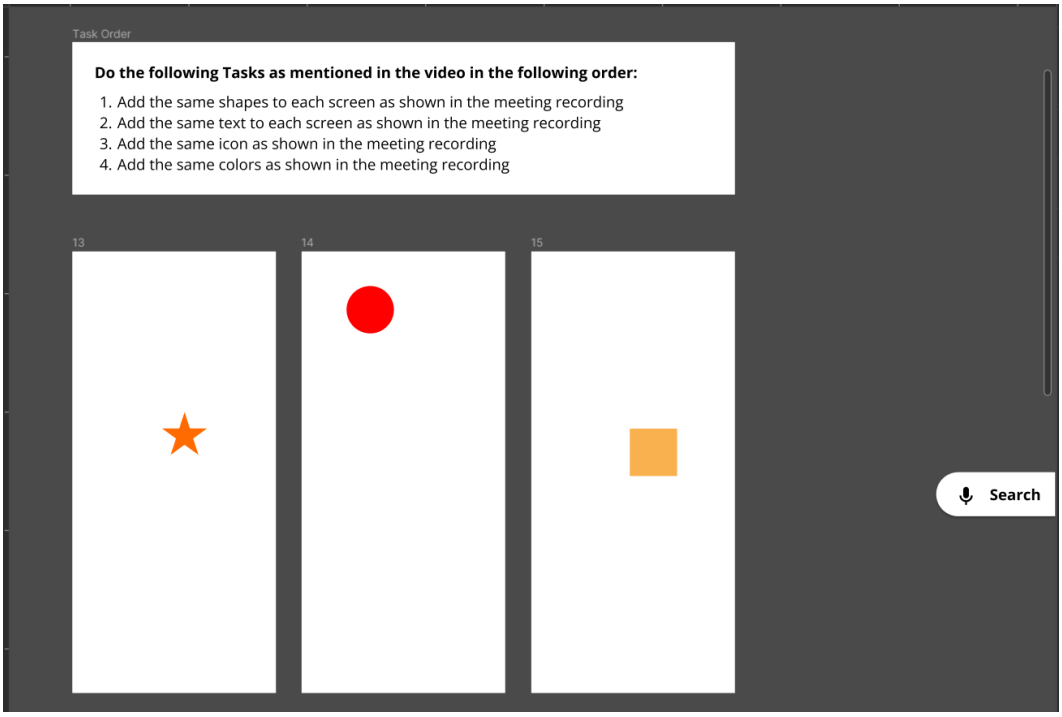

Figure 3.18: Enhanced AI Search Tool Main Screen. Several enhancements were made to the AI Search tool, including adding a voice search button, displaying search results as an overlay, and ranking ordering the results.

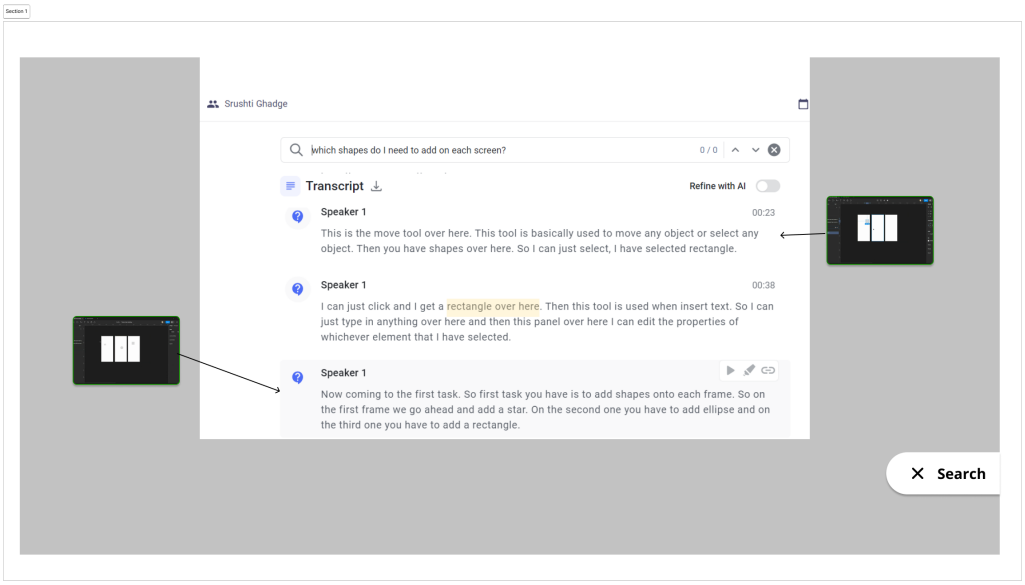

Figure 3.19: fig: Enhanced Interface Overlay

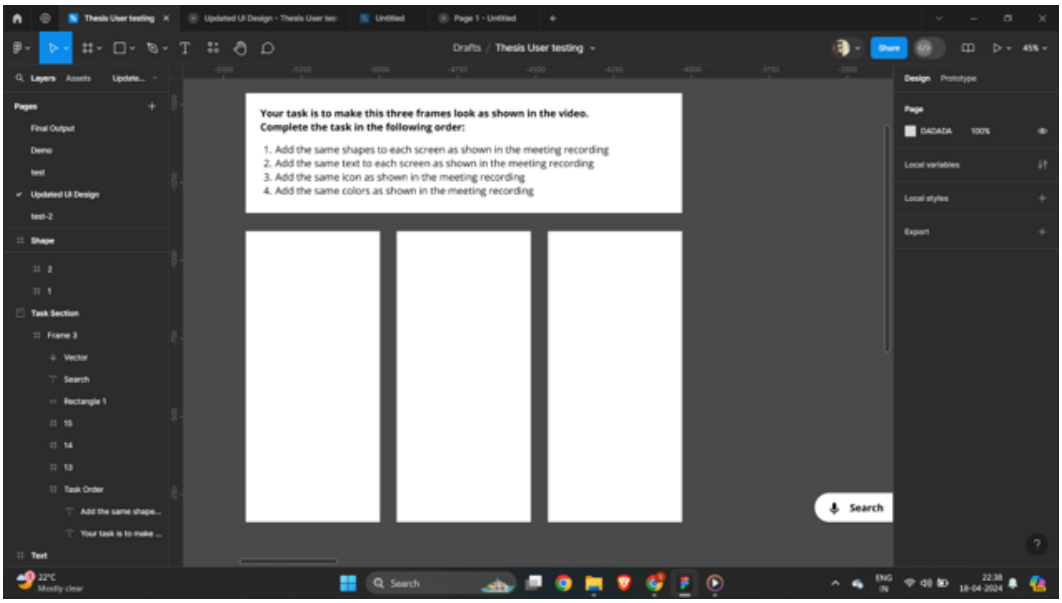

Figure 3.20: This is the enhanced AI tool's task screen. Here, you can see a voice search button on the bottom right. Participants can click on this button and speak out loud their search query

Ai transcript. Which has 50% less opacity (see fig. 3.21). The system highlights the relevant answer here. A wizard has stimulated this step using Anydesk software.

(f) As shown in the fig 3.21, the relevant answer sections also have a thumbnail beside them. Based on whichever thumbnail the user selects, the wizard will take them to that point in the video (see Fig. 3.21 and 3.22).

(g) Then, participants just come back to the Figma window and complete the task.

3.5 Data Analysis

Data analysis includes the following steps:

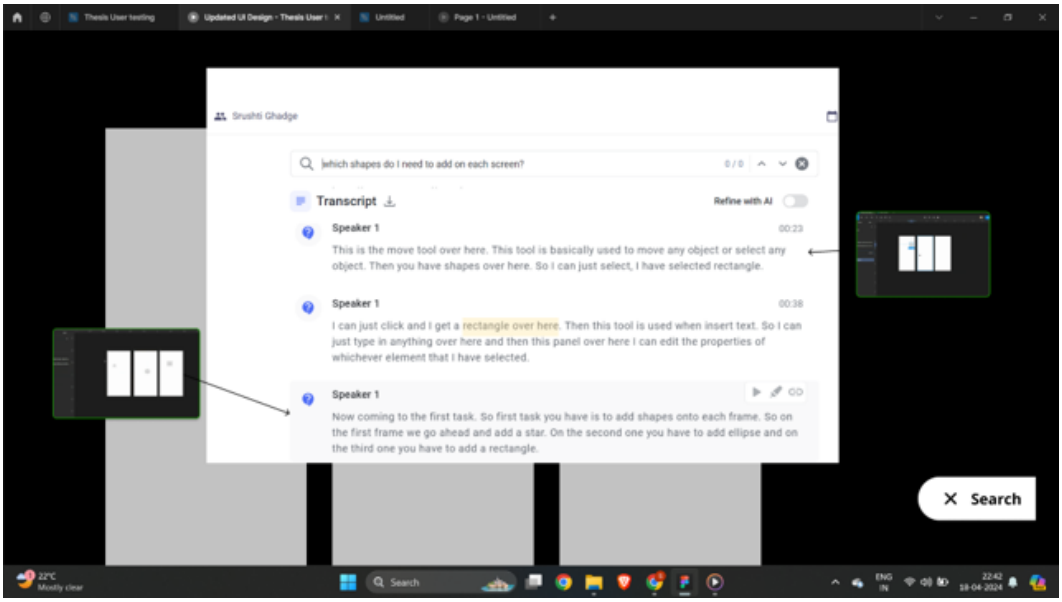

Figure 3.21: Here you can see that the AI search tool has appeared as an overlay on top of the window that Participant is Completing the Task

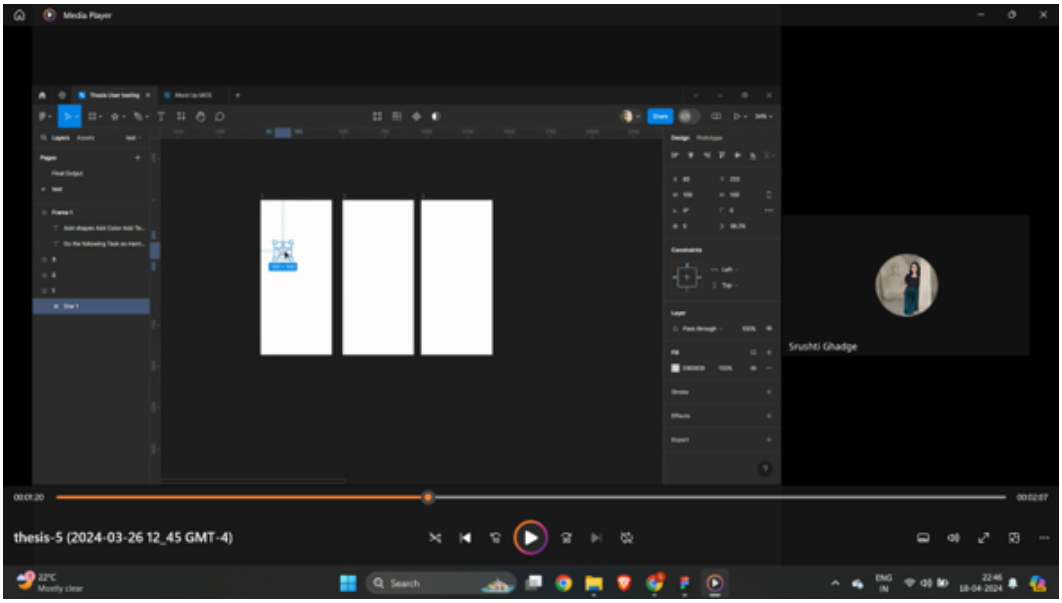

Figure 3.22: Here in the Meeting Recording Screenshot. You can see that the System has taken the Participant to the Point in the Meeting Recording Where if they Play the Video, they will immediately find Where in the Information They are Looking For

3.5.1 Descriptive Statistics

Descriptive statistics were calculated to provide a summary of the characteristics of the variables being studied. Measures such as means, standard deviations, and ranges were computed for continuous variables. The categorical variables were summarized by calculating the frequencies and percentages. The statistics provide a comprehensive analysis of the data distribution, facilitating the identification of any distribution patterns or trends.

3.5.2 Inferential Statistics

The main inferential statistical method used in this investigation was the independent samples t-test. A parametric test was employed to compare the means of two separate groups on a continuous outcome variable. The t-test was employed to evaluate if there were significant differences in information retrieval efficiency between the treatment group (participants exposed to the AI-powered search mechanism) and the control group (participants using traditional search methods).

In Part 2 of this study, a paired t-test was employed. To assess the difference between the previously evaluated user interface and the newly improved artificial intelligence search tool.

3.5.3 Statistical Tests

A t-test was performed to examine the hypothesis that the AI-powered search mechanism would yield significantly greater information retrieval efficiency in comparison to conventional search methods. The t-test yielded a t-value, degrees of freedom, and p-value, which respectively represent the extent of the disparity

between the means of the two groups and the probability of randomly identifying such a difference.

3.5.4 Validity and Reliability

Various measures were used to ensure the accuracy and consistency of the data analysis process. These measures included following established statistical methods, being transparent in reporting, and paying careful attention to the quality and integrity of the data.

3.6 Ethical Considerations

Ethical considerations are addressed by obtaining informed consent from participants, ensuring the privacy and confidentiality of data, and securing ethical approval from the Florida Tech Ethics Committee.

3.7 Limitations

This study may face limitations, including sample size constraints, generalizability to other populations, and potential biases related to participants' prior experience with search tools.

Chapter 4

Results

For experiment one we aimed to investigate the impact of an integrated artificial intelligence-powered search mechanism on information retrieval efficiency from meeting recordings and transcripts compared to traditional methods. The research hypotheses proposed that the AI-powered search mechanism would significantly enhance information retrieval efficiency compared to traditional methods.

4.1 Descriptive Statistics for Experiment One

Table 4.1 displays the descriptive statistics for the variables. The mean search time (in seconds), median and standard deviation for both the AI-powered search group and the traditional search group are provided (see Figure 4.1).

Table 4.1: Descriptive Statistics

	AI Search Group	**Traditional Search Group**
Mean Search Time (seconds)	297.167	471.267
Median	283.800	514.800
Standard Deviation	78.287	101.489

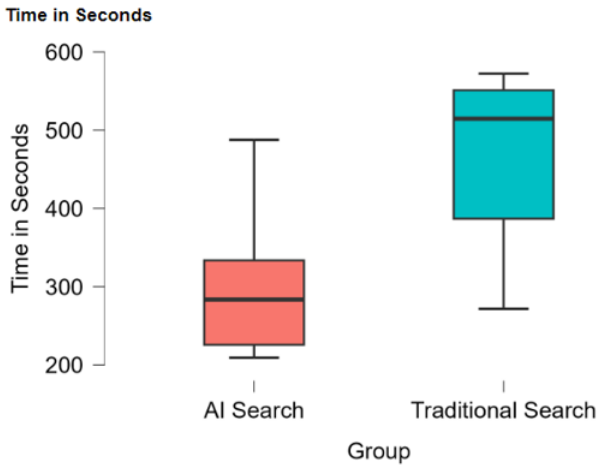

Figure 4.1: Boxplot for Ai vs Traditional Search

4.2 Inferential Statistics for Experiment One

The results of the Shapiro-Wilk normality test are as follows:

(a) For the treatment group, W = 0.911 and P = 0.090

(b) For the control group, W = 0.850 and P = 0.008

Since the AI search group data is nonparametric, we used the Mann-Whitney U test for data analysis. The results revealed a significant difference in mean search time between the AI-powered search group (M = 297.167 seconds, SD = 78.287) and the traditional search group (M = 471.267 seconds, SD = 101.489), p ¡ .001.

4.3 Results for Experiment Two

4.3.1 Descriptive Statistics for Enhanced AI Vs Existing AI Search Tools Experiment Two

4.2 displays the descriptive statistics for the variables. The mean search time (in seconds), median, and standard deviation for both the enhanced AI search tool

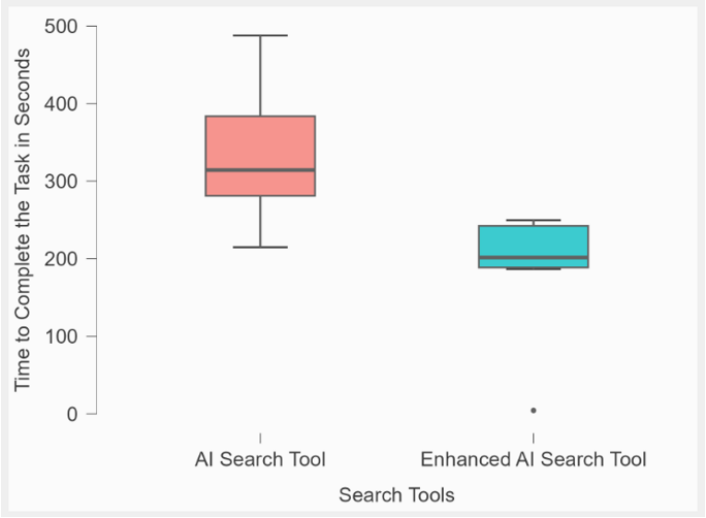

Figure 4.2: Boxplot for Existing AI Search Tool vs Enhanced AI Search Tool

and existing AI search tool are provided (see fig: 4.1).

Table 4.2: Descriptive Statistics

	Enhanced AI Search Tool	**Existing AI Search Tool**
Mean Search Time (seconds)	188.259	335.229
Median	201.600	314.400
Standard Deviation	85.258	90.909

4.3.2 Inferential Statistics for Enhanced AI Vs Existing AI Search Tools Experiment Two

The results from the Shapiro-Wilk normality test are as follows: W = 0.904 and P = 0.354. Since the data is parametric, we used a paired sample t-test for data analysis. The results from the test are as follows: t=2.928, df=6, p=0.026, Cohen's d=1.107, and SE Cohen's d=0.723.

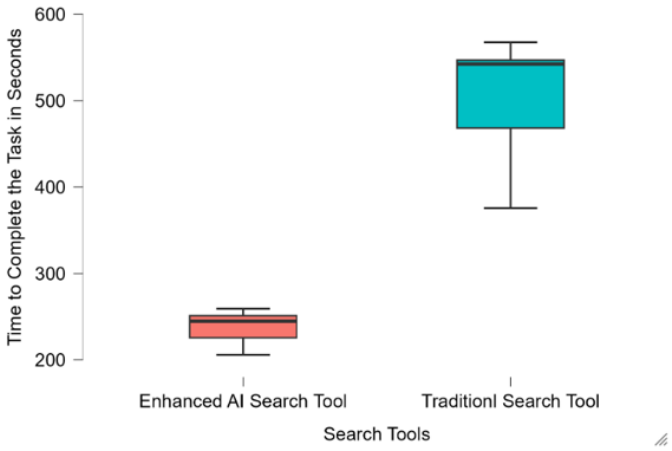

Figure 4.3: Boxplot for Enhanced AI Search Tool vs Traditional Search Tool

4.3.3 Descriptive Statistics for Enhanced AI Vs Traditional Search Tools Experiment Two

4.3 displays the descriptive statistics for the variables. The mean search time (in seconds), median, and standard deviation for both the enhanced AI search tool and existing AI search tool are provided (see fig: 4.1).

Table 4.3: Descriptive Statistics

	Enhanced AI Search Tool	**Traditional Search Tool**
Mean Search Time (seconds)	237.600	502.286
Median	244.800	542.400
Standard Deviation	73.770	21.258

4.3.4 Inferential Statistics for Enhanced AI Vs Traditional Search Tools Experiment Two

The results from the Shapiro-Wilk normality test are as follows: W = 0.927 and P = 0.524. Since the data is parametric, we used a paired sample t-test for data analysis. The results from the test are as follows: t=9.950, df=6, p¡0.001,

Cohen's d=3.761, and SE Cohen's d=1.271.

Chapter 5

Discussion

The aim of this study was to investigate the effectiveness of an integrated artificial intelligence-powered search mechanism in improving the efficiency of retrieving and utilizing information from meeting recordings and transcripts compared to traditional methods. The study's findings offer useful insights into the possible advantages and consequences of implementing AI-driven search tools in organizational and academic environments. Additionally, we aimed to identify the strategies that could be employed to improve the search and utilization of meeting recordings and transcripts, hence minimizing frustration and time spent by students and professionals to retrieve information.

5.1 Finding of the Research and Interpretation

A key finding of this study is the notable increase in retrieval efficiency that was seen when the AI-powered search tool was used. Individuals in the experimental group, employing the AI-driven search tool, exhibited a significant reduction in the duration needed to access certain data in contrast to those employing con-

ventional search techniques. This implies that AI technology has the capacity to transform information retrieval procedures, providing more effective and efficient alternatives to traditional approaches.

The findings from our investigation unveiled a statistically significant difference in efficiency as measured by the time between the group of participants utilizing the search mechanism empowered by artificial intelligence and the group employing conventional approaches. The results of the study indicate that individuals who were part of the AI-powered group exhibited a notable increase in their ability to retrieve and effectively utilize information obtained from meeting recordings and transcripts. The result mentioned previously provides empirical evidence that aligns with our initial hypothesis, suggesting that the integration of AI-powered search mechanisms has the potential to significantly improve the efficiency of information retrieval processes.

5.2 Theoretical Implications

Our research adds to the growing body of literature on the importance of artificial intelligence in information retrieval procedures. The results of our research provide evidence in favor of ideas advocating the utilization of contemporary technology, such as AI-driven search techniques to enhance the effectiveness and output of organizations. The importance of considering the human-computer interaction aspect during the design and deployment of AI-powered systems is highlighted in our work.

5.2.0.1 Advancement of Information Retrieval Theories

The study presented herein makes a significant contribution to the existing body of knowledge pertaining to the advancement of theories concerning the human use of information retrieval processes. Through the demonstration of the efficacy of search mechanisms powered by AI, this study offers empirical evidence to support the proposition that advanced technologies have the potential to greatly improve the efficiency and effectiveness of tasks related to retrieving information. These findings are consistent with existing theories that propose that the introduction of technological advancements can have a transformative effect on the way individuals and organizations seek and utilize information within their operational environments.

5.2.0.2 Human-Computer Interaction Theories

This study provides insights into the interaction between users and AI-powered systems in information retrieval tasks from a human-computer interaction standpoint. It emphasizes the significance of taking into account the usability, user experience, and cognitive elements of human-computer interaction throughout the design and implementation of AI systems. The findings from your study enhance and expand upon current theories in human-computer interaction, namely those that revolve around user-centered design principles and adaptable user interfaces.

5.2.0.3 Integration with Cognitive Theories

The present study has the potential to make a valuable contribution to the existing body of knowledge in the field of cognitive theories of information processing and decision-making. Through the implementation of AI technology, search

mechanisms are able to automate various aspects of information retrieval and filtering. This automation process effectively reduces the cognitive load placed on users, enabling them to allocate their mental resources towards more complex cognitive tasks, such as sense making and decision-making. The earlier claim is in accordance with the principles of distributed cognition and cognitive offloading. These theories propose that cognitive processes are not confined to an individual's mind, but rather extend to include the involvement of other individuals, artifacts, and the surrounding environment. The findings derived from the conducted study offer empirical substantiation regarding the manner in which artificial intelligence (AI) technologies enhance the cognitive abilities of individuals in tasks that require a significant amount of information processing.

5.2.0.4 Implications for Technology Adoption Theories

The present study has the potential to contribute valuable insights to the existing body of knowledge on technology adoption and acceptance. Through the presentation of empirical evidence, this study showcases the advantages of utilizing AI-powered search mechanisms to enhance the efficiency of information retrieval. Consequently, it offers empirical support for the various factors that influence the adoption and usage of AI technologies within organizational contexts. The findings derived from this investigation have the potential to make valuable contributions to the advancement of technology acceptance models, such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT). Specifically, this study sheds light on the significance of perceived usefulness, ease of use, and various other factors in influencing users' attitudes and intentions towards artificial intelligence (AI) technologies.

5.2.1 Practical Implications

The practical implications of the findings are of great importance for organizations that aim to enhance their information retrieval processes. The implementation of AI-powered search mechanisms has the potential to yield significant advantages, such as saving time, boosting productivity, and improving decision-making abilities. Furthermore, our research findings indicate that it would be advantageous for organizations to allocate resources toward the implementation of training programs aimed at enhancing user proficiency in utilizing AI-powered technologies. This strategic approach would enable users to become well-versed in the functionalities and capabilities of such technologies, thereby optimizing the potential benefits that can be derived from their utilization.

5.2.2 Limitations and Future Directions

Notwithstanding the valuable insights acquired from this investigation, it is imperative to acknowledge the inherent limitations associated with it. One notable constraint pertains to the relatively small sample size, potentially impeding the extent to which the findings can be extrapolated to a broader population. One potential avenue for future investigation involves the exploration of this constraint through the implementation of more extensive research endeavors encompassing a broader range of organizational contexts. Furthermore, it is imperative to conduct additional research in order to delve into the enduring consequences of AI-driven search mechanisms on user behavior and organizational outcomes.

Chapter 6

Conclusions and Future Work

6.1 Conclusion

The present study aimed to examine the effects of employing an integrated artificial intelligence-powered search mechanism on the efficiency of information retrieval from meeting recordings and transcripts in comparison to conventional methods. The results of the study suggest that the utilization of an AI-powered search mechanism has a notable impact on improving the efficiency of information retrieval. This is supported by the observed reduction in search times and the higher levels of user satisfaction reported by the participants. The findings of this study provide empirical evidence that the utilization of AI technology has the potential to significantly enhance the efficiency and effectiveness of accessing and utilizing information derived from meeting recordings and transcripts.

Moreover, this research study adds to the current body of knowledge by showcasing the tangible advantages of utilizing artificial intelligence (AI) powered search mechanisms in practical, real-world scenarios. Through the optimization of the information retrieval process and the consequent reduction in the current invest-

ment necessary to obtain pertinent information, organizations have the potential to enhance productivity, decision-making capabilities, and knowledge management practices. The implications of these findings are significant across multiple domains, such as education, business, and technology, where the ability to access information efficiently is essential for achieving success.

Nevertheless, it is crucial to recognize the constraints inherent in this investigation, such as the utilization of a simulated setting and a relatively limited number of participants. Future investigations should strive to reproduce these findings in more extensive and heterogeneous groups and investigate additional variables that could potentially impact the efficacy of artificial intelligence-driven search mechanisms. These variables may encompass user experience, interface design, and task intricacy. Furthermore, it is worth noting that longitudinal studies have the potential to evaluate the lasting effects of AI technologies on both information-seeking behaviors and organizational outcomes over an extended period of time.

The findings of this study highlight the significant impact that AI-powered search mechanisms can have on enhancing the efficiency of information retrieval and driving organizational effectiveness. Through the adoption and integration of emerging technologies, coupled with the utilization of artificial intelligence (AI) capabilities, organizations have the potential to access novel avenues for fostering innovation, facilitating collaboration, and promoting the sharing of knowledge in the era of digitization.

6.2 Future Work

6.2.1 Longitudinal Study

It is of utmost importance to conduct longitudinal studies in order to evaluate the long-term effects of AI-powered search mechanisms on information retrieval behaviors and organizational outcomes over extended periods of time. Longitudinal research offers a valuable opportunity to gain a deeper understanding of the changes in user behaviors and preferences as individuals gradually adapt to AI technologies. By observing and analyzing user interactions over an extended period, researchers can uncover valuable insights into the evolving dynamics between users and AI systems. Furthermore, a thorough investigation into the sustainability of enhancements in information retrieval efficiency and organizational performance over an extended period will serve to substantiate the enduring advantages of adopting artificial intelligence (AI) technology.

6.2.2 User Expedience Research

It is imperative to conduct additional investigations into the user experience elements of search interfaces that are powered by artificial intelligence (AI). The scope of our research encompasses the examination of user satisfaction, usability, accessibility, and acceptance of AI technologies within various user groups and contextual settings. The utilization of qualitative research methods, such as interviews and focus groups, can be instrumental in the exploration and elucidation of user perceptions, preferences, and pain points that are intricately linked to AI-powered search mechanisms. The integration of user feedback within the design and development process has the potential to result in the generation of search solutions that are characterized by enhanced intuitiveness and user-friendliness.

6.2.3 Cross-Cultural Studies

Examining cultural differences in information retrieval behaviors and attitudes toward AI technologies through cross-cultural studies holds significant value. The adoption and utilization of AI-powered search mechanisms in diverse populations can be influenced by various cultural factors. These factors encompass communication styles, trust in technology, and attitudes toward automation. It is important to recognize that these cultural factors play a significant role in shaping the acceptance and usage of AI-powered search mechanisms among different population groups. Conducting comparative research in various cultural contexts allows for a deeper understanding of how AI technologies can be customized to cater to the requirements and preferences of distinct user groups, thereby improving their experiences with information retrieval.

6.2.4 Advanced AI Applications

By delving into sophisticated AI applications like natural language processing (NLP) and machine learning techniques, we may significantly augment the capabilities of search systems. Natural Language Processing (NLP) approaches provide advanced language comprehension and semantic analysis, enhancing the ability of AI systems to accurately read and process natural language requests. Machine learning algorithms may be utilized to customize search results and suggestions by taking into account user preferences, habits, and past experiences with the system. Exploring these sophisticated AI approaches can result in the creation of more intelligent and adaptable search solutions that effectively cater to the requirements of users in intricate information environments.

6.2.5 Organizational Adoption

It is crucial to analyze the organizational aspects that impact the acceptance and execution of AI-driven search methods. The successful integration of AI technology into current processes and practices can be greatly influenced by factors such as organizational culture, leadership support, technological infrastructure, and resource availability. Examining obstacles and enablers to the acceptance of AI-powered search mechanisms inside organizations can provide insights for developing tactics to encourage widespread adoption and efficient use in different organizational contexts.

Bibliography

[1] Artificial intelligence (2nd ed.). Archive Location: world.

[2] Artificial intelligence (3rd ed.). Archive Location: world.

[3] Artificial intelligence meets natural stupidity | ACM SIGART Bulletin.

[4] Colibri.ai - AI Meeting Notes & Conversation Intelligence.

[5] The Fast Remote Desktop Application.

[6] Figure 1. Disadvantages of traditional methods.

[7] Liu: Interactive multimedia design and production processes - Google Scholar.

[8] Modern Information Retrieval.

[9] [No title found]. *International Journal of Computer Networks and Communications Security.*

[10] (PDF) SEARCH ENGINE OPTIMIZATION: A REVIEW.

[11] Scopus preview - Scopus - Document details - Developing a framework for user participation in information system development projects.

[12] Scopus preview - Scopus - Document details - Hypertext Design Environments and the Hypertext Design Process.

[13] Scopus preview - Scopus - Document details - The need for a hypertext instructional design methodology.

[14] Smart Search vs. Traditional Search Engines: Transforming Market Intelligence.

[15] To Meet or Not to Meet: Finding the Shortest Paths in Road Networks | IEEE Journals & Magazine | IEEE Xplore.

[16] To Meet or Not to Meet: Finding the Shortest Paths in Road Networks | IEEE Journals & Magazine | IEEE Xplore.

[17] Understanding and Predicting User Satisfaction with Conversational Recommender Systems | ACM Transactions on Information Systems.

[18] UX Design Books and Articles.

[19] The Limitations of Traditional Research, September 2012.

[20] What is Information Retrieval?, July 2020. Section: AI-ML-DS.

[21] THE IMPACT OF ARTIFICIAL INTELLIGENCE ON SEARCH ENGINE OPTIMIZATION STRATEGIES | International Conference on Economic Business and Social Science. April 2023.

[22] Information retrieval, February 2024. Page Version ID: 1207764981.

[23] Hua Ai, Jianwei Chai, Jilei Zhang, Shaweta Khanna, and Kayhan Zrar Ghafoor. Research on the application of search algorithm in computer communication network. *Journal of Intelligent Systems*, 31(1):1150–1159, January 2022. Publisher: De Gruyter.

[24] Firas Al-Mukhtar, Nawzad Hamad, and Shahab Kareem. SEARCH ENGINE OPTIMIZATION: A REVIEW. *Journal of Applied Computer Science Methods*, 17:69–79, March 2021.

[25] Muhammad Asif and Shakeel Ahmad Khan. Online Information Searching Techniques: An Investigation from Library Science Professionals.

[26] Satanjeev Banerjee, Carolyn Rose, and Alexander Rudnicky. The Necessity of a Meeting Recording and Playback System, and the Benefit of Topic–Level Annotations to Meeting Browsing. volume 3585, pages 643–656, January 1970.

[27] Satanjeev Banerjee, Carolyn Rose, and Alexander Rudnicky. The Necessity of a Meeting Recording and Playback System, and the Benefit of Topic–Level Annotations to Meeting Browsing. volume 3585, pages 643–656, January 1970.

[28] C Barry and M Lang. A comparison of 'traditional' and multimedia information systems development practices. *Information and Software Technology*, 45(4):217–227, March 2003.

[29] F. Bartumeus and J. Catalan. Optimal search behavior and classic foraging theory. *Journal of Physics A: Mathematical and Theoretical*, 42(43):434002, October 2009.

[30] Ana Luize Corrêa Bertoncini and Mauricio C. Serafim. Ethical content in artificial intelligence systems: A demand explained in three critical points. *Frontiers in Psychology*, 14:1074787, March 2023.

[31] Philip Nicholas Boucher. Artificial intelligence: How does it work, why does it matter, and what can we do about it? June 2020. Publisher: <bound method Organization.get_name_with_acronym of <Organization: European Parliamentary Research Service>>.

[32] Wichor M. Bramer, Gerdien B. de Jonge, Melissa L. Rethlefsen, Frans Mast, and Jos Kleijnen. A systematic approach to searching: an efficient and complete method to develop literature searches. *Journal of the Medical Library Association : JMLA*, 106(4):531–541, October 2018.

[33] Anu C. Haridasan, Angeline Gautami Fernando, and B. Saju. A systematic review of consumer information search in online and offline environments. *RAUSP Management Journal*, 56(2):234–253, January 2021. Publisher: Emerald Publishing Limited.

[34] Jamie Callan, James Allan, Charles L. A. Clarke, Susan Dumais, David A. Evans, Mark Sanderson, and ChengXiang Zhai. Meeting of the MINDS: an information retrieval research agenda. *ACM SIGIR Forum*, 41(2):25–34, December 2007.

[35] Stephen Carradini, Kristen Getchell, Peter Cardon, Carolin Fleischmann, Jolanta Aritz, and James Stapp. Evidence-based recommendations for recorded-meetings policies. *Business Horizons*, 67(1):83–92, January 2024.

[36] Peter H Carstensen and Lasse Vogelsang. Design of Web-Based Information Systems - New Challenges for Systems Development?

[37] W. S. Cooper. A definition of relevance for information retrieval. *Information Storage and Retrieval*, 7(1):19–37, June 1971.

[38] W. Bruce Croft. Combining Approaches to Information Retrieval. In W. Bruce Croft, editor, *Advances in Information Retrieval: Recent Research from the Center for Intelligent Information Retrieval*, pages 1–36. Springer US, Boston, MA, 2000.

[39] Thomas H Davenport and Rajeev Ronanki. Don't start with moon shots.

[40] Emilio Delgado López-Cózar, Enrique Orduña-Malea, and Alberto Martín-Martín. Google Scholar as a Data Source for Research Assessment. In Wolfgang Glänzel, Henk F. Moed, Ulrich Schmoch, and Mike Thelwall, editors, *Springer Handbook of Science and Technology Indicators*, pages 95–127. Springer International Publishing, Cham, 2019.

[41] Lubna Luxmi Dhirani, Noorain Mukhtiar, Bhawani Shankar Chowdhry, and Thomas Newe. Ethical Dilemmas and Privacy Issues in Emerging Technologies: A Review. *Sensors*, 23(3):1151, January 2023. Number: 3 Publisher: Multidisciplinary Digital Publishing Institute.

[42] Linh Duc Tran, Alex Stojcevski, Thanh Chi Pham, Tony de Souza-Daw, Nhan Trong Nguyen, Vinh Quang Nguyen, and Chau Minh Nguyen. A smart meeting room scheduling and management system with utilization control and ad-hoc support based on real-time occupancy detection. In *2016 IEEE Sixth International Conference on Communications and Electronics (ICCE)*, pages 186–191, July 2016.

[43] World Leaders in Research-Based User Experience. AI-Powered Tools for UX Research: Issues and Limitations.

[44] Omobolanle Seri Fasola. HARNESSING ARTIFICIAL INTELLIGENCE-POWERED SEARCH ENGINES FOR THE LITERATURE REVIEW PROCESS.

[45] Kailash A. Hambarde and Hugo Proenca. Information Retrieval: Recent Advances and Beyond. *IEEE Access*, 11:76581–76604, 2023. arXiv:2301.08801 [cs].

[46] Philip J. Hayes. Intelligent High-Volume Text Processing Using Shallow, Domain-Specific Techniques. In *Text-based intelligent Systems*. Psychology Press, 1992. Num Pages: 15.

[47] T. Ikeda, Min-Yao Hsu, H. Imai, S. Nishimura, H. Shimoura, T. Hashimoto, K. Tenmoku, and K. Mitoh. A fast algorithm for finding better routes by AI search techniques. In *Proceedings of VNIS'94 - 1994 Vehicle Navigation and Information Systems Conference*, pages 291–296, August 1994.

[48] Mu Jun. Research and Application of Artificial Intelligence Algorithm in Network Search System. In *2021 IEEE International Conference on Data Science and Computer Application (ICDSCA)*, pages 415–419, October 2021.

[49] Katherine A. Karl, Joy V. Peluchette, and Navid Aghakhani. Virtual Work Meetings During the COVID-19 Pandemic: The Good, Bad, and Ugly. *Small Group Research*, 53(3):343–365, June 2022.

[50] Ayad Ali Keshlaf, Abdulmonam A. Alahresh, and Mustafa KH. Aswad. Factors Influencing the Use of On-Line Meeting Tools. In *2021 IEEE 1st International Maghreb Meeting of the Conference on Sciences and Techniques of Automatic Control and Computer Engineering MI-STA*, pages 908–912, May 2021.

[51] Do-Yeon Koo and Soonhung Han. Application of the Configuration Design Methods to a Design Expert Systems for Paper Feeding Mechanisms. *Proceedings of the 3rd World Congress on Expert Systems*, pages 49–56, 1996. Accepted: 2013-03-15T17:13:55Z.

[52] Richard E Korf. Artificial intelligence search algorithms.

[53] J. E. (Hans) Korteling, G. C. van de Boer-Visschedijk, R. a. M. Blankendaal, R. C. Boonekamp, and A. R. Eikelboom. Human- versus Artificial Intelligence. *Frontiers in Artificial Intelligence*, 4, March 2021. Publisher: Frontiers.

[54] Suad Kunosić, Denis Čeke, Enver Zerem, Suad Kunosić, Denis Čeke, and Enver Zerem. Advantages and Disadvantages of the Webometrics Ranking System. In *Scientometrics Recent Advances*. IntechOpen, June 2019.

[55] Olga Liskin, Kurt Schneider, Stephan Kiesling, and Simone Kauffeld. Meeting intensity as an indicator for project pressure: Exploring meeting profiles. In *2013 6th International Workshop on Cooperative and Human Aspects of Software Engineering (CHASE)*, pages 153–156, May 2013.

[56] Ping Liu, Qiong Wu, Xiangming Mu, Kaipeng Yu, and Yiting Guo. Detecting the intellectual structure of library and information science based on formal concept analysis. *Scientometrics*, 104(3):737–762, September 2015.

[57] Jianbing Ma, Xi Wu, and Lihong Huang. The Use of Artificial Intelligence in Literature Search and Selection of the PubMed Database. *Scientific Programming*, 2022:e8855307, March 2022. Publisher: Hindawi.

[58] Nicola Jones magazine, Nature. New AI-Based Search Engines are a "Game Changer" for Science Research.

[59] Zaki Malik, Khayyam Hashmi, Erfan Najmi, and Abdelmounaam Rezgui. Wisdom extraction in knowledge-based information systems. *Journal of Knowledge Management*, 23(1):23–45, January 2018. Publisher: Emerald Publishing Limited.

[60] Thomas Mandl. Artificial Intelligence for Information Retrieval. January 2008.

[61] Susan Nevelow Mart. Understanding the Human Element in Search Algorithms and Discovering How It Affects Search Results.

[62] Anne Thushara Matthias and Pingamage Dona Jayamini Kaushalya. Quality of online information for the general public on familial hypercholesterolaemia. *Health Education Journal*, 81(6):759–767, October 2022. Publisher: SAGE Publications Ltd.

[63] John McCarthy. WHAT IS ARTIFICIAL INTELLIGENCE?

[64] Hafizudin Mohamad Nor. Disadvantage of Traditional Methods. Technical report, April 2015.

[65] Jose Maria N. David, Marcio G. P. Rosa, Flavia Maria Santoro, and Marcos R.S. Borges. Considering Context Elements in Pre-Meeting Systems. In *2006 10th International Conference on Computer Supported Cooperative Work in Design*, pages 1–6, May 2006.

[66] NA. The Benefits and Limitations of Generative AI: Harvard Experts Answer Your Questions | Harvard Online, April 2023.

[67] Jakob Nielsen. Search vs. AI: What's Faster?, August 2023.

[68] D. T Pham and P. T. N Pham. Artificial intelligence in engineering. *International Journal of Machine Tools and Manufacture*, 39(6):937–949, June 1999.

[69] Dilip Pratihar. Traditional vs. non-traditional optimization tools. pages 25–33. January 2012.

[70] Prerender. Traditional Search vs. AI-Powered Search Explained, October 2023.

[71] Jana Saab. The Impact of Artificial Intelligence on Search Engine: Super Intelligence in Artificial Intelligence (AI). pages 141–160. March 2023.

[72] Dominik Schoeb, Rodrigo Suarez-Ibarrola, Simon Hein, Franz Friedrich Dressler, Fabian Adams, Daniel Schlager, and Arkadiusz Miernik. Use of Artificial Intelligence for Medical Literature Search: Randomized Controlled Trial Using the Hackathon Format. *Interactive Journal of Medical Research*, 9(1):e16606, March 2020.

[73] Clemencia Siro, Mohammad Aliannejadi, and Maarten De Rijke. Understanding and Predicting User Satisfaction with Conversational Recommender Systems. *ACM Transactions on Information Systems*, 42(2):55:1–55:37, November 2023.

[74] Karen Sparck Jones. Information retrieval and artificial intelligence. *Artificial Intelligence*, 114(1):257–281, October 1999.

[75] Bernd Carsten Stahl and David Wright. Ethics and Privacy in AI and Big Data: Implementing Responsible Research and Innovation. *IEEE Security & Privacy*, 16(3):26–33, May 2018. Conference Name: IEEE Security & Privacy.

[76] Collin Stephenson. Subject and Course Guides: Research Process :: Step by Step: Search Strategy.

[77] Sahar Sultan. Limitations Of Artificial Intelligence.

[78] Neenu Ann Sunny. Machine Learning in Search Engines. 8(2), 2012.

[79] Hiraga T. An improved bidirectional search algorithm for the 2 terminal shortest path. *The 6th Karuizawa Workshop on Circuits and Systems*, pages 249–254, 1993.

[80] Hiraga T. An improved bidirectional search algorithm for the 2 terminal shortest path. *The 6th Karuizawa Workshop on Circuits and Systems*, pages 249–254, 1993.

[81] Mike Thelwall. Quantitative comparisons of search engine results. *Journal of the American Society for Information Science and Technology*, 59(11):1702–1710, 2008. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1002/asi.20834.

[82] Mike Thelwall and Pardeep Sud. A comparison of methods for collecting web citation data for academic organizations. *Journal of the American Society for Information Science and Technology*, 62(8):1488–1497, 2011. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1002/asi.21571.

[83] Giulio Tononi, Melanie Boly, Marcello Massimini, and Christof Koch. Integrated information theory: from consciousness to its physical substrate. *Nature Reviews Neuroscience*, 17(7):450–461, July 2016. Publisher: Nature Publishing Group.

[84] Ahmet Uyar. Google stemming mechanisms. *Journal of Information Science*, 35(5):499–514, October 2009. Publisher: SAGE Publications Ltd.

[85] Ahmet Uyar. Investigation of the accuracy of search engine hit counts. *Journal of Information Science*, 35(4):469–480, August 2009. Publisher: SAGE Publications Ltd.

[86] Pawan R. Vora. Design/Methods & Tools: Designing for the Web: a survey. *Interactions*, 5(3):13–30, May 1998.

[87] David Wilkinson and Mike Thelwall. Search markets and search results: The case of Bing. *Library & Information Science Research*, 35(4):318–325, October 2013.

[88] Bing Xue, Mengjie Zhang, Will N. Browne, and Xin Yao. A Survey on Evolutionary Computation Approaches to Feature Selection. *IEEE Transactions on Evolutionary Computation*, 20(4):606–626, August 2016.

[89] Nurce Yagci, Sebastian Sünkler, Helena Häußler, and Dirk Lewandowski. A Comparison of Source Distribution and Result Overlap in Web Search Engines. *Proceedings of the Association for Information Science and Technology*, 59(1):346–357, 2022. _eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1002/pra2.758.

[90] Yodhi Yuniarthe. Application of Artificial Intelligence (AI) in Search Engine Optimization (SEO). pages 96–101, September 2017.

[91] Serkan Özal. Vector Search For AI — Part 1 — Vector Similarity Search Algorithms, October 2023.

Appendix A

Method

The purpose of this preliminary survey is to gather information about the participants' backgrounds, goals, and challenges. This information is essential for tailoring the study methodology and assuring the gathering of relevant data. The survey results contribute to the formation of personas, research questions, and hypotheses. Additionally, it aided in the improvement of the research methods. These steps guarantee that the study is based on solid foundations and organized in a way that produces significant findings.

A.0.1 Pre-Experiment Survey

Question 1: Select the most appropriate option.

- Student: 13 participants (57%)
- Student + working professional: 3 participants (13%)
- Working Professional: 7 participants (30%)
- Other: 0 participants (0%)

A.0.1.1 Question 2: What's your role in your organization?

- Sr UX Designer
- Student
- Student and Mentor
- UX Designer
- Junior Software Engineer
- Student
- Quality Associate
- Designer
- student + software programmer
- Clinical Data Analyst
- Student
- Student
- Student
- Student
- Student
- Team lead
- Student
- Ux designer
- Sr ux designer
- Student

A.0.1.2 Question 3: What is your age range?

- 18 to 24: 13 participants (57%)
- 25 to 35: 8 participants (35%)
- 36 to 50: 1 participants (4%)

- 50 plus: 1 participant (4%)

A.0.1.3 Question 4: What is your gender identity?

- Male: 14 participants (61%)
- Female: 9 participants (39%)
- Other: 0 participants (0%)

Question 5: How often do you use the video conferencing tools?

- Daily: 10 participants (43%)
- Weekly: 5 participants (22%)
- Biweekly: 2 participants (9%)
- Monthly: 1 participants (4%)
- Rarely: 5 participants (22%)

A.0.1.4 Question 6: How often do you make meeting notes?

- Always: 9 participants (39%)
- Sometimes: 14 participants (61%)
- Never: 0 participants (0%)

A.0.1.5 Question 7: How do you make notes of the meeting? (multiple select)

- I don't make any notes: 1 participant (4%)
- I write on paper: 16 participants (70%)
- I type the important points: 7 participants (30%)
- I record the meeting: 13 participants (57%)
- I record the meeting and generate transcript: 3 participants (13%)

- Other (e.g., plugins/extensions to make notes): 2 participants (9%)

Question 8: How do you revisit the information from office or academic meetings?

- I don't revisit the information: 3 participants (14%)
- I revisit my notes that I wrote: 18 participants (82%)
- I revisit the document in which I have made meeting notes: 6 participants (27%)
- I refer to the meeting recordings: 41 participants (9%)
- I refer to the meeting transcript and recordings: 3 participants (14%)
- Other: 0 participants (0%)

Question 9: How often do you encounter challenges while searching for specific information in your daily routine?

- Always: 2 participants (9%)
- Sometimes: 20 participants (91%)
- Never: 0 participants (0%)

A.0.1.6 Question 10: What types of devices do you typically use for retrieving information from meeting recordings and transcripts?

- Desktop: 4 participants (18%)
- Laptop: 15 participants (68%)
- Tablet: 3 participants (14%)
- Mobile Phone: 0 participants (0%)
- Other: 0 participants (0%)

A.0.1.7 Question 11: Rank the online video conferencing tools you use the most

- Zoom: 1 Rank: 8, 2 Rank: 8, 3 Rank: 6, 4 Rank: 0
- Google Meet: 1 Rank: 8, 2 Rank: 7, 3 Rank: 6, 4 Rank: 1
- Microsoft Meets: 1 Rank: 5, 2 Rank: 6, 3 Rank: 9, 4 Rank: 2
- Others: 1 Rank: 1, 2 Rank: 1, 3 Rank: 1, 4 Rank: 19

Question 12: What are the challenges that you face while revisiting the recorded information or the meeting transcript? (multiple Select)

- Difficult to Navigate and Search: 13 participants (59%)
- Errors and Incompleteness in the transcript: 6 participants (27%)
- Transcripts and Recordings are not immediately available: 4 participants (18%)
- Not Accessible to All: 4 participants (18%)
- Speech to Text Inaccuracy: 9 participants (41%)
- Concerns Regarding Privacy of Participants: 2 participants (9%)
- Data Security Concerns: 20 participants (40%)
- No User Control Over Data: 3 participants (14%)
- Other: 0 participants (0%)

Question 13: Any suggestions?

- Some smart plug-in that also creates MoM would be helpful
- Using Text - Speech Transcription for meetings is a good idea. My suggestion would be that the transcripts should be built in dialogue forms so that it would be easier to understand that while going through again.

A.0.2 Post Experiment Survey - Treatment Group

Question 1: On a Scale of 1 to 5 how likely are used this method for searching information?

- 1: 1 participants (5.6%)
- 2: 0 participants (0%)
- 3: 3 participants (16.7%)
- 4: 5 participants (27.8%)
- 5: 9 participants (50%)

A.0.2.1 Question 2: Do you have any suggestions?

- I think this tool has potential
- Switching between the windows was frustrating
- Everything is great
- It would mostly be helpful for longer meetings good idea
- No, it's excellent
- It is good
- It would be good to have voice command
- Voice interface would be better
- Switching between Windows and typing promotes all the time is time-consuming and annoying

A.0.3 Post Experiment Survey - Control Group

Question 1: On a Scale of 1 to 5 how likely are used this method for searching information?

- 1: 1 participants (5.6%)

- 2: 4 participants (22.2%)
- 3: 8 participants (44.4%)
- 4: 1 participants (5.6%)
- 5: 4 participants (22.2%)

Question 2: Do you have any suggestions?

- Time-consuming
- It's good
- I am satisfied with the approach
- It's very time-consuming.
- I think it's easy to search for information from short videos.
- This method is fine for short meetings but can introduce features like searching on the same tab for longer videos

A.1 Enhanced AI Interface

Here are all the screenshots of the enhanced AI search tool.

A.2 Training

The users were given a demo video recording and task to get to know how the tool that was given to them works (see fig. A.7 and A.8).

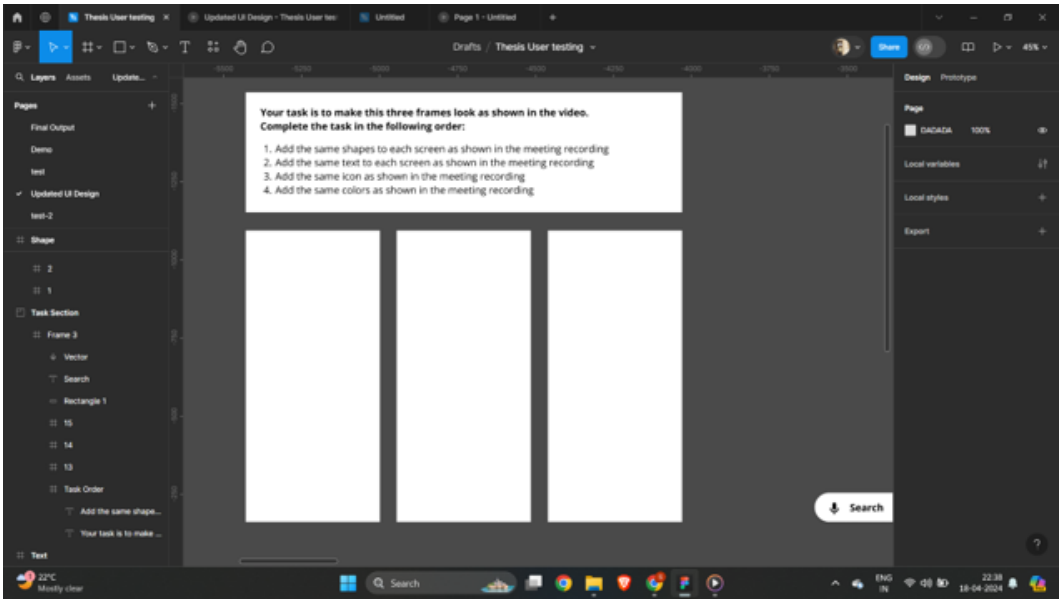

Figure A.1: Enhanced UI: Task window with The Voice Command Search on the Bottom Right. By clicking on the Voice Command button, participants can Speak Out Loud Their Search Query. They won't have to Switch to a Different Window. Which has Helped Reduce the information search Time and Frustration Caused by Constantly Switching Tabs.

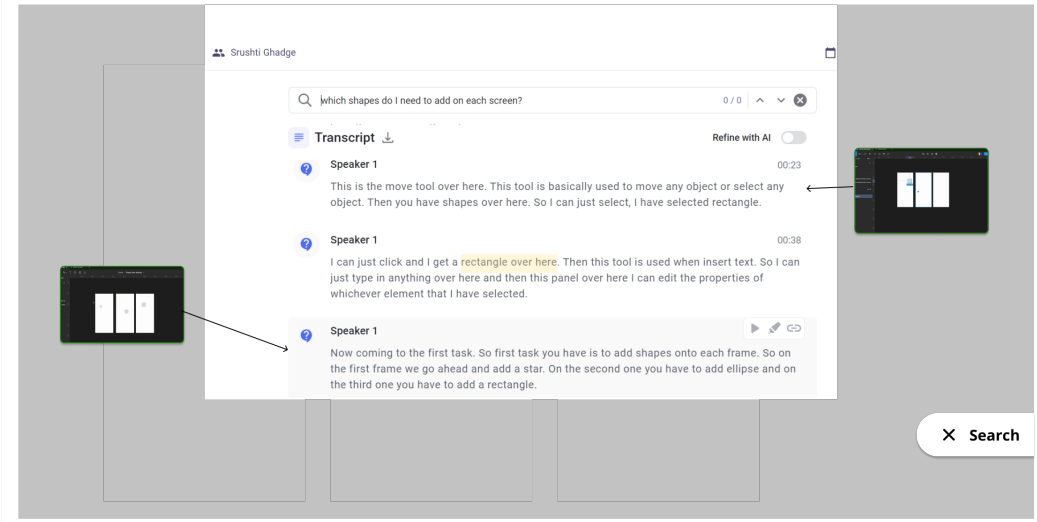

Figure A.2: Enhanced UI: When Participants are Doing Task 1

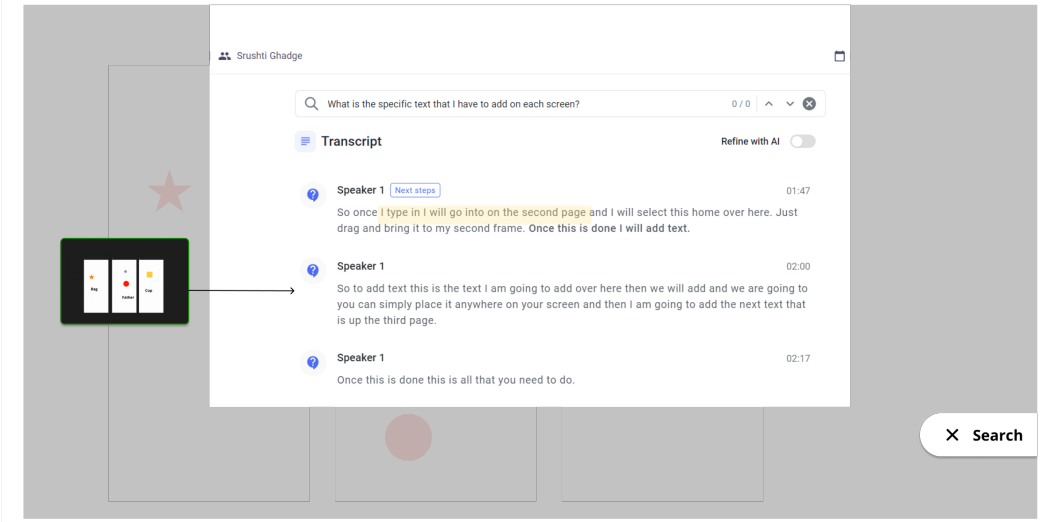

Figure A.3: Enhanced UI: When Participants are Doing Task 2

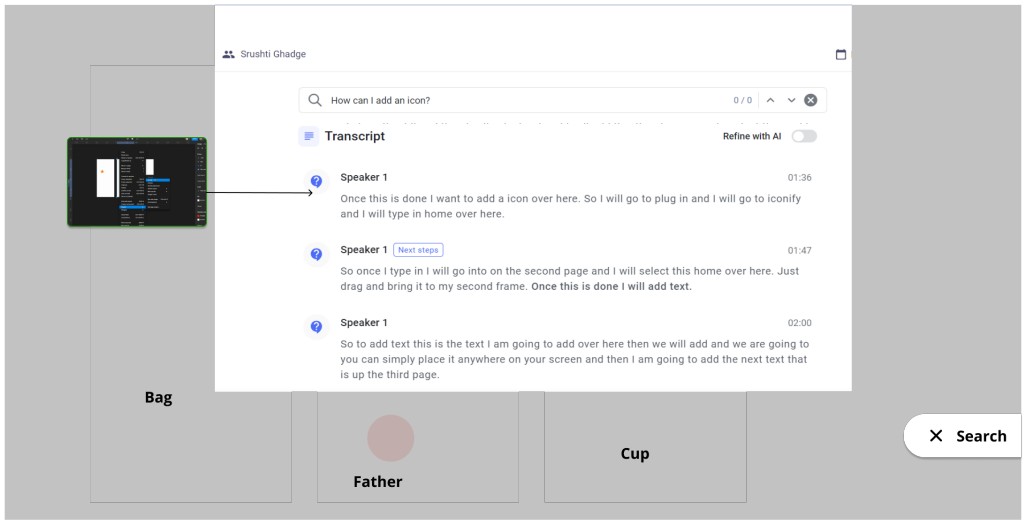

Figure A.4: Enhanced UI: When Participants are Doing Task 3

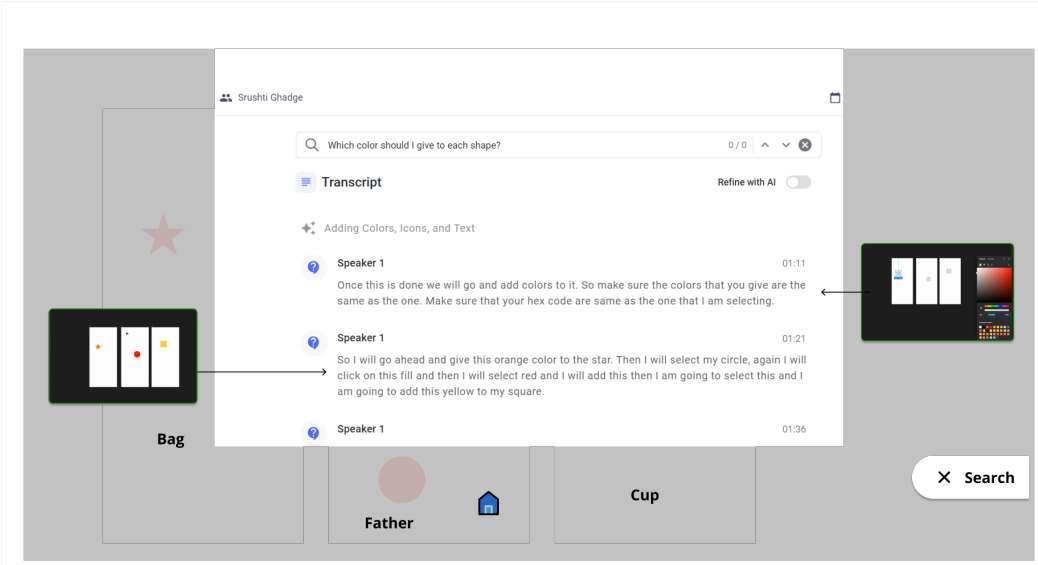

Figure A.5: Enhanced UI: When Participants are Doing Task 4

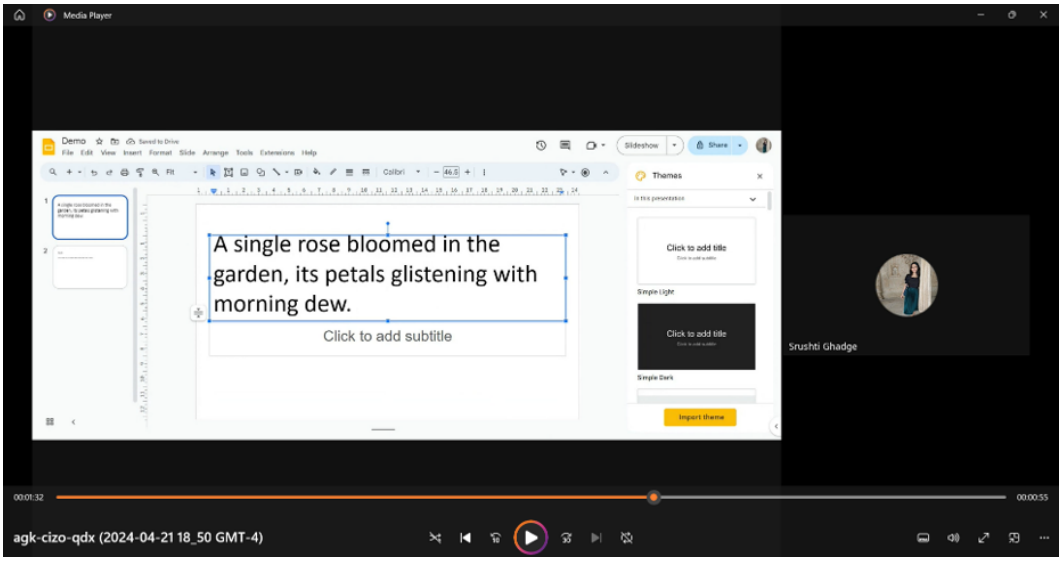

Figure A.6: This is the demo meeting recording that the participants watched

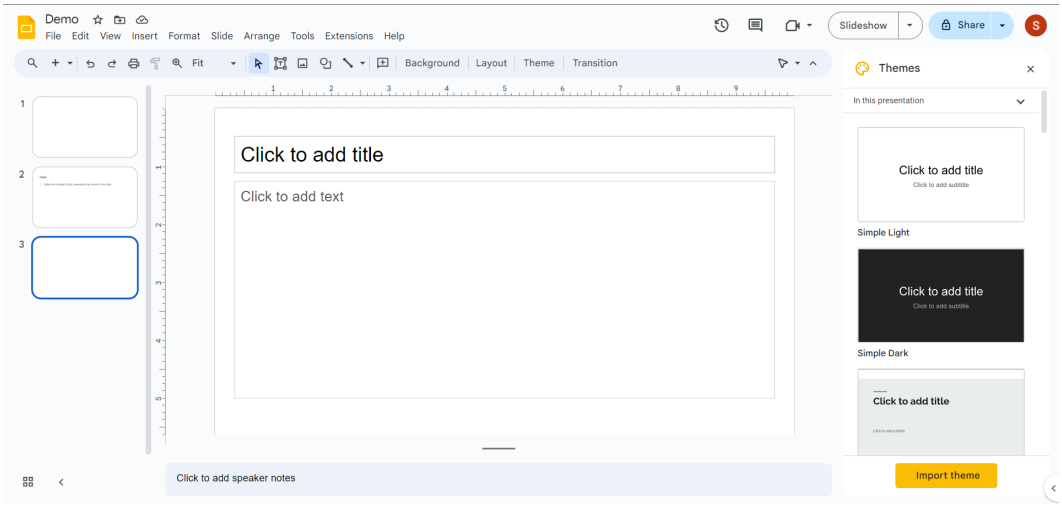

Figure A.7: Here is how the Demo Task Window Looked Like. This is a Google Slide

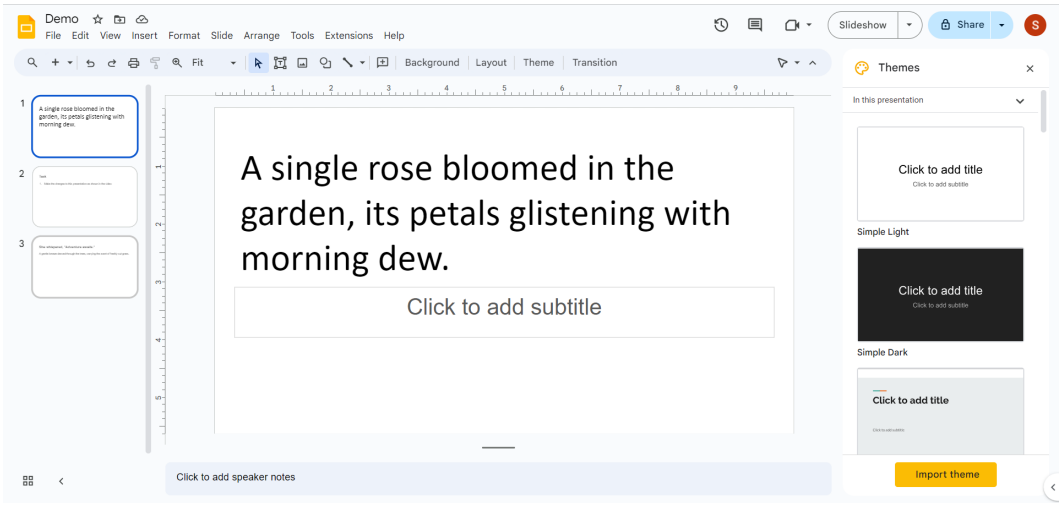

Figure A.8: Here is how the demo task file looked like after task completion