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Data Search System for Thesis and Internship Reports in the Library of the Faculty of Engineering, Gajah Putih University Takengon

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Abstract. *The purpose of this research is to develop a data search system for thesis and internship reports at the Faculty of Engineering Library of Gajah Putih University Takengon (UGP). This search engine will be created and used to help students and library employees access thesis and internship report information. Analysis of user needs, system design, creation of effective search algorithms, and evaluation of system performance are all topics that will be discussed in this thesis. Interviews with potential users, satisfaction surveys, and historical data collection of library usage are the methods used. It is expected that the results of this research will help library users find and retrieve thesis and internship report data and improve the accessibility and availability of academic information at the UGP Faculty of Engineering. When search engine technology is used, it is expected that the time required for Information will increase productivity, improve efficiency, and support the academic development of students at UGP.*

Keywords *internship report; search engine; thesis*

1. INTRODUCTION

Gajah Putih University Takengon has the potential role of higher education by producing quality graduates through completion in final assignments such as a thesis and an internship report. However, with the increasing number of theses and internship reports, it leads to difficulties in management and searching for information. Overcoming these problems requires the development of an efficient website-based data search system. Search System Needs: It is complicated and time-consuming to search information manually. The website-based search system is expected to facilitate the accessibility of thesis data and internship reports.User Benefits: It will help students to trace the relevant references, assist lecturers in supervising student research, andallow more efficiency in data management by the library. Objective.(Gunawan & Sudarsono, 2022)

Integrate physical data sources into a digital platform. Ease the students in seeking references more quickly. Employing a Structured Search Method for Easy staff.(Nisar & Ali, 2023) Problem Limitation Concentrate on searching thesis titles and internship reports at the Faculty of Engineering Using the Winnowing algorithm with PHP and MySQLi Access is limited only to registered students and staff. Wang and C. Yu (2022) Related research follows Conclusion The five studies significantly contributed to the development and improvement of the performance of search engines. Research by H. Wang and C. Yu (2022) provides a better understanding as to how user behavior affects search engine performance. In this regard, research by Y. Liu and J. Zhang (2022) had focused on an intelligent deep learning-based

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search engine and reinforced learning to enhance accuracy in search results. Research by J. Kim et al. (2022) illustrated the effect of Google's BERT algorithm on search engine optimization. Meanwhile, in the research of S. Alotaibi et al. (2022), there is given a survey of methodologies concerning performance evaluation and measurement of search engines. Finally, research by M. Naeem et al. (2023) examines search engine personalization, offering a systematic review of research in the area. Combined, these studies can help in the development and enhancement of search engine performance that is more accurate, efficient, and tailored to user needs. (G. Gunawan & Nuri David Veronica, 2019)

2. LITERATURE REVIEW

Definition of Website

Websites can be used for a variety of purposes, such as conveying information, sharing content, selling goods or services, building online communities, and more. Websites usually consist of text, images, videos, and other interactive elements that are used to present information or facilitate interaction between users and content providers. Technically, a website consists of files that are stored on a web server and can be accessed through a URL address, also known as a Uniform Resource Locator. Software called a web browser allows users to access websites by using a device connected to the Internet, such as a computer, smart phone, or tablet. Using this software, they can browse the available web pages. Websites can also contain various features, such as forms. contact, search features, user comments, restricted member areas, and other features, depending on the purpose of the website owner or manager. Websites are an important tool for marketing and communication in businesses and organizations. This is due to the website's ability to reach a larger audience, make information more accessible, and ease interaction with users. .(Simbolon, 2023)

Winowwing Algorithm

Very popular in plagiarism testing, text benchmarking, and related information retrieval, the winnowing algorithm is used in data or text processing to find patterns or similarities in very large sets of text. The winnowing algorithm process starts by cutting the text into fingerprints. To generate a unique hash value, each fingerprint consists of a number of tokens or words taken sequentially from the text. The hash of each fingerprint is then calculated, and then a process known as “winnowing” is performed to find the fingerprint with the lowest hash value within each window that moves sequentially through the text. These windows serve to compare the fingerprint in the text with the current fingerprint. In the case of a fingerprint. (Abid et al., 2016)

3. METHODS

Research Approach

Stages carried out by the researchers in analysing data:

1. Preparation of an analysis plan: - The researcher has to consider upfront how the data analysis will be done. At this stage, the researcher needs to determine the purpose of the analysis, the research question to be answered, and the methods and techniques of the analysis.
2. Data Collection: The data collection stage involves the gathering of data relevant to the research questions posed. This may be through surveys, interviews, observations, or secondary data collection.
3. Data cleaning and preparation: Depending on the nature of the data collected, cleaning and preparation might be necessary before analysis. This involves validation checks for the data, handling missing values, normalization of the data, and selection of variables to be used in the analysis. (Syafi'i & Kasih, 2022)
4. Data exploration: The researcher, during this stage, explores the data to understand its characteristics and patterns. The use of statistical methods and data visualization could be employed to identify the relationships, trends, and anomalies in the data. (Darnita et al., 2022)
5. Application of analysis method: With an improved understanding of the data, the researcher can then apply those analysis methods that best suit the research objectives. This could involve the use of statistical methods.
6. Interpretation of results: Once the analysis is done, the researcher interprets the obtained results. This included drawing inferences based on the statistical findings, and the results either support or fail to support the proposed research hypothesis.
7. Presentation of Results: A researcher should present the results from the analysis in a simple form that will be comprehensible to the audience. This can include tabulation, graphical illustrations, or even a report that outlines the findings and discusses implications.
8. Evaluation and revision: This is the final stage, where the outcomes of the analysis are evaluated and revisions suggested.

The researcher must go back to reconsidering the methodology, the research questions, and his interpretation of results in case of weaknesses or surprising findings. (Faqih et al., 2022)

Here, the steps for utilizing the simple thesis, thesis, and internship data search engine system by applying Depth First Search (DFS) algorithm, Winnowing Algorithm, and Winnowing Algorithm, are being elaborated.

- Predetermining Search Needs: You first need to define what you are looking for and your criteria for such. For instance, you might want to search for thesis data or places of internship about a particular topic or field of study.
- Setting up the search query: You will then need to prepare the search query that best suits your needs. The search query should include keywords, phrases, or terms relevant to the topic or field of study of interest.
- Applications of Winnowing Algorithm: The winnowing algorithm is applied in the removal of duplication or reduction in similarity between documents. This algorithm provides for more relevance in identifying and presenting documents through search engine systems by considering the content uniqueness and originality.
- Assessment of search results: Once the search engine system provides a list of documents that are relevant to your search query, then you should assess the results. Check these documents and note how they fit your needs and the search criteria you set.
- Refining search: If the results are not satisfying your needs or very relevant, then you have the ability to refine your query and, therefore use the Winnowing algorithm to speed up the pencarian process.
- Access and utilization of data: After getting the appropriate document, you can review it and use it according to your needs, such as reading skripsi or reading magang laporan.

Research Method

The Waterfall Method is one approach to the development of a structured and linear lunak perangkat. This approach thus demonstrated the phases of the lunak development as alirans that flow from one stage to the next, similar to alirans of air in terjun (waterfall) air. "Model Sequential Linier" or "Model Cascading" are other names for this method. (Sukabumi, 2022)

The Waterfall method steps usually include the following:

1. Analysis This is the process of understanding users' needs and preferences and determination of information required to begin a pro ject.

2. Planning: After analysis, system perancangan is elaborately done which includes architecture, antarmuka, data structure, and other various system components.
3. Implementation: During this stage, the lunak is actually built, which is based upon the design developed earlier. Writing of program code is done, the functional units are implemented, and the system components are dismantled.
4. Testing: After implementation, the lunak perangkat is thoroughly examined to ensure that it functions in accordance with the established principles. Unit, integration, system, and user-received pengujian are all included in the pengujian.
5. Deployment: When the Lunak device successfully completes the pengujian phase, then it is ready for delivery to the user at the end. This might include the installation of a lunak perangkat in the production environment and user training.
6. Maintenance: After using a Device Software, maintenance is necessary to address potential problems, offer solutions, and implement changes that must be made carefully over time.

Data Analysis Teknik

Before data analysis techniques are conducted, the research instrument is reviewed first. From the research result of Prof. Dr. Moleong, 2017: In a book written by Moleong, " Qualitative Research Methodology," analysis technique means any process of changing data into information understandable and comprehensible. (Daniati et al., 2022) Data analysis technique consists of the activity of data collection, analysis, interpretation, and pola analysis. One of the used techniques of data analysis is

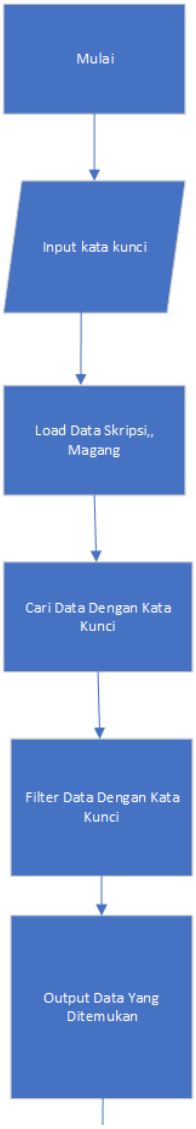
- Reliability Technique: Reliability is the measure that can tell how well the data collected during the study can be analyzed and consistent. Reliability is used so that if a pengukuran or pengujian is carried in a similar way then the results that come after are satisfactory.
- Data Analysis Teknik: Data analysis techniques refer to methods used to understand, organize, and analyze data in the kualitatif study. The techniques of qualitative data analysis include thematic analysis, descriptive analysis, interactive analysis, and comparative quantitative analysis.

4. RESULTS

In this regard, the main objective of the Design of the search engine lunak is to provide the users with the power of searching correctly and appropriately in line with the given keywords or questions. The process is done by the use of the Winowwing algorithm and the Depth First Search, DFS method.

System flowchart after using the Winowwing algorithm and DFS (Depth First Search)

The flowchart below depicts the processes in the data skripsi and magang system prior to the application of the Winnowing algorithm. (Sitompul et al., 2022) The collection and filtering of the data in this flowchart are done by using the Winnowing algorithm, combined with the Depth First Search method. This can be seen in gambar 1 below this.Use lowercase and alphabetical letters for list numbering. (Rohmadan Wahari & Reswan, 2022)



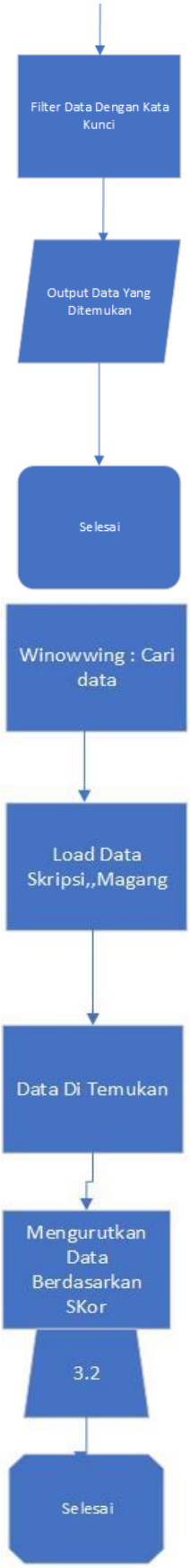


Figure 1. Flowchart after the system uses the DFS method and the window-opening algorithm

The program starts from logging in if the user already has an account, or you can also register if you don't have an account. (Larsen & Proserpio, 2024) (Dwivedi et al., 2023) After that, the user is directed to use the word search. Here are the variables that must be analyzed for further use. The search was carried out in order to find data that matched the word key that would be used with the Winnowing algorithm. The stages are as follows: Thesis and internship data are loaded on the software. Furthermore, the data that has been collected is filtered based on keywords. Followed by data analysis using scores. Finally, the data that has been collected is displayed to the user. After the data collection and data processing process is complete, the software is complete and can be used.

Table 1. Example Cases

Langkah	**Deskripsi**	**Teks/Dokumen**
1	Pengumpulan Dokumen	- Skripsi 1: "Penerapan Teknologi IoT dalam Monitoring Lingkungan" - Skripsi 2: "Sistem Kendali Otomatis untuk Pertanian Berbasis IoT"
2	Praproses Data	- Skripsi 1: "penerapan teknologi iot dalam monitoring lingkungan" - Skripsi 2: "sistem kendali otomatis untuk pertanian berbasis iot"
3	Pembuatan Fingerprint	- Fingerprint Skripsi 1: "penerapan teknologi iot monitoring lingkungan" - Fingerprint Skripsi 2: "sistem kendali otomatis pertanian berbasis iot"
4	Penyimpanan Data	Simpan fingerprint dokumen dalam indeks atau basis data.
5	Proses Pencarian	- Pengguna mencari "sistem kendali otomatis untuk pertanian." - Sistem membuat fingerprint dari kueri pencarian: "sistem kendali otomatis pertanian." - Bandingkan fingerprint kueri dengan fingerprint dokumen dalam indeks. - Temukan kesamaan dengan Skripsi 2.
6	Peringkat Hasil Pencarian	- Skripsi 2 memiliki kesamaan kata kunci yang lebih tinggi. - Sistem memberi peringkat lebih tinggi pada Skripsi 2.
7	Pengembalian Hasil	- Tampilkan hasil kepada pengguna: "Dokumen yang cocok: Sistem Kendali Otomatis untuk Pertanian Berbasis IoT." - Pengguna dapat memilih Skripsi 2 untuk dibaca lebih lanjut.

Then, the system may use these langkah-langkah to compare the kueri of the user and the documents of the perpustakaan, providing the most relevant results based on the common language used.

User Implementation

User Implementation Among others, this page is implemented by the pages related to login, beranda and form pencarian results, skripsi and magang input results.

1. **Halaman Login Implementation**

The results of the login process are the first thing that appears when a user opens this system. This login process is used for two user levels, namely admin and user. The results of the login process can be seen in the following figure 3.Contains the results of application implementation or program results (which are important only), or results from method testing.

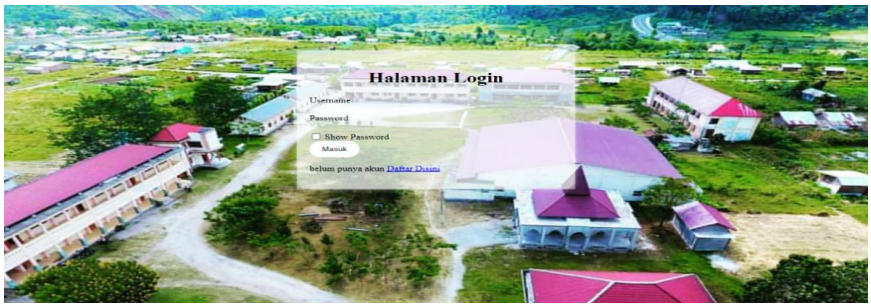


Figure 3. Login Page

This system takes advantage of multi-user authentication, namely for users and administrators. The user has to insert a username and password inside the login field. Then, the system will verify if the data inserted by the user matches the contents of the database. b. Homepage

Home page can be seen when the user has successfully logged in with all access points. The results of the halaman beranda can be seen in figure 4 below.

Figure 4. Home Page

In the input data, there are three buttons that direct the user to the pencarian page: input data skripsi, input data magang, and input data skripsi.

2. **Halaman Tampilan Pencarian**

Search page used by the user to seek skripsi and magang data. The results of the halaman pencarian can be seen in figure 5 below.

Figure 5. Search Page

In this case, the user will enter the word "kunci" in the form, and the system will look for data that matches the word "kunci" when the pencarian button is pressed.

3. **Skripsi and magang of the input data**

The purpose of this halaman is to allow users to enter text and lengthy passages. The skripsi input and magang laporan can be seen in figure 6 below.

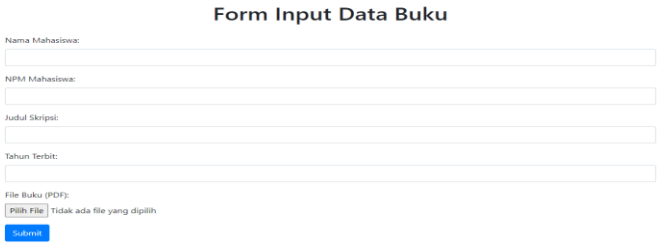


Figure 6. Thesis data input page

The purpose of this is to prompt the user to input data in the given form. Tampilan halaman input laporan magang is a feature or halaman in a system or application that allows users to input information related to laporan magang. In figure 7 is the tampilan halaman input laporan magang.

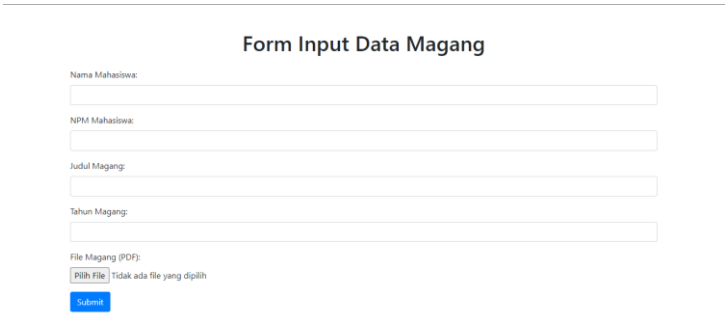


Figure 7. Internship Input Page

In this section, the user must enter data in the form that has already been provided, such as name, npm judul, year, and file laporan magang.

Administration Implementation Page

Administration Implementation Page The implementation in the administrative level covers the implementation relating to the implementation of the admin's results, the skripsi's results, the magang's results, the petugas' results, and the mahasiswa's results.

1. **Thesis data page display on the web admin**

Description of the page display for the data on skripsi in the admin's web is the information which on the admin web panel is designed to collect and display about skripsi or tasks data for masters. Administrators or perpustkaan staff usually use this halaman to view, comment, or analyze the data related to the students of mastery. Skripsi data samples can be seen in figure 8 below.

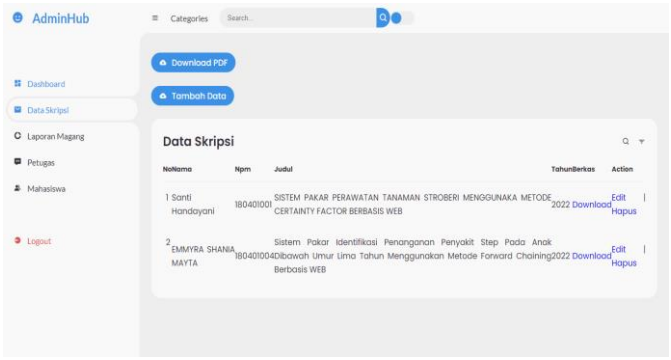


Figure 8. Thesis Data Page

Data skripsi halaman above shows data-data skripsi such as mahasiwa name, NPM, Judul, year and file data skripsi that can be downloaded.

2. **Data Page View Internship Report**

Data Page View of Report of Student Internship Assignment in the web admin system represents a graphic tool which enables the administrator or the user of this system to view, edit, comment, and discuss the entries of magang mahasiswa. In this chapter, all the relevant information is provided in a very easy and organized way. Halaman data laporan magang can be viewed as shown in figure 9 below.

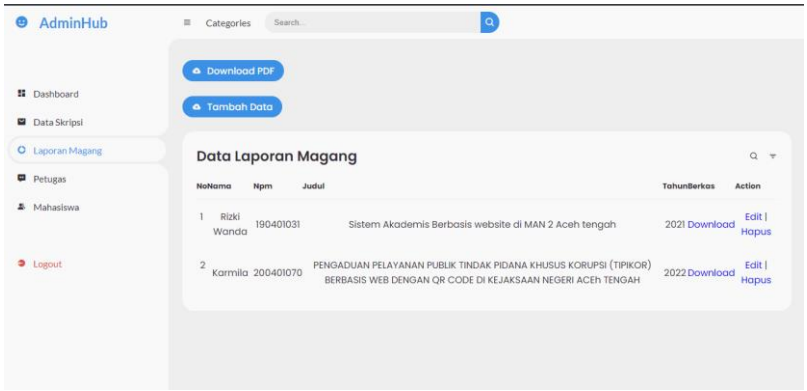


Figure 9. Internship Report Data Page

The above data laporan halaman displays data skripsi such as mahasiswa name, NPM, Judul, year, and file data laporan that can be downloaded.

3. **Page View Officer**

Tampilan Halaman Data Petugas The graphic facility that is provided in the online admin system allows system administrators or users to view, add, edit, and edit petugas data. Tampilan Halaman Petugas can be seen in figure 10 below.

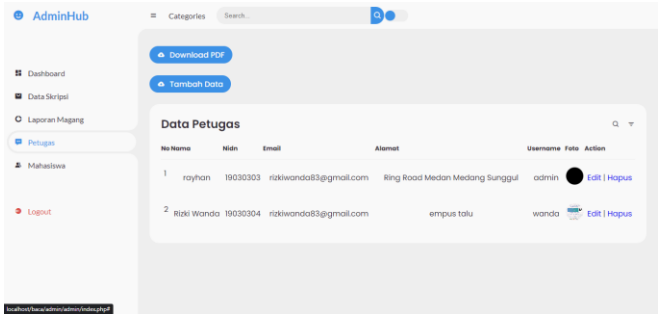


Figure 10. Officer Page View

Here, the name, ID, e-mail, address of the petugas, and username are shown, along with a photo of the petugas previously entered.

4. **Student Page The View**

In online admin systems, halaman data mahasiswa is a display that allows the system administrator or user to view and update data mahasiswa. Here is a sample of the data mahasiswa as shown in figure 11 below.

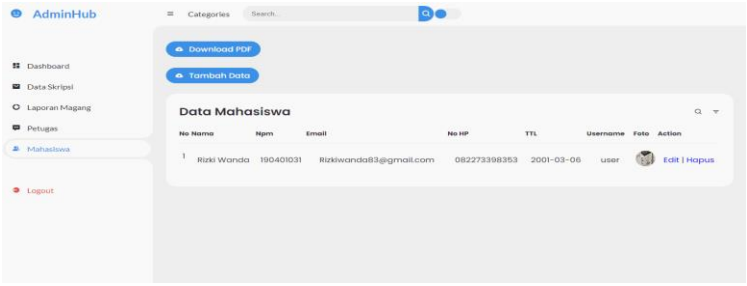


Figure 11. Student Page View

This section displays the user's information, including name, npm, email, HP number, birthdate, username, and a photo of the student that has already been entered.

Testing System

Evaluation of the system is conducted at this stage whether the system operates in line with the goal or still problems or issues are persisting with the system.

This system for collecting skripsi and magang data is located in the Perpustakaan Fakultas Teknik Informatika. Skripsi and magang data from mahasiswa constitute the data used in the analysis of this system.

Table 2. Thesis Data Table on System Testing

No	Nama	NPM	Judul
1.	Santi Handayani	180401001	Sistem Pakar Perawatan Tanaman Strawberry Menggunakan Metode Certainty Factor Berbasis Web
2	Emmyra Shania Mayta	180401004	Sistem Pakar Identifikasi Penanganan Penyakit Step Pada Anak Dibawah Umur Lima Tahun Menggunakan Metode Forward Chaining Berbasis WEB
3	Marta Sari Bru Tarigan	170401050	Penjadwalan Roster Menggunakan Metode Vertec Graph Coloring

In this system, the test uses two tables, yes, the thesis table that has been listed in table 2 above and the internship table which can be seen in table 3 below.

Table 3. Internship Report Data on System Testing

No	Nama	NPM	Judul
1.	Rizki Wanda	190401031	Sistem Informasi Akademis Berbasis Webiste di MAN 2 Aceh Tengah
2	Muhammad Rizki	190401064	Sistem Informasi Perpustakaan Di Man 2 Aceh Tengah
3	Edi Sentosa	200401003	Penentuan Lokasi Titik Jaringan Iconnet di Kabupaten Aceh Tengah Menggunakan Google Earth di PT Oregon Lintas Nusa
4	Ilham Maharami	200401077	Pemetaan Sebaran UMKM di Aceh Tengah Menggunakan Qgis Pada Dinas Koperasi Aceh Tengah
5	Karmila	200401070	Pelayan Publik Tindak Pidana Khusus Korupsi (TIPIKOR) Dengan QR Code di Kejaksaan Negri Aceh Tengah
6	Ainun Humaira	190401034	Penggunaan Video Animasi Sebagai Sarana Edukasi Bagi Anak Di Dinas Keluarga Berencana, Pemberdayaan Perempuan Dan Perlindungan Anak
7	Gracia Novellia	200401071	Rancang Bangun Video Animasi Terhadap Pengaruh Remaja Dalam Penyalahgunaan Narkoba di Kejaksaan Negri Aceh Tengah
8	Miranti Wulandari	200401069	Penetuan Jalur Distribusi Pupuk Terbaik Antar Aceh Menggunakan Teory Graf dan Menggunakan Bahasa Pemerograman PHP dan MySQL

It is clear from the above table that the pencarian is based on the name of the company, the title of the script, and the description of the product. The results of the study can be seen in figure 12 below.

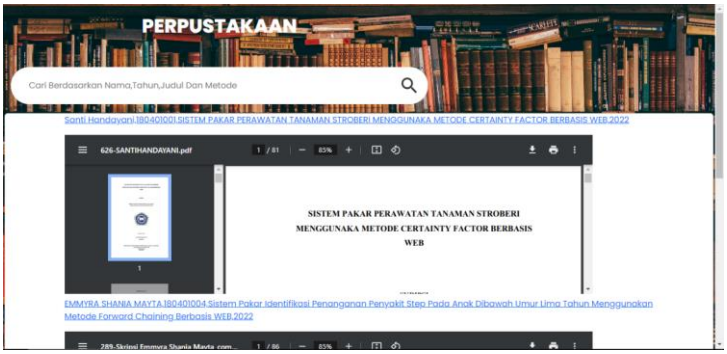


Figure 12. Search Results

The next step is system testing, which involves the use of a black box. System evaluation has the purpose of ensuring that the system is built according to the results of analysis and perancangan and does not experience problems during implementation. The following table presents results regarding the investigation that has already been carried out relating to the angka credit system, as identified in Table 4 below.

Table 4. Black Box Testing

No	Pegujian	Test Case	Hasil Yang di Harapkan	Kesimpulan
1	Login	Input username Dan Password	• Berhasil Login • Masuk ke halaman Utaman	Lulus
2	Tambah Data	Inputkan Data Skripsi Dan Laporan Magang	Data Berhasil Di Input	Lulus
3	Tambah Data	Inputkan Data Petugas Dan Mahasiswa	Data Berhasil di Input	Lulus
4	Pengujian Pencarian	Input Kata Kunci pada Form Pencarian	Menampilkan Hasil Pencarian Sesuai dengan Kata Kunci	Lulus

Based on the blackbox testing that is done, the testing is done from each user level, which includes the admin and user levels. There are four pengujian in this system, and all of the results are in line with what is anticipated.

5. DISCUSSION

The discussion section is arguably the most important part of an article, as it is the last section a reader sees and can significantly impact their perceptions of the article and the research conducted. Different authors take varied approaches when writing this section. The discussion section should:

- Restate the study’s main purpose.
- Reaffirm the importance of the study by restating its main contributions.
- Summarize the results in relation to each stated research objective or hypothesis without introducing new material.
- Relate the findings to the literature and the results reported by other researchers.
- Provide possible explanations for unexpected or non-significant findings.
- Discuss the managerial implications of the study.
- Highlight the main limitations of the study that could influence its internal and external validity.
- Discuss insightful (i.e., non-obvious) directions or opportunities for future research on the topic.

The discussion section should not merely restate the findings reported in the results section or introduce additional findings not previously discussed. Instead, it should focus on highlighting the broader implications of the study's findings and relating these to previous research. Ensure that the conclusions you reach follow logically from and are substantiated by the evidence presented in your study.

6. CONCLUSION

- Improved Document Organization: The system facilitates better organization of thesis and internship documents through the use of metadata, tags, and categories. This structured approach allows users to easily find specific content tailored to their needs, thereby enhancing academic orderliness and accessibility.
- Enhanced Collaboration: By providing a more efficient search mechanism, the system promotes collaboration among professionals, scholars, and students. Quick access to references and reports can lead to deeper research insights and innovative ideas, fostering positive advancements in knowledge and industry.
- Efficiency Gains: The implementation of this data collection system is expected to yield significant improvements in operational efficiency, organization, and collaboration across both academic and professional realms.

LIMITATION

1. Integration of NLP Algorithms: To further enhance search outcomes, it is recommended to incorporate Natural Language Processing (NLP) algorithms. This would enable students to locate relevant documents even with imprecise keywords.
2. User Experience Enhancements: Developing comprehensive user guides with clear instructions on search procedures, result filtration, and system features will empower students to utilize the system more effectively.
3. User Feedback Mechanism: Implementing features for users to review and rate documents will assist other scholars in assessing document quality before use. This feedback can also provide authors with valuable insights for improving their work.
4. Focus on Engineering Faculty Data: The system should prioritize data collection from the engineering faculty at Universitas Gajah Putih, ensuring a comprehensive integration of relevant academic resources.

Overall, the proposed data search system for thesis and internship reports stands to significantly benefit academic institutions by improving efficiency, organization, and collaboration among users.

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