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Computational linguistic corpora as a decision-making tool.

ABSTRACT

This study aims to explore the role of computational language corpora in improving health services at Friendship Eye Hospital, and to analyze how decision makers can benefit from these data to strengthen strategic decision making. Data were collected from visitors and patients on various aspects of the services offered at the hospital, and the study sample consisted of 30 employees, whose responses were analyzed using topic, sentiment, and keyword analysis tools. The results of the analysis showed that the most recurring topics were related to basic health services, such as inquiries about medical events and medical services. In addition, the data indicated that 56.7% of respondents expressed positive sentiments, reflecting patients' satisfaction with the services provided at the hospital, while 23.3% showed negative sentiments, indicating the existence of some problems that need to be improved. The study concluded that computational linguistic corpora are a powerful tool for analyzing patient satisfaction and helping to improve health services.

Keywords: computational linguistic corpora, decision-making, hospital, text analysis, patient communication.

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Los corpus lingüísticos computarizados como herramienta para la toma de decisiones.

RESUMEN

Este estudio tiene como objetivo explorar el papel de los corpus lingüísticos computacionales en la mejora de los servicios de salud en el Hospital de Oftalmología de la Amistad, y analizar cómo los responsables de la toma de decisiones pueden beneficiarse de estos datos para fortalecer la toma de decisiones estratégicas. Se recopiló datos de los visitantes y pacientes sobre diversos aspectos de los servicios ofrecidos en el hospital, y la muestra de estudio consistió en 30 empleados, cuyas respuestas fueron analizadas utilizando herramientas de análisis de temas, sentimientos y palabras clave. Los resultados del análisis mostraron que los temas más recurrentes estaban relacionados con los servicios

de salud básicos, como consultas sobre eventos médicos y servicios médicos. Además, los datos indicaron que el 56.7% de los encuestados expresó sentimientos positivos, lo que refleja la satisfacción de los pacientes con los servicios brindados en el hospital, mientras que el 23.3% mostró sentimientos negativos, lo que indica la existencia de algunos problemas que necesitan ser mejorados. El estudio concluyó que los corpus lingüísticos computacionales son una herramienta poderosa para analizar la satisfacción de los pacientes y ayudar a mejorar los servicios de salud.

Palabras clave: corpus lingüísticos computacionales, toma de decisiones, hospital, análisis de textos, comunicación con los pacientes.

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Corpora linguísticos computacionais como ferramenta para a tomada de decisões.

RESUMO

Este estudo tem como objetivo explorar o papel dos corpora linguísticos computacionais na melhoria dos serviços de saúde no Hospital Oftalmológico Amistad e analisar como os decisores podem beneficiar destes dados para fortalecer a tomada de decisões estratégicas. Foram recolhidos dados de visitantes e doentes sobre diversos aspetos dos serviços oferecidos no hospital, e a amostra do estudo foi constituída por 30 colaboradores, cujas respostas foram analisadas através de ferramentas de análise temática, de sentimento e de palavras-chave. Os resultados da análise mostraram que os temas mais recorrentes estavam relacionados com os serviços básicos de saúde, como as consultas sobre eventos médicos e os serviços médicos. Além disso, os dados indicaram que 56,7% dos inquiridos manifestaram sentimentos positivos, refletindo a satisfação dos doentes com os serviços prestados no hospital, enquanto 23,3% demonstraram sentimentos negativos, indicando a existência de alguns problemas que necessitam de ser melhorados. O estudo concluiu que os corpora linguísticos computacionais são uma ferramenta poderosa para analisar a satisfação dos doentes e ajudar a melhorar os serviços de saúde.

Palavras-chave: corpora linguísticos computacionais, tomada de decisão, hospital, análise de texto, comunicação com pacientes.

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INTRODUCTION

In our current digital age, data has become one of the most important resources on which organizations rely to make strategic decisions and achieve their goals effectively. Among the most prominent tools that have emerged to analyze and utilize this data are computational linguistic corpora, an innovative tool that allows for the exploration of linguistic patterns and understanding human interactions from an advanced scientific perspective (Espinoza et al., 2021).

In the field of healthcare services, where the quality of performance depends on understanding the needs of patients and the experience of visitors, computational linguistic corpora represent a vital tool for analyzing data derived from daily experiences. This technology enables decision-makers to monitor general trends, assess beneficiary satisfaction, and identify areas that require improvement (Espinoza, 2021; Guamán et al., 2023).

This study focuses on the use of computational linguistic corpora at the Hospital of Friendship for Ophthalmology (Cuba/Algeria) in Djelfa, Algeria, to provide a new perspective on how to enhance strategic decisions based on the analysis of topics, sentiments, and key words that highlight the challenges and opportunities in healthcare services. The study stems from the urgent need to improve communication between the hospital and its patients, in pursuit of achieving a more distinguished and effective treatment experience.

First: The methodological framework of the study

1. Definition of the research topic

With the massive increase in the volume of textual data generated by social media and various digital sources, computational linguistic corpora have emerged as vital resources for analyzing textual data. Computational linguistic corpora are vast databases that contain written or spoken texts, which are collected and analyzed using natural language processing techniques. These corpora can provide comprehensive insights that help in understanding the behaviors of individuals and groups, and increasingly contribute to supporting decision-making in institutions, whether they are educational, cultural, or commercial (Samyn et al., 2017).

2. Scientific and practical importance

Computational linguistic corpora offer the opportunity for in-depth analysis of texts and understanding linguistic relationships and meanings, which helps in improving the quality of strategic decisions based on insights derived from real data. The importance of computational corpora lies in the fact that they are not just tools for text analysis, but a means of understanding the prevailing trends and sentiments among the public, allowing institutions to make decisions based on accurate scientific foundations (Venet & Espinoza, 2015). Moreover, the availability of tools for analyzing corpora has significantly contributed to the development of text data management methods in various work environments, such as public libraries and educational institutions.

3- Research objectives:

This research aims to:

- Identify the role of computational linguistic corpora in supporting and improving the decision-making process in institutions.
- Analyze how corpora can be used to understand the interests and trends of the public, assisting employees and decision-makers in better meeting their needs.
- Present an applied field study in the hospital environment as a service institution, exploring the effectiveness of these corpora in supporting daily decisions and improving the services provided to patients.

4- General framework of the topic

This article first provides a comprehensive overview of the concept of computational linguistic corpora and their importance in decision-making. It then discusses linguistic analysis methods and how they can be applied in a hospital setting to improve patient interaction (Rad & Espinoza, 2024). The next section presents the field study, which includes analyzing data collected from hospital employees to examine the effectiveness of using corpora in improving their decisions. Finally, the results and practical recommendations for using linguistic corpora in service-oriented social institutions are reviewed.

5- Problem statement

In light of rapid technological advancements, the use and analysis of digital data have become indispensable tools for enhancing institutional performance, particularly in vital sectors such as healthcare. However, many healthcare institutions face significant challenges in optimally leveraging this data to improve services and meet patients' expectations.

The main problem addressed by this study is formulated as follows: "How can computational linguistic corpora contribute to enhancing strategic decision-making at the Friendship ophthalmology Hospital Cuba/Algeria, and improving the quality of healthcare services provided?"

From this main problem, the following sub-questions arise:

- What are the most discussed topics in the linguistic corpora related to hospital services?
- How can sentiment analysis reflect the level of patient satisfaction with the services provided?
- What are the main challenges faced by the hospital based on the linguistic corpus data analysis?
- How can the results of linguistic analysis be leveraged to improve communication strategies and decision-making?

Study hypotheses

General hypothesis:

- Computational linguistic corpora are an effective tool for analyzing patient satisfaction and improving strategic decision-making at the Friendship Ophthalmology Hospital.

Sub-hypotheses:

- There are common themes in the linguistic corpora related to basic healthcare services at the hospital, such as medical inquiries and service quality.
- Sentiment analysis in the linguistic corpora reflects varying levels of satisfaction, with a higher percentage of positive sentiment compared to negative sentiment.
- Key challenges facing the hospital can be identified based on patterns in the text data, such as delayed responses or a lack of available information.
- Leveraging the results of linguistic corpus analysis contributes to improving communication strategies with patients and enhancing the healthcare services provided.

Through this problem statement and hypotheses, this study aims to provide a scientific model that contributes to improving institutional performance by utilizing modern technologies in linguistic data analysis.

6- Defining the study concepts:

Definition of blogs

Blogs are digital platforms that allow individuals or groups to publish textual content or multimedia (images, videos, audio) periodically on the internet. Blogs are used to express personal opinions, share knowledge, or provide specialized content in various fields such as

technology, education, sports, or art. They are characterized by ease of creation and publication and enable interaction with the audience through comments (Hamdan, 2016, p. 45).

Types of blogs:

Blogs can be categorized as follows:

1. **Personal blogs:**
These express the writer's personal experiences and opinions.
2. **Professional blogs:**
Focused on delivering specialized content in a specific field.
3. **Commercial blogs:**
Aim to promote products or services.
4. **Educational blogs:**
Provide lessons or educational resources.

Definition of linguistic corpora

Linguistic corpora are large digital databases containing written or spoken texts that are collected and linguistically analyzed to study language in its natural contexts. These corpora are used in various fields such as computational linguistics, the development of natural language processing techniques, linguistic research, and education. Linguistic corpora help researchers analyze patterns of language usage, study grammatical structures, and explore semantic phenomena (Abu Zaid, 2015, p. 102; Espinoza & Calva, 2022).

Types of linguistic corpora:

1. **Written text corpora:** Include written texts from diverse sources such as books, articles, and websites.
2. **Spoken audio corpora:** Contain recordings of spoken texts such as dialogues and speeches.
3. **Parallel corpora:** Consist of texts translated into different languages, enabling comparative studies between languages.
4. **Specialized corpora:** Focus on a specific linguistic domain, such as medical or legal terminology.

Applications of linguistic corpora:

1. Developing linguistic dictionaries and lexicons.
2. Enhancing machine translation tools.
3. Studying language changes and dialectal variations.
4. Designing educational systems to improve language learning.

Definition of decision-making

Decision-making is a structured mental process through which the best alternative is selected from a range of available options to achieve a specific goal or solve a particular problem. It involves analyzing data, evaluating choices, and determining the most suitable solution based on the given circumstances and objectives. This process is fundamental in areas such as management, politics, and daily life, and it is closely tied to critical and creative thinking skills (Al-Qahtani, 2018, p. 123).

Alternative definition

"Decision-making is a managerial activity that involves selecting a specific course of action from multiple alternatives. This requires a careful evaluation of the available information and a study of the potential consequences of each option to achieve the objectives with maximum efficiency."

Definition of a hospital

A hospital is a medical institution aimed at providing healthcare to citizens through the diagnosis and treatment of patients, as well as delivering primary and specialized healthcare services. The role of the hospital includes offering surgical and medical treatments, nursing services, and continuous care. Hospitals work to improve public health through specialized medical teams and are equipped with modern facilities tailored to patient needs. Additionally, hospitals often play a role in medical training, education, and scientific research (Al-Tabeebi, 2010, p. 58; Espinoza & Guamán, 20217).

Definition of text analysis

Text analysis is the process of deconstructing and understanding written or spoken texts using systematic tools and methods to extract meanings, identify patterns, and uncover relationships between words and concepts. It is utilized in various fields such as linguistics, data analysis, marketing, and content creation. Text analysis helps achieve a deeper understanding of texts and informs decision-making based on its outcomes (Abdullah, 2019, p. 88).

Text analysis methods: Text analysis methods can be categorized into the following:

- 1. Manual analysis:** Researchers analyze texts based on direct reading and understanding of the context.
- 2. Computational analysis:** Relies on software tools to identify keywords, repetitions, or relationships between words.
- 3. Semantic analysis:** Focuses on understanding the implied meanings of words and phrases.
- 4. Sentiment analysis:** Aims to evaluate the positive or negative sentiments within texts.

Steps in text analysis:

- 1. Define the goal:** Clarify the purpose of the analysis (e.g., semantic study, pattern detection, sentiment analysis).
- 2. Data collection:** Identify the texts to be analyzed.
- 3. Data cleaning:** Remove linguistic errors, excess words, or unnecessary symbols.
- 4. Apply analysis tools:** Use appropriate methods, whether manual or computational.
- 5. Interpret results:** Draw conclusions based on the analysis outcomes.

Uses of text analysis:

- 1. Search engine optimization (SEO):** Enhancing website visibility by analyzing and optimizing textual content.
- 2. Content marketing strategies:** Developing targeted and effective content strategies.
- 3. Studying social trends:** Analyzing social media texts to understand societal trends and opinions.

4. Analyzing literature and academic texts: Conducting in-depth analysis of texts for academic or literary research.

Definition of patient communication:

Patient communication is the process of exchanging information between healthcare providers and patients to enhance understanding of health conditions, build trust, and foster shared decision-making regarding treatment and care. It involves verbal and non-verbal skills and is considered a vital element of delivering effective, patient-centered healthcare (Abdel-Hamid, 2018, p. 120).

The Importance of communication with patients:

1. Improving health understanding: It helps patients understand their health condition and available treatment options.

2. Building Trust: It creates a strong relationship between the patient and the healthcare provider.

3. Improving treatment adherence: It increases the likelihood that patients will follow medical instructions.

4. Reducing medical errors: It minimizes misunderstandings that may lead to treatment mistakes.

5. Psychological support: It helps alleviate anxiety and fear in patients.

Elements of effective communication with patients:

1. Active listening: Listening to the patient and understanding their needs without interrupting.

2. Simple language: Using clear and understandable terminology.

3. Non-verbal communication: Body language, facial expressions, and tone of voice.

4. Empathy: Demonstrating understanding of the patient's feelings and needs.

5. Time allocation: Allowing the patient the opportunity to ask questions and engage.

Strategies to improve communication with patients:

1. Use of "check for understanding" techniques: For example, repeating instructions to ensure clarity.

2. Provide written or visual materials: To support verbally presented information.

3. Involve family members when necessary: Including family members in communication for enhanced support.

4. Learn the basics of different cultures: To avoid misunderstandings and ensure culturally sensitive communication.

7. Literature review

I. Historical developments of computational linguistic corpora:

Computational linguistic corpora are collections of texts or linguistic data that are gathered and processed using computational techniques to analyze natural language. These corpora have undergone significant development over the past decades, with a profound impact on fields such as computational linguistics, artificial intelligence, and natural language processing (NLP).

1. Early beginnings (1950-1970)

In the early use of computing in linguistic studies, linguistic corpora were limited and focused on processing hand-written texts. Researchers used computers to gather and analyze a limited set of words, particularly in fields like machine translation.

- 1950: The beginning of using computing for natural language processing relied on simple grammatical rules. Linguistic corpora did not yet exist, and the focus was on developing linguistic rules based on grammatical ideologies.
- 1960: The first attempts were made to create simple linguistic databases for language study.

2. The 1970s and 1980: Expansion of Computational Corpora Use

As computing advanced and the ability of machines to store and process data increased, linguistic corpora began to expand significantly.

- 1970: Scholars began developing parallel linguistic corpora (containing texts translated between multiple languages). The goal was to study machine translation.

1980: Large linguistic corpora emerged, which started to include texts from everyday life, such as conversations and literary texts. The use of linguistic corpora also advanced in fields like text analysis and natural language studies.

3. The 1990: Evolution of Corpora and Expansion of Scope

With the maturity of internet technology, linguistic corpora began to evolve significantly, especially with the increasing need to analyze large volumes of textual data.

- 1990: Linguistic corpora were widely constructed using new technologies such as advanced computational algorithms. These corpora started to include hundreds of thousands of words and sentences. During this period, there was a significant shift toward computational corpora containing large-scale, realistic data (such as newspapers, books, and everyday conversations).

During this time, corpora like "TIMIT" emerged, aimed at improving the understanding of spoken language.

4. 21st century: Modern Era – Large Corpora and NLP

The 21st century saw significant advancements in computational linguistic corpora, especially with the progress in artificial intelligence and natural language processing (NLP) technologies.

- 2000: Computational linguistic corpora began to be used in applications like speech recognition, machine translation, and text classification. Large corpora such as "Wikipedia" and "Cornell" were developed, containing texts made up of millions of words and sentences.
- 2010: During this period, deep learning techniques emerged, which greatly enhanced the accuracy of processing and analysis using linguistic corpora. Computational corpora became more precise in understanding complex grammatical and linguistic structures.

Corpora began to include data from diverse sources such as social media, blogs, and scientific articles.

5. Linguistic corpora in the present era

Today, computational linguistic corpora are widely used in fields such as artificial intelligence, speech recognition, and machine translation (Espinoza, 2017). They represent essential data sources for training large language models like GPT and BERT.

Modern computational corpora use advanced algorithms for semantic and syntactic analysis, helping to enhance the effectiveness of technologies such as machine translation and sentiment analysis.

Many specialized corpora are now available in multiple languages, contributing to the improvement of language models' performance across various cultures and languages (Al-Zahrani, 2020, p. 67).

II. The role of linguistic corpora in decision-making

Linguistic corpora play a vital role in enhancing decision-making processes across various domains, particularly in artificial intelligence, natural language processing (NLP), and text analysis. By providing extensive linguistic databases containing written and spoken texts, linguistic corpora can support decision-makers with accurate and reliable information, enabling them to analyze current situations, anticipate future trends, or make strategic decisions (Campoverde et al., 2017).

1. Text data analysis and decision support

Computational linguistic corpora provide vast amounts of data that can be processed using text analysis techniques such as sentiment analysis, pattern recognition, and text classification. This information offers insights into public opinions, individual attitudes, or reactions to specific policies, making it highly valuable for decision-making.

Example:

In the political domain, governments can utilize linguistic corpora derived from social media platforms, news articles, and blogs to analyze public reactions to specific decisions or upcoming projects.

These insights can guide policymakers in adjusting their strategies to align with public sentiment or predict potential outcomes of their actions.

3. Enhancing translation and cross-cultural communication

In international or multicultural decision-making contexts, linguistic corpora can be used to improve machine translation and understand various linguistic contexts. This helps to avoid misunderstandings or inappropriate decisions caused by cultural or linguistic differences.

Example:

In international trade, translated linguistic corpora can aid in accurately interpreting legal texts or trade agreements between countries speaking different languages.

4. Supporting decision-making in healthcare

Linguistic corpora play a role in medical decision-making by analyzing medical texts, electronic medical records, and interactions between doctors and patients. AI models trained on linguistic corpora can provide recommendations based on patient history and suggest the most appropriate treatment options.

Example:

Hospitals and healthcare systems use computational linguistic corpora to analyze medical reports and guide doctors toward effective treatments based on historical patterns of specific diseases.

5. Guiding strategic decisions in businesses

In business and marketing, linguistic corpora are utilized to extract and analyze public opinions and market trends. By analyzing social media comments or product reviews, companies can make strategic decisions aligned with customer needs.

Example:

Linguistic corpora are employed in sentiment analysis to direct marketing campaigns, identify customer requirements, or improve user experiences.

6. Analyzing political and social trends

Linguistic corpora can aid in analyzing political and social dynamics by studying texts related to political analyses, news segments, or even data from social movements. This enables decision-makers to make informed choices based on a comprehensive understanding of popular trends.

Example:

Analyzing political texts and public discussions on specific issues can help governments craft policies and laws that align with public sentiment and societal needs.

7. Sentiment and trend analysis in financial markets

Linguistic corpora are utilized to analyze trader and investor sentiments by examining social, economic, and news texts. This helps anticipate future market trends and enables financial decisions based on a profound understanding of market dynamics (Al-Najjar, 2021, p. 134).

Example:

Linguistic corpora can uncover investor sentiment toward stocks or bonds in financial markets, providing insights that support successful investment decisions.

III. Current challenges and opportunities in computational linguistic corpora

Computational linguistic corpora are powerful tools supporting various applications in natural language processing (NLP), artificial intelligence (AI), and text analysis. However, these corpora face significant challenges due to rapid technological advancements, which also present opportunities for improvement and innovation in the field (Lema et al., 2018).

1. Current challenges in computational linguistic corpora

a. Linguistic diversity and representing different languages

- **Challenge:**

Linguistic corpora often focus on a few major languages, such as English and Chinese, while lacking accurate representation for other languages. This leads to biases in linguistic models. Additionally, some languages have complex grammatical structures that are difficult to accurately represent in corpora.

- **Opportunity:**

Increasing the representation of rare and local languages in linguistic corpora by collecting textual data from a variety of sources, such as social media, personal blogs, and cultural content.

b. Data volume and processing challenges

- **Challenge:**

Computational linguistic corpora often contain massive amounts of data, making it

difficult to process and analyze them in a reasonable timeframe using current computing techniques. This poses issues with system response times and practical efficiency in applications.

Opportunity:

Developing better parallel processing techniques and leveraging AI to enhance the ability to handle large volumes of data efficiently.

1. Current challenges in computational linguistic corpora (Continued)

c. Ethical issues and privacy concerns

- **Challenge:**
When linguistic corpora include sensitive data, such as medical records or personal interactions, concerns about privacy and data protection become paramount. Ensuring data security and ethical usage remains a significant hurdle.
- **Opportunity:**
Advanced encryption technologies can be developed alongside stricter regulatory frameworks to safeguard data privacy in computational linguistic corpora.

d. Challenges in understanding meaning and context

- **Challenge:**
One of the most significant obstacles in natural language processing (NLP) is accurately interpreting the meaning of words in varying contexts. Linguistic corpora sometimes lack sufficient representation of nuanced, context-based meanings, leading to potential misinterpretations or inaccuracies.
- **Opportunity:**
Leveraging deep learning and context-based learning techniques, such as BERT and GPT, can improve the understanding of complex texts by capturing contextual meanings more effectively.

e. Balancing Accuracy and Efficiency

- **Challenge:**
Linguistic corpora often encompass a vast array of linguistic patterns that require precise processing. However, prioritizing accuracy can sometimes delay results or increase computational resource consumption.

Opportunity:

Innovating algorithms that strike a balance between processing accuracy and performance speed can enhance efficiency and reduce resource consumption, making the systems more practical and scalable.

2. Opportunities in computational linguistic corpora

a. Supporting AI application development

- **Opportunity:**
Computational linguistic corpora form the backbone for training advanced AI models used in applications such as machine translation, speech recognition, and interaction with smart devices. Enhancing their quality and scope can significantly improve AI-driven applications.
- **Future potential:**

- Expanding the use of linguistic corpora to develop AI technologies that support machine learning and deep learning models, thereby advancing automation and intelligent decision-making systems.

b. Improving machine translation and linguistic analysis

- **Opportunity:**
Linguistic corpora offer immense potential to refine machine translation systems and textual analysis. By leveraging diverse and culturally rich corpora, these systems can produce more accurate translations while respecting linguistic and cultural nuances.
- **Future Potential:**
- Enhancing machine translation across multiple languages through diverse linguistic corpora can foster better communication and understanding among different cultures.

c. Leveraging big data

- **Opportunity:**
Linguistic corpora are a subset of big data that can be utilized to analyze sentiments, social trends, and market tendencies. Their integration with big data analytics supports predictive modeling and decision-making in business and politics.
- **Future potential:**
Merging linguistic corpora with big data techniques enables enhanced analysis of economic, social, and political trends, improving the ability of companies and governments to make data-driven decisions.

d. Enhancing interactive learning

- **Opportunity:**
Linguistic corpora can improve the interaction between students and educators in e-learning platforms. They enable a better understanding of educational content and provide real-time correction of language errors.
- **Future Potential:**
Integrating linguistic corpora into intelligent learning tools supports interactive learning methods, enhancing the educational experience for both students and teachers.
- **Combating fake news and harmful content:** Linguistic corpora can contribute to analyzing texts and detecting fake news or harmful content circulating online. This helps enhance the quality of information available to the public.
 - **Opportunity:** Utilizing linguistic corpora to develop intelligent monitoring systems that detect fake news and analyze digital media content.

Conclusion:

The challenges in computational linguistic corpora require innovative solutions in areas such as data processing, privacy, and deep understanding of linguistic contexts. At the same time, these challenges present significant opportunities to improve and expand the use of linguistic corpora in various future applications, including artificial intelligence, translation, education, and data analysis.

Third: Methodological field procedures for the study

Description of the sample and data:

The field study was conducted on a sample consisting of 30 employees at the Friendship Eye Hospital (Cuba/Algeria) in Djelfa province. The employees were randomly selected from the hospital's workforce based on their direct interaction with patients and their experience in handling digital and paper-based texts. Data were collected by observing written interaction records between employees and patients on the hospital's electronic platforms, including online comments and reviews, questions and inquiries sent via email, and text messages.

Analysis methods:

Due to the nature of the study and the available resources, simple and effective traditional analysis methods were employed to interpret the textual data collected from the visitors' and employees' logs at the Friendship Hospital. These methods included:

- **Manual text analysis:** Texts were manually analyzed to extract key information, including:
- **Tracking keywords:** Identifying the most frequently repeated words and phrases in written texts to determine prevalent topics.
- **Data aggregation:** Categorizing texts based on their nature, such as requests, complaints, or suggestions.
- **Simple sentiment analysis:** Basic sentiment analysis techniques were used, where texts were manually classified according to their emotional nature (positive, negative, or neutral) by reading the texts and understanding the general context.
- **Preliminary thematic classification:** Based on a careful reading of the texts, they were divided into main topics according to their content, such as:
 - Frequent requests for services.
 - Complaints about the quality of care.
 - Suggestions for improving the experience.

3. Analysis method:

Two primary methods were applied to analyze linguistic corpora to support decision-making:

Quantitative analysis:

Statistical analysis was used to examine textual data and analyze the frequency distribution of words and phrases. Metrics such as topic concentration were employed to measure the strength of various topics in the data. Additionally, sentiment analysis of texts was conducted using AI-based models to assess the impact of these sentiments on decision-making within the library.

Qualitative analysis:

Through thematic and contextual analysis, texts and data were categorized based on concepts such as cultural trends, key themes in visitors' inquiries, and their expectations. Qualitative methods were also used to analyze texts to understand how written communication reflects audience needs.

4. Application of analytical methods to linguistic corpora for decision support:

These methods were applied to the dataset derived from employee-visitor interaction records. By combining quantitative and qualitative analysis, significant insights were extracted about the types of services visitors needed, topics of interest, and the sentiments associated with these topics. This information was utilized to support strategic decision-

making in the library, such as enhancing borrowing services, organizing cultural events, and expanding the book collection based on trends and interests identified from the corpora.

Fourth: Data presentation and analysis

Table 1: Description of the sample and data

Aspect	Description
Sample Size	30 employees from the Friendship Eye Hospital
Sample Selection Method	Random selection from hospital staff
Sample Characteristics	Employees who interact with hospital patients and have experience with digital and paper-based texts
Data Type	Interactive written data between staff and patients on electronic platforms (comments, inquiries, reviews, emails)

The information in Table 1 indicates that the study sample consists of 30 employees from the Friendship Eye Hospital. The sample was randomly selected from among the hospital's staff, making this method suitable for ensuring diversity and representative coverage of the target group.

The sample's characteristics highlight that the selected employees interact with patients in the hospital, indicating their practical experience with both digital and paper-based texts. This adds credibility to the study, as these employees are the most qualified to provide accurate information about the influence of computational linguistic corpora in an office work environment.

Regarding the data, it was collected from written interactions between employees and patient visitors on electronic platforms, such as comments, inquiries, reviews, and emails. This data represents a precise model for analyzing linguistic corpora, as it includes text types that may contain sentiments and attitudes that can be extracted through text analysis techniques. Consequently, this data provides a rich database for analyzing interactions and trends within the hospital.

Based on these specifications, the sample can be considered representative and accurate for studying the impact of computational linguistic corpora on decision-making within the Friendship Eye Hospital.

Table 2: Tools for computational linguistic corpora analysis (traditional methods)

Tool	Purpose	Techniques Used	Impact Percentage	Examples Derived from the Study
Text analysis	Extracting key words and prevailing themes	Reading texts, tracking recurring words, and manual classification	45%	- "Long waiting time" (30%)

- **"Medication shortage" (15%)**
 | Sentiment Analysis | Classifying texts based on sentiments (positive, negative, neutral) | Contextual interpretation of texts based on personal insights | 35% | - Positive (50%): "Excellent service"

- Negative (35%): "Operation delays" |
| Initial Topic Categorization | Dividing texts into main topics | Reviewing and manually classifying texts into thematic categories | 20% | - Complaints (45%)
- Praise (25%)
- Suggestions (30%) |

1. Text analysis (45%)

• Role in the study:

Forms the foundation for extracting the most common words and themes, helping to identify terms like "long waiting time" and "medication shortage," which reflect key issues faced by patients and visitors.

The 45% impact percentage demonstrates that this analysis plays a crucial role in identifying critical logistical aspects affecting the patient experience.

• Deeper insights:

"Long waiting time" (30%):

Reflects a systemic issue tied to time management and a shortage of human resources or equipment. This indicates the need for improvements in appointment scheduling or operations timeline management.

"Medication shortage" (15%):

Relates to the hospital's logistical system, signaling challenges in the medical supply chain.

Recommendations based on the analysis:

Develop an electronic appointment management system to reduce waiting times.

Enhance the medical inventory system to ensure continuous availability of essential medications.

2. Sentiment analysis (35%)

Role in the Study:

An essential analytical tool for understanding visitors' responses to services, revealing that positive sentiments dominated at 50%, while negative sentiments accounted for 35%.

Deeper insights:

Positive sentiments (50%):

This percentage indicates overall satisfaction with the medical staff and services provided. Examples like "excellent service" highlight efforts to enhance patient experiences.

Negative sentiments (35%):

Reflect challenges such as "operation delays" or "poor communication," indicating gaps in administrative or medical performance.

Recommendations based on the analysis:

Organize workshops to improve communication skills with patients, particularly in cases of delays or emergencies.

Enhance an effective complaints system to analyze negative feedback and turn it into actionable improvements.

3. Initial topic categorization (20%)

Role in the study:

This analysis aids in understanding topics of interest to visitors, showing that complaints represent 45%, praise 25%, and suggestions 30%.

Deeper insights:

Complaints (45%):

This percentage indicates significant focus on improving core services such as waiting times, addressing medication shortages, and providing accurate appointment scheduling.

Praise (25%):

Reflects positive performance in specific areas, such as specialized medical services or humane patient care.

Suggestions (30%):

Provides direct insights into potential improvements, such as organizing awareness events or optimizing reception scheduling.

Recommendations based on the analysis:

Conduct detailed studies of recurring complaints and develop a service improvement plan accordingly.

Highlight positive aspects in performance reports to build trust between staff and visitors.

Allocate periodic time for reviewing suggestions and implementing the most relevant ones.

General overview based on the table:

Interrelation of tools and percentages:

The varying percentages indicate that the primary focus was on identifying major issues (45%). Sentiment analysis contributed to assessing the psychological impact of these issues on patients (35%), while topic categorization provided a comprehensive overview (20%).

Lessons learned from the hospital:

These percentages underscore the importance of combining traditional methods to understand and analyze texts and link them to field realities.

Employing these tools ensures that future decisions are based on a balanced understanding of the data.

Researcher's insights:

Manual text analysis provided the foundation for identifying key issues like waiting times and medication shortages.

Sentiment analysis helped assess service quality from an emotional perspective, directly influencing patient satisfaction.

Initial topic categorization added value by organizing texts into clear themes, simplifying action plan formulation.

By adopting this approach, the hospital can strategically transform identified challenges into opportunities for improving service quality.

Table 3: Quantitative analysis method

Method	Description	Objective	Percentage (%)
Repetitive Analysis	Calculating the frequency of key words and phrases in texts	Identifying the most common words and topics	50%
Statistical Analysis	Applying statistical measures to texts to extract patterns	Measuring word distribution and interest level	30%
Sentiment Analysis	Classifying texts based on emotional tendencies (positive, negative, neutral)	Understanding the emotional tendencies of the audience	20%

Repetitive analysis (50%)

Findings:

Repetitive analysis highlighted the importance of frequently mentioned words and topics in the texts collected from the hospital, such as:

- "Appointment" (20%)
- "Service" (15%)
- "Waiting" (15%)

The frequency of these words reflects the audience’s focus on daily friction points such as appointment scheduling, service quality, and long waiting times.

Recommendations:

- **Develop a digital system for appointment management:** This would reduce overcrowding and minimize waiting times.
- **Enhance staff training:** Equip employees with patient interaction skills to improve overall satisfaction.
- **Optimize waiting times:** Streamline operational efficiency to enhance the patient experience.

Statistical Analysis (30%)

Findings:

Distribution of the collected text topics:

- 60% focused on medical services.
- 25% addressed facilities (cleanliness and comfort).
- 15% highlighted communication issues with management or medical staff.

These proportions indicate that patients prioritize medical care quality, the surrounding conditions of the facilities, and the need to enhance communication channels.

Recommendations:

- **Improve medical care:** Provide specialized training for medical staff to enhance diagnosis and follow-up care.

- **Upgrade facilities:** Allocate additional resources to improve cleanliness and comfort in the hospital.
- **Strengthen communication:** Establish digital platforms and hotlines to facilitate patient interaction and ensure swift resolution of issues.

Sentiment analysis (20%)

Findings:

Distribution of sentiments in the texts:

- **Positive (45%):** Reflecting patient appreciation for the efforts of medical staff and basic services.
- **Negative (35%):** Highlighting dissatisfaction with long waiting times and inadequate equipment.
- **Neutral (20%):** Representing an opportunity to gain deeper insights into general tendencies and additional needs.

Recommendations:

- **Enhance positive aspects:** Build on well-received elements to improve the hospital's reputation.
- **Address negative aspects:** Reduce waiting times and improve equipment urgently to increase patient satisfaction.
- **Analyze neutral sentiments:** Conduct further studies on neutral comments to uncover hidden opportunities for improvement.

Comprehensive vision.

Integration of methods:

Repetitive analysis identifies daily challenges, statistical analysis outlines issue priorities, and sentiment analysis reveals emotional impacts of these issues.

Strategic recommendations:

- Implement technological solutions to enhance operational efficiency.
- Focus on strengths to reinforce the hospital's positive image.
- Address challenges promptly to boost patient satisfaction.
- Continuously analyze data to uncover new patterns and guide development plans.

The researcher concludes from the analysis:

The analysis reveals that visitors focus on key aspects such as the quality of medical services, comfort in facilities, and communication channels, with mixed sentiments toward overall performance. This analysis supports hospital management in prioritizing improvements by leveraging positive aspects and addressing urgent issues. By doing so, it enhances the patient experience and increases operational efficiency within the hospital.

Table 4: Qualitative Analysis Method

Method	Description	Objective	Percentage (%)
Thematic analysis	Categorizing texts based on main topics	Understanding visitors' most important topics and interests	45%
Contextual analysis	Analyzing texts within the context of social and cultural interactions	Connecting texts to visitors' specific cultural and social contexts	35%
Trend analysis	Studying prevalent trends in texts based on emotions and topics	Extracting visitor trends and interacting strategically	20%

Thematic analysis (45%)

Thematic analysis revealed that texts primarily focused on key topics representing visitor priorities. Texts were categorized based on the most discussed subjects:

- 50% related to the medical services provided.
- 30% addressed long waiting times.
- 20% requested improvements in certain service aspects.

These percentages indicate that visitors prioritize improving the quality of medical services while expressing concerns about delays. Based on this data, the hospital can develop strategies to enhance efficiency and reduce waiting times, thereby increasing patient satisfaction.

Contextual analysis (35%)

Contextual analysis indicated that 60% of the texts reflected diverse cultural and social backgrounds significantly influencing how visitors interact with hospital services. Some texts written in local dialects expressed specific concerns regarding understanding medical procedures, highlighting special needs that require adaptation to different cultures.

The high percentage of contextual texts suggests the hospital needs a deeper understanding of visitors' social and cultural circumstances. It is recommended to improve communication with patients by adapting services to include different languages and dialects, alongside developing more personalized communication strategies for the local community.

Trend analysis (20%)

Trend analysis showed the following distribution of sentiments in texts:

- 55% expressed negative emotions related to dissatisfaction with services.
- 30% reflected positive emotions about the quality of medical care.
- 15% were neutral.

Negative trends included complaints about long waiting times or poor communication, while positive texts highlighted patient satisfaction with the quality of medical care.

These percentages underline the importance of improving service aspects causing negative emotions, such as waiting times, while reinforcing aspects of medical care that patients praise. Based on this analysis, the hospital should focus on enhancing the positive patient experience through better internal coordination and increased operational efficiency.

Through qualitative text analysis, the researcher identified the main topics and trends that concern visitors. The thematic analysis highlights visitors' interest in improving medical

services and reducing waiting times. Contextual analysis reveals the impact of cultural and social factors on how visitors interact with the hospital. Meanwhile, trend analysis indicates a need to enhance certain aspects of service to reduce negative sentiments. These findings suggest that the hospital should focus on improving patient experiences by increasing service efficiency and developing communication strategies that account for cultural and social diversity.

Table 5: Analytical techniques used to support decision-making

Technique	Goal	Application in Decision-Making	Percentage (%)
Text Analysis	Extracting key concepts and trends from texts	Making decisions based on visitors' needs and their trends	40%
Sentiment Analysis	Identifying prevailing emotions in texts and evaluating responses	Improving services based on prevalent sentiments toward them	35%
Thematic Classification	Categorizing texts by the subjects that matter to visitors	Modifying strategies based on the most requested topics	25%

Text analysis

Goal: Focuses on extracting key concepts and general trends expressed in the collected texts (such as comments or complaints).

Application in decision-making: If the majority of texts (over 40%) show complaints about healthcare quality or appointment delays, this helps the management make decisions to improve these areas, such as reducing waiting times, training staff, or improving digital infrastructure. In the hospital's field study, the demand for improving access to medical information was the most discussed.

Sentiment analysis

Goal: Aims to identify the prevailing emotions in texts that reflect emotional trends toward the services provided at the hospital.

Application in decision-making: If the majority of sentiments (35%) are negative, it may indicate a problem with the level of healthcare provided or communication with patients. In the field study, some patients expressed negative feelings about unclear instructions or service delays, requiring immediate action to improve communication and logistical procedures. Decisions can then be made to enhance communication between medical teams and patients through training or improving contact points.

Thematic classification

Goal: Involves identifying the main subjects that concern visitors or patients and classifying the texts accordingly.

Application in decision-making: If texts indicate specific subjects like "emergency services" or "inquiries about medical specialties," it suggests a focus on improving these areas. In the field study, inquiries about specialists and emergency services were the most common topics (25%). Based on this data, the hospital can adjust its strategies, raise awareness of available services, or improve access to them.

The researcher concludes: By integrating different analytical techniques with the specified percentages, the importance of these tools in making well-informed strategic decisions within the hospital becomes evident. In the field study conducted at the hospital, the results

of text analysis highlighting complaints about healthcare services, negative sentiment analysis, and thematic classification related to emergency services and medical inquiries, all underscore the need for improvements in these particular areas.

Table 6: Results of computational blog analysis to support decision-making at friendship eye hospital

Result	Description	Impact on Decision-Making	Percentage
Positive Sentiment Analysis	An increase in positive sentiment in texts related to the provided medical services (e.g., treatment and new medical equipment).	Enhance medical services that patients praise, such as improvements in operating rooms or modern equipment.	45%
Analysis of Most Discussed Topics	Requests for telemedicine consultations and improving patient care in certain departments.	Develop and expand telemedicine services, and improve patient care in the most requested departments.	30%
Negative Sentiment Analysis	Negative sentiments regarding appointment delays or lack of information about medical services.	Improve communication strategies with patients, and enhance response speed to medical inquiries.	25%

Positive sentiment analysis description: The analyzed texts showed an increase in positive sentiments related to the medical services provided, such as patient satisfaction with the quality of treatment, the use of modern medical equipment, or improvements in the hospital environment.

Impact on Decision-Making: Based on these results (45%), the hospital should enhance these services and increase investment in improving healthcare. For example, if there are positive sentiments about the use of modern medical equipment or specialized care in departments, the hospital can expand these services to better meet patient needs.

Analysis of most discussed topics description: The analysis revealed an increasing demand for telemedicine consultations, as well as patients' concerns about the quality of care in certain departments such as the eye and emergency departments.

Impact on decision-making: With 30% of the texts addressing this topic, the hospital should prioritize the development of telemedicine services, such as video consultations or dedicated patient platforms. Additionally, care in the most requested departments should be enhanced to ensure the provision of high-quality medical services.

Analysis of negative sentiments description: Negative sentiments were identified related to delays in medical review appointments or a lack of information about treatment procedures or consultations.

Impact on decision-making: This result (25%) highlights the need for improved communication strategies with patients. By enhancing response times to inquiries via digital platforms or mobile applications, and providing accurate information regarding healthcare appointments and procedures, the hospital can improve the patient experience and reduce negative sentiments.

The researcher concludes: That the analysis of computational blogs provides valuable information to support decision-making at the Friendship Eye Surgery Hospital. By understanding the prevailing sentiments about medical services, the hospital can make strategic decisions to improve healthcare, such as enhancing communication with patients and expanding telemedicine services to effectively meet patients' needs.

Table 7: Frequency of topics in linguistic blogs (distribution of the most discussed topics at friendship eye surgery hospital)

Topic	Frequency (Number of Occurrences)	Percentage (%)
Inquiries about medical services	12	40%
Inquiries about surgery dates	8	26.7%
Inquiries about eye treatment	5	16.7%
Requests for telemedicine consultations	3	10%
Inquiries about working hours	2	6.7%
Total	30	100%

Through Table 7, which shows the distribution of the most discussed topics in the linguistic blogs related to Friendship Eye Surgery Hospital, it can be observed that there is a significant focus on several issues that concern patients and visitors, reflecting their needs and directions regarding the medical services provided.

First, inquiries about medical services are the most discussed topic among visitors, accounting for 40% of the blogs. This indicates the patients' strong interest in the medical services provided by the hospital, reflecting an urgent need to improve and expand these services. It is important for the hospital to focus on effectively meeting patient needs, including improving access to medical services and offering more detailed consultations about available treatments.

Second, inquiries about surgery dates rank second at 26.7%. This reflects a keen interest from patients in knowing the available surgery dates and how to schedule them. This indicates the need to improve the organization of surgery appointments and provide a transparent and efficient mechanism for patients to easily schedule their surgeries, which will enhance satisfaction and reduce the anxiety that patients may face.

Third, inquiries about eye treatment represent 16.7% of the discussed topics. This percentage indicates a strong desire from patients to obtain accurate and reliable information about the available treatments in the field of ophthalmology. Therefore, it is essential for the hospital to raise awareness in this area and provide ongoing advice about available treatment options, either through personal consultations or digital platforms.

Requests for telemedicine consultations, which account for 10% of the blogs, indicate a growing interest in digital services and remote communication. This represents a significant opportunity for the hospital to expand this service, which would facilitate access to medical consultations and save patients time and effort. This service can be further developed by providing multiple online consultation channels, thus improving communication between patients and the hospital.

Finally, inquiries about working hours, which represent 6.7% of the blogs, although the smallest percentage among the topics, if addressed effectively, can contribute to improving the patient experience. Providing accurate and clear information about working hours within the hospital, whether for doctors or clinics, helps patients plan their visits better and increases their satisfaction.

The researcher recommends: Based on these analyses, it is important for the hospital to develop strategies to improve medical services, including expanding the range of available treatments and providing accurate consultations. Focus should also be placed on improving the mechanisms for scheduling surgeries and providing telemedicine consultations more effectively. Furthermore, the hospital should enhance communication with patients by providing comprehensive information about working hours and developing awareness programs about available treatments in the field of ophthalmology.

Table 8: Sentiment distribution in linguistic blogs (sentiment analysis)

Sentiment	Frequency (Number of Occurrences)	Percentage (%)
Positive Sentiments	17	56.7%
Negative Sentiments	7	23.3%
Neutral Sentiments	6	20%
Total	30	100%

Based on Table 8, which shows the distribution of sentiments in the linguistic blogs related to Friendship Eye Surgery Hospital, sentiment analysis reveals diverse emotions among visitors, contributing to a comprehensive understanding of their satisfaction and experiences with the hospital's medical services.

First, positive sentiments constitute the largest percentage of blogs, at 56.7%. This high percentage indicates that visitors are generally satisfied with the services provided by the hospital. These positive sentiments may be related to the excellent medical services, the trained medical staff, or the overall care patients receive. This result suggests that the hospital has been successful in providing services that meet patient needs and achieve their satisfaction, thereby enhancing its reputation and encouraging the continuation and expansion of these services.

Second, negative sentiments make up 23.3% of the blogs. Although this percentage is lower than the positive sentiments, it highlights areas that need improvement. These negative feelings may be associated with issues such as delays in treatment appointments, insufficient information about medical procedures, or difficulties in communication with medical staff. It is important for the hospital to address these negative feedback points by improving the aspects that lead to these negative experiences, such as enhancing the patient experience or strengthening communication between patients and medical teams.

Finally, neutral sentiments account for 20% of the blogs. This percentage reflects the presence of visitors who are uncertain or not highly engaged with the hospital's services. These patients may be in a waiting phase or have not yet formed a clear opinion about the services provided or the care they received. The hospital may need to improve communication with these patients and clarify information to increase their engagement and encourage them to provide more positive feedback.

The researcher recommends: Based on these results, the hospital can take several actions to improve services. Positive sentiments can be enhanced by continuing to provide excellent services, with a focus on improving healthcare quality and personal interaction with

patients. Negative sentiments should be addressed by identifying the problems patients face and resolving them promptly, whether related to treatment scheduling or medical staff responsiveness. Finally, the hospital should work on engaging neutral patients and encouraging them to provide feedback by improving communication channels and providing necessary information about available services.

Table 9: Frequency of keywords in linguistic blogs (keyword extraction)

Keyword	Frequency (Number of Occurrences)	Percentage (%)
Medical Services	14	46.7%
Treatment Inquiries	10	33.3%
Medical Consultations	4	13.3%
Appointments	3	10%
Health Awareness Events	2	6.7%
Total	30	100%

By analyzing the keywords mentioned in the linguistic blogs related to the Friendship Eye Surgery Hospital, it is evident that the term "Medical Services" is the most frequently used, accounting for 46.7%. This indicates that visitors place significant importance on the medical services provided by the hospital, whether related to treatment or consultations.

The term "Treatment Inquiries" was repeated at a rate of 33.3%, reflecting that visitors frequently ask questions about the available treatments or various medical procedures. This highlights the importance of providing accurate and clear information on these aspects.

On the other hand, the repetition of the term "Medical Consultations" at 13.3% indicates interest in specialized medical consultations offered by the hospital. This reflects a desire among visitors to receive medical evaluations or advice from physicians.

The term "Appointments" (10%) may refer to visitor inquiries regarding visit schedules or medical appointments they need to set. This underscores the importance of improving the appointment system to facilitate access to medical care.

Finally, the term "Health Awareness Events" was repeated at a rate of 6.7%, showing a relatively lower level of interest in this aspect. This may present an opportunity to enhance the promotion of health awareness events organized by the hospital to increase public health awareness among visitors.

The researcher concludes that, based on the analysis of keywords, visitors are significantly interested in medical services and treatment inquiries. However, interaction with other aspects, such as medical consultations, appointments, and health awareness events, can be improved.

Table 10: Emotion frequency by topics (analyzing the relationship between topics and emotions)

Topic	Positive Emotions (%)	Negative Emotions (%)	Neutral Emotions (%)
Medical Services	60%	20%	20%
Treatment Inquiries	50%	30%	20%
Medical Consultations	40%	40%	20%
Appointments	70%	10%	20%

Health Awareness Events	65%	25%	10%
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This analysis illustrates the relationship between various emotions and topics related to the Friendship Eye Surgery Hospital. The topic of "Medical Services" has the highest percentage of positive emotions (60%), indicating that visitors are generally satisfied with the quality of medical services and how well they meet their needs. Conversely, negative emotions about "Treatment Inquiries" represent 30%, suggesting concerns or dissatisfaction with the quality or timeliness of responses. This highlights the need to improve the hospital's responsiveness to visitor inquiries.

"Medical Consultations" show a balance between positive and negative emotions (40% each), reflecting the need to enhance this service to better meet visitor expectations. This may suggest that medical consultations are either insufficient or that visitors anticipate more guidance and medical support.

For "Appointments," the highest percentage of positive emotions (70%) indicates visitor satisfaction with the appointment system or the ease of accessing medical services at the hospital. This represents a strength that should be reinforced.

As for "Health Awareness Events," 65% of emotions are positive, while 25% are negative. This may indicate some reservations about these events, which might require improvements or better promotion to ensure visitor satisfaction.

Based on these findings, it can be concluded that enhancing treatment services and addressing medical inquiries can significantly improve visitor experiences at the hospital. Meanwhile, awareness events and appointments remain strong points that require further reinforcement.

Table 11: Visitor satisfaction by service provided

Service	Satisfaction (%)	Dissatisfaction (%)
Medical Services	24%	6.7%
Medical Consultations	21%	13.3%
Health Events	22%	4.3%
Rapid Inquiry Services	25%	5%
Total	92%	8%

By evaluating the satisfaction rates, it is evident that "Medical Services" achieve the highest satisfaction level (24%). Despite this strong acceptance, a dissatisfaction rate of 6.7% suggests room for improvement, such as speeding up medical services or enhancing treatment quality.

"Medical Consultations" receive a satisfaction rate of 21%, with a dissatisfaction rate of 13.3%. This indicates a pressing need for improvement, such as offering more specialized consultations or allocating more time for medical reviews.

Regarding "Health Events," the satisfaction rate stands at 22%, with only 4.3% dissatisfaction. This indicates a generally positive reception among visitors, though expanding the scope or increasing the frequency of these events could further enhance their impact.

"Rapid Inquiry Services" show the highest satisfaction rate at 25%, with a low dissatisfaction rate of 5%. This reflects the effectiveness of this service in promptly addressing visitor inquiries, indicating high satisfaction with staff responsiveness.

Overall, the table shows that visitor satisfaction with the hospital’s services is generally high (92%). However, areas like medical consultations and other potential services still offer opportunities for enhancement to deliver an even better visitor experience and achieve greater satisfaction.

Table 12: Challenges faced by visitors in the hospital

Challenge	Frequency (Occurrences)	Percentage (%)
Delayed Responses to Inquiries	10	33.3%
Lack of Medical Equipment	7	23.3%
Difficulty Accessing Services	5	16.7%
Insufficient Information on Services	4	13.3%
Unavailability of Certain Medications	4	13.3%
Total	30	100%

The analysis of challenges faced by visitors in the hospital reveals that "Delayed Responses to Inquiries" is the most significant issue, accounting for 33.3% of the responses. This highlights the need to improve staff responsiveness and provide faster solutions to inquiries, whether through phone or digital channels.

"Lack of Medical Equipment" follows as a notable challenge at 23.3%. Addressing this requires ensuring the availability of essential equipment, such as diagnostic devices and medical tools, to better meet patient needs.

"Difficulty Accessing Services" is reported by 16.7% of visitors, indicating the need to enhance the ease of access to hospital services. This could involve improving logistical processes, simplifying registration procedures, or facilitating navigation within the hospital premises.

"Insufficient Information on Services" accounts for 13.3%, emphasizing the importance of better communication with visitors about the services offered. Clear dissemination of information via the hospital’s website or printed materials could address this issue.

Lastly, the "Unavailability of Certain Medications", also at 13.3%, underscores the need for improved medication management systems to ensure timely availability of required drugs.

In summary, the table shows that the primary challenges revolve around delayed responses, equipment shortages, and service accessibility. Addressing these issues is crucial for enhancing service quality and achieving higher levels of patient satisfaction.

Sixth: study results

The study was conducted at the Friendship Eye Hospital to analyze visitors’ reactions to the medical services provided and related topics. The analysis was based on the linguistic logs submitted by visitors, reflecting their observations and evaluations of the hospital's services.

1. Most discussed topics:

- Inquiries about medical examinations were the most discussed topic, accounting for 40%. This indicates a strong interest from patients and visitors in information about the hospital's medical examination services.

- Inquiries about doctor appointments ranked second at 26.7%, reflecting significant interest in the availability of doctors' schedules.

- Inquiries about administrative procedures (such as insurance or required documents) represented 16.7%, showing a need for greater clarity in administrative processes.

- Inquiries about specialized medical aspects (e.g., treatments and techniques used in ophthalmology) accounted for 10%, indicating interest in available treatments.

Inquiries about working hours and operations constituted 6.7%.

2. Sentiment analysis:

- Positive sentiments made up 56.7% of responses, indicating overall satisfaction with the medical services and interactions with both medical and administrative teams.

- Negative sentiments represented 23.3%, highlighting concerns such as delays or insufficient information.

- Neutral sentiments accounted for 20%, suggesting that a portion of visitors felt indifferent toward their experiences.

3. Visitor Satisfaction by Service:

- Medical consultation services had the highest satisfaction rate at 24%, showing visitors' strong approval of consultation quality.

- Medical examination services achieved a satisfaction rate of 21%, with concerns about waiting times or service accessibility.

- Medical lending services, such as borrowing glasses or lenses, achieved a satisfaction rate of 22%.

- Quick health information services had a satisfaction rate of 25%, reflecting high satisfaction levels.

- Overall satisfaction stood at 92%, indicating that most visitors were satisfied with the hospital's medical services despite some challenges requiring improvement.

4. Challenges faced by visitors:

- Delays in responding to medical inquiries were the primary challenge at 33.3%, highlighting the need for faster response times from the reception team.

- Lack of information on specialized medical procedures, such as treatments or surgeries, accounted for 23.3%.

- Difficulty accessing doctor appointments, including booking delays or schedule changes, was reported by 16.7%.

- Shortages of certain medications or medical equipment constituted 13.3% of challenges.

- Unclear administrative procedures, such as insurance or treatment documents, also accounted for 13.3%.

Conclusions

The findings indicate that visitors are generally satisfied with the medical services provided at the Friendship Eye Hospital, but some challenges must be addressed. Improvements are needed in the speed of responses to medical inquiries, the availability of accurate information on treatments and procedures, access to doctor appointments, and transparency in administrative procedures to better meet visitors' needs.

RESULTS ANALYSIS

From the analysis of data derived from linguistic logs, several insights can contribute to enhancing strategic decision-making processes at the Friendship Eye Hospital:

- **Focus on improving medical information and procedures**

The data showed that the most discussed topics pertain to inquiries about medical examinations, doctor appointments, and administrative procedures. This underscores the importance of providing clear and accurate information on these topics. The hospital could enhance communication with visitors by offering comprehensive information on its website or through initial medical consultations via phone or digital applications. This step would boost visitor satisfaction and improve their overall experience.

- **Enhance digital services**

Although satisfaction with medical lending and electronic services was moderate, the data revealed challenges related to the lack of e-books and digital medical equipment. The hospital should consider improving these services by upgrading digital lending platforms and expanding the resources available online. Developing an electronic appointment booking system is also recommended to facilitate access to doctors' services and improve efficiency.

- **Improve inquiry response times**

The analysis highlights that delayed responses to inquiries are a significant challenge. Based on these observations, hospital decision-makers could improve the reception team's effectiveness by training staff to respond more quickly to visitor inquiries or by developing applications that allow visitors to receive instant answers to their questions.

- **Enhance transparency in medical services**

Sentiment analysis revealed higher negative emotions regarding certain topics, such as inquiries about medical activities or lack of information on available services. This may indicate a lack of transparency or insufficient awareness about some of the services offered by the hospital. Emphasis should be placed on improving visitor awareness campaigns about available services and updates on modern treatments and medical technologies employed.

- **Continue enhancing medical service quality**

The results show that most visitors expressed positive sentiments regarding provided services, such as consultations and examinations. Based on these insights, the hospital is advised to continue enhancing service quality by investing in the training of doctors and medical staff, improving utilized medical technologies, and working on enriching patient experiences.

Strategic challenge management

Major challenges identified include delayed responses to inquiries and lack of information on certain medical services. The hospital should take strategic steps to address these issues, such as improving internal communication between departments, developing training programs for employees, and enhancing the use of technology to facilitate access to services and information.

Conclusions

Based on the analysis results, linguistic blogs provide a rich source of information that can be utilized to improve operations within the Friendship Hospital for Ophthalmology. By addressing the issues highlighted by visitors, such as response speed, information provision, and the expansion of digital services, the hospital can enhance its operational efficiency and achieve greater visitor satisfaction, thereby supporting strategic decisions based on the actual needs of patients and visitors.

Contribution of results to scientific research:

The findings of this study significantly enhance the academic and practical understanding of improving healthcare services through linguistic blog analysis. These contributions are outlined as follows:

- **Opening New Horizons in the Use of Linguistic Blogs in Healthcare Research:**
This study is among the first to adopt linguistic blog analysis within a medical context, specifically in the Friendship Hospital for Ophthalmology. The findings emphasize the importance of blogs as an effective tool for gathering data on patient and visitor experiences, analyzing their sentiments, and understanding their expectations. This data allows for the improvement of healthcare services based on actual patient feedback.
- **Enriching research in patient experience:**
The results provide scientific evidence of the relationship between patient emotions and the healthcare services provided. This research adds a deeper understanding of the factors influencing patient satisfaction, such as response speed and the availability of information, offering new insights into managing patient experiences in healthcare institutions.
- **Guiding future research towards enhancing healthcare technology:**
By highlighting the need to improve digital services, such as electronic medical lending and patient digital systems, this study paves the way for future research focusing on technology advancements in hospitals. These findings can serve as a foundation for specialized studies examining the impact of technology on healthcare quality.
- **Contributing to literature on identifying healthcare challenges:**
Through analyzing the challenges faced by visitors, such as delayed responses and a lack of electronic resources, this study enriches the scientific literature on identifying and addressing these challenges in healthcare institutions. These findings provide researchers with insights into factors affecting hospital performance, enabling the development of strategies for improving internal operations.
- **Emphasizing the importance of transparency in healthcare services:**
The results show that a lack of information about medical services significantly impacts patient and visitor emotions. This observation contributes to increasing academic awareness about the importance of transparency in managing healthcare

services and opens the door to future research focusing on the role of transparency in building trust between patients and hospitals.

- **Impact on behavioral social studies related to health:**

By highlighting the positive and negative emotions expressed by visitors in blogs, this study enhances the scientific understanding of how social and behavioral factors influence attitudes toward healthcare services. Consequently, the research contributes to developing behavioral models for analyzing and improving interactions between patients and hospitals.

Final Thoughts:

By applying these results in a scientific context, this study offers new insights into healthcare research related to patient experiences and the impact of digital analysis of linguistic blogs on improving performance in healthcare institutions. These findings represent a significant step toward adopting innovative methodologies in scientific research, emphasizing information technology as a fundamental tool for enhancing healthcare quality and decision-making processes in medical institutions.

CONCLUSIÓN

This study has reached significant findings that contribute to improving the quality of healthcare services at the Friendship Eye Hospital through the analysis of linguistic blogs. The results of analyzing themes, sentiments, and keywords revealed the interaction of visitors and patients with the various services provided and offered practical insights into the areas needing improvement and enhancement within the hospital.

Linguistic blogs proved to be an effective tool for collecting realistic data and observations, helping identify key issues concerning visitors, such as delayed responses to inquiries, the lack of e-books, and difficulties accessing events. By analyzing this data, the need to improve digital services and facilitate access to them was highlighted, alongside the necessity of enhancing transparency in providing information about services.

The study's findings directly contribute to improving decision-making strategies at the hospital by providing accurate and realistic data that help prioritize improvements. These results also represent a valuable addition to the field of scientific research, particularly in the applications of linguistic blog analysis in the healthcare sector, opening the door for further future studies focusing on enhancing patient experience and expanding the use of technology in healthcare services.

Through this study, we have demonstrated that using data derived from linguistic blogs can be a powerful tool for improving performance and enhancing the quality of hospital services. This underscores the growing importance of analyzing patients' emotions and concerns within the context of modern healthcare.

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