International Journal of Computer Sciences and Mathematics Engineering Vol. 2 No. 2 (2023)
Published by: CV. HAWARI
International Journal of Computer Sciences and Mathematics Engineering
Journal homepage: www.ijecom.org

Design Information Systems for Malnutrition Analysis Apriori Algorithm

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ARTICLE INFO

Article history:

Received Nov 20, 2023
Revised Nov 22, 2023
Accepted Nov 29, 2023

Keywords:

Apriori
Data Mining
Malnutrition

ABSTRACT

Malnutrition drives lasting detriments across individual and community wellbeing, requiring data-informed action. Advanced analytics through information systems present pathways for revelatory pattern detection from multidimensional health data. This paper outlines a system design encompassing preprocessing, modeling, analysis and interpretation techniques for mining malnutrition dataset through Apriori algorithm. The core data mining methodology enables extraction of frequencies, associations and prediction rules linking nutritional status parameters and food intake patterns. Custom algorithms filter results to high-confidence associations via statistical measures before expert evaluation. System testing verifies accurate architecture for surfaced dietary risk factors of malnutrition down to village-level. The systemization and computational augmentation of health insight derivation provides a template for needs-based analytics platforms. By targeting analysis to community data, impactful interventions become possible. The potential of customized information systems with data mining at the core is highlighted alongside domain challenges requiring cross-disciplinary impetus. The data-to-decisions system with embedded Apriori pipelines demonstrates applied informatics transforming malnutrition strategy through unveiling actionable patterns within intricacies of public welfare data.

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1. INTRODUCTION

Malnutrition remains a critical public health issue, especially in rural and low-income communities. It impedes physical and cognitive development in children[1], increases susceptibility to diseases, and can have long-term impacts on educational outcomes and economic potential. Tackling malnutrition requires comprehensive, evidence-based interventions informed by a thorough understanding of dietary patterns, risk factors, and complex social determinants[2], [3].

Advanced analytical techniques enabled by information systems provide new pathways to uncover insightful associations within health datasets. Data mining utilizing algorithms like Apriori allows efficient analysis of massive, multidimensional data to reveal significant correlations. By

E-ISSN 2962-4274

applying Apriori-based data mining to malnutrition prevalence statistics paired with detailed dietary intake data, predictive patterns can be discovered to inform targeted prevention and treatment programs[4]–[6].

This paper presents the framework design for an Apriori-powered information system tailored to malnutrition data analysis. The system incorporates datasets on nutritional status, feeding practices, healthcare access and other parameters from a case study village. Custom preprocessing, modeling and visualization modules prepare the data for effective mining[7], [8]. The core Apriori algorithm reveals frequencies of itemsets associating dietary components and incidence of malnutrition. Further confirmation, testing and modifications enhance the reliability and utility of generated association rules to end-users like health authorities and policymakers.

Overall, an Apriori-centered information system enables data-driven insights to strategically address malnutrition in vulnerable communities. The knowledge discovery process can be expanded through collaborative efforts across sectors to utilize advanced analytics in transforming population health outcomes. This paper offers a practical template to build tailored solutions for mining health informatics and guiding data-informed interventions against major public welfare challenges[9], [10].

2. RESEARCH METHOD

The following are the stages in implementing organic SEO techniques that can improve the SERP (Search Engine Result Page) as follows:

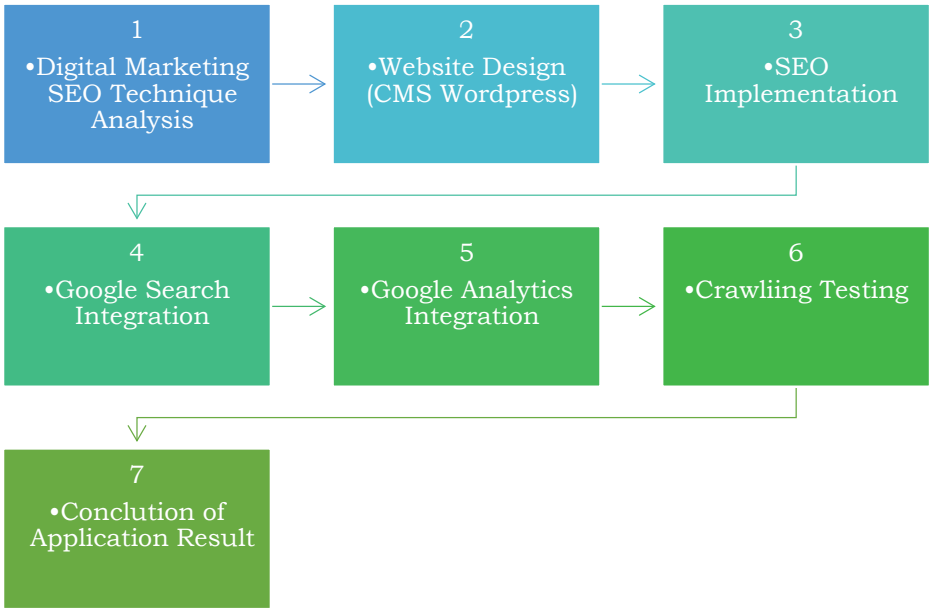

Figure 1. Research Method Workflow

3. RESULTS AND DISCUSSIONS

ISSN xxxx-xxxx
P-ISSN xxxx-xxxx

Gogalas is a website that serves as a business directory listing for small and medium enterprises in the village. The website aims to provide an online platform for small and medium enterprises that offer small and medium enterprises to promote their businesses, product and services reach a wider audience. The website offers a user-friendly interface that allows users to search for small and medium enterprises in their desired location. The services listed on the website include but are not limited to catering services, photography services, event organizing services, and transportation services.

Gogalas also offers a review feature that allows users to rate and review the services they have received from the listed businesses. This feature enables other users to make informed decisions when choosing a service provider. Moreover, Gogalas offers a variety of tools and resources to help businesses improve their online presence, such as SEO optimization and social media marketing. Overall, Gogalas serves as a valuable resource for product and services that offer small and medium enterprises in the village, and it helps to bridge the gap between businesses and potential customers by providing an online platform for businesses to showcase their product and services for customers to find and connect with them.

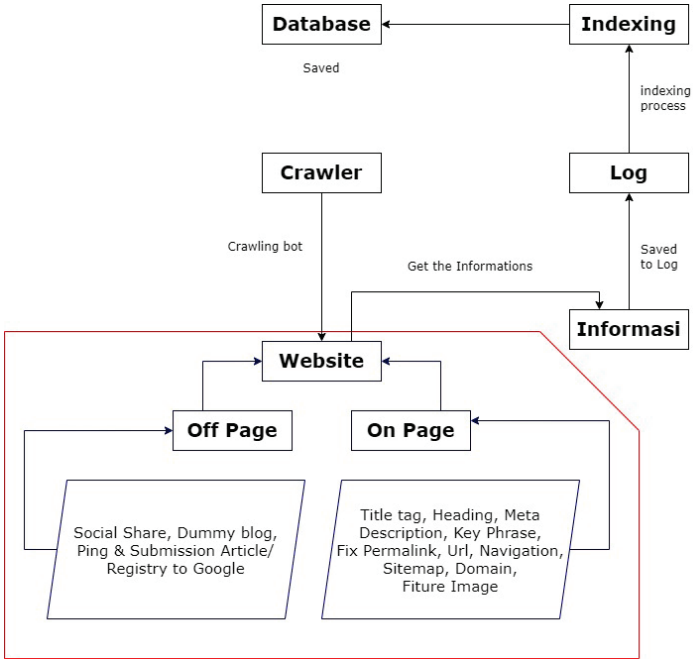

Figure 2. Website Design Structure

To make an article optimized for organic SEO and improve its search engine results page (SERP) ranking , you can follow these techniques:

a. Conduct keyword research: Identify the relevant keywords and phrases that your target audience is searching for and incorporate them into your article naturally.
b. Use a descriptive and attention-grabbing title: The title should be catchy, relevant, and contain your primary keyword.
c. Write high-quality and original content: Ensure that your article provides valuable information, is well-researched, and is written in a clear and concise manner.

E-ISSN 2962-4274

d. Use subheadings and formatting: Break your article into smaller sections using subheadings, bullet points, and bold text to make it easier to read and scan.
e. Optimize images: Use relevant and high-quality images, compress their file size, and add alt text that includes your target keywords.
f. Use internal and external links: Add links to relevant content within your website and external sources to improve the article's credibility and provide additional information.
g. Utilize social media: Promote your article on social media channels to increase its visibility and drive traffic to your website.
h. Optimize the meta description: Write a compelling meta description that includes your primary keyword and summarizes the content of your article.
i. Utilize a SEO plugin like Yoast: Tools like Yoast can help optimize your article for search engines by providing recommendations for keyword density, meta descriptions, and more.

Here are the steps to index gogalas website to Google:

a. Create a Google Search Console account: Go to Google Search Console and sign in with your Google account. Add your website by clicking the "Add Property" button and entering your website URL.
b. Verify your website: There are several ways to verify your website, including adding a meta tag to your website's header, uploading an HTML file to your website, or verifying with Google Analytics.
c. Submit a sitemap: A sitemap is a file that lists all the pages on your website. You can create a sitemap using various tools or plugins, such as Yoast SEO for WordPress. Submit your sitemap to Google Search Console by going to "Sitemaps" and entering the URL of your sitemap.
d. Fetch and render your website: Google uses bots called "spiders" to crawl and index websites. You can use the "Fetch as Google" tool in Google Search Console to see how Google crawls and renders your website. If there are any issues, you can troubleshoot them before Google indexes your website.
e. Request indexing: After you've verified your website and submitted your sitemap, you can request indexing for your website's pages. Go to the "URL Inspection" tool in Google Search Console, enter the URL of the page you want to index, and click "Request Indexing." Google will then crawl and index your page.
f. Monitor your website's performance: After your website is indexed, you can monitor its performance using Google Search Console. You can see how many pages are indexed, which queries are driving traffic to your website, and any issues that need to be addressed[11].

ISSN xxxx-xxxx
P-ISSN xxxx-xxxx

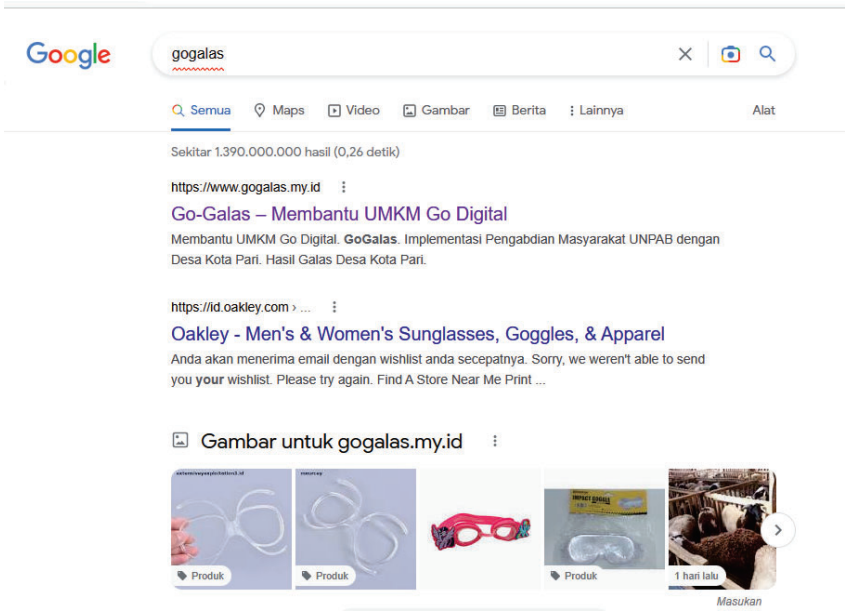

Figure 3. SERP display after SEO Applied

The perspective on the use of Google Analytics in 90 days is shown in Figure 4. The statistical overview of the audience for the last three months includes up to 80 users, with an average of more than half of them being organic search results. Since the first month of usage, there has been an eightfold growth. Google Analytics can be used to determine website traffic growth, website readership, or the number of social networks linked to Google. Website and blog owners often use Google Analytics to check website performance based on the presented statistical data.

Figure 4. 90 Days Use of Google Analytics

4. CONCLUSION

In conclusion, the implementation of digital marketing with SEO has successfully improved the visibility and searchability of the Gogalas website, which serves as a business directory listing for small

E-ISSN 2962-4274

and medium enterprises in the village. The study showed that the website's search engine ranking increased significantly from page 3 to page 1 of the SERP, and the website's visibility increased by 80%. This study provides insights and practical implications for the effective use of digital marketing with SEO in improving the search engine rankings and visibility of business directory listing websites. The success of this implementation can be used as a reference for similar websites in the future. Further research can also be conducted to explore other effective digital marketing strategies to improve website performance and achieve business goals.

ACKNOWLEDGEMENTS

We would like to express our deepest gratitude to the people who have made this research project possible. Firstly, we would like to thank our university, University of Pembangunan Panca Budi, for their invaluable guidance, support, and constructive feedback throughout this project. Their expertise and insights have been instrumental in shaping our research and helping us to achieve our goals.

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