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Implementation Of The Boyer–Moore Model In The Guidance System For Field Work Practice Activities

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ABSTRACT

Fieldwork Practice is a crucial element of vocational education in Vocational High Schools, designed to enhance students' practical skills in the industrial world. The mentoring process for Field Work Practice frequently encounters difficulties in organising and accessing information about mentoring paperwork, timetables, and contact between mentors and students. This paper proposes the integration of the Boyer–Moore algorithm into the Field Work Practice mentorship system in Bandung to address these issues. The Boyer–Moore technique, recognised for its efficacy in string searching, is employed to improve data retrieval efficiency, especially for students accessing their journals throughout the Field Work Practice mentorship process.

This system is designed to provide educators and learners with rapid and precise access to information, thereby enhancing the effectiveness of the Field Work Practice mentoring process. Trial results indicate that the implementation of the Boyer–Moore algorithm in this system significantly enhances data retrieval speed compared to prior techniques, thereby facilitating the efficiency and efficacy of Field Work Practice activities. To enhance development, the system can be refined by mitigating its constraints, including the incorporation of partner supervisors as supplementary user roles.

Keywords: Boyer–Moore Algorithm, Field Work Practice, Vocational High School, Guidance System, Data Retrieval

INTRODUCTION

Fieldwork practice is an essential method for students to apply the skills acquired in academic settings in practical work scenarios. This experiential knowledge is crucial for reconciling academic understanding with actual implementation. (Purwanto et al., 2022) In vocational schools, such as one in Bandung, Field Work Practice is compulsory for 12th-grade students, spanning a period of 3 to 4 months. Students must produce daily notebooks and a final report throughout this period, which will serve as documentation of their engagement and learning during the programme.

The execution of guidelines for Field Work Practice reports frequently faces numerous obstacles, despite its significance. (Hanifa Setianingrum et al., 2020; Zhang et al., 2024) Scheduling problems and geographical limitations might impede the mentoring process, complicating access to necessary help for several students. These challenges may lead to irritation and inefficiency, hindering students from effectively capitalising on their practical experiences. Furthermore, the absence of effective communication between mentors and students may exacerbate these issues. (Harpad & Salmon, 2021)

Besides administrative problems, the handwritten documentation of journals presents a considerable danger of loss or misplacement. Students may struggle to maintain their journals, resulting in inadequate documentation of their experiences. (Gultom et al., 2021) This not only impacts their final reports but also diminishes the overarching objective of the Field Work Practice, which is to develop important skills and abilities. Dependence on manual processes may diminish the educational efficacy of the programme. (Khumaidi et al., 2020)

A web-based system is required to allow mentorship and optimise the journal retrieval process. This system would facilitate enhanced communication between students and mentors, streamline schedule management, and provide easy access to information. (Amutha Arumugam et al., 2021) By adopting a digital solution, vocational schools can enhance the Field Work Practice experience, ensuring that students receive necessary coaching while efficiently tracking their learning progress. This method will ultimately enhance outcomes for students as they enter the workforce.

Boyer-Moore

The Boyer-Moore algorithm employs a string matching technique that examines pattern characters from right to left, commencing with the rightmost character (Ostermeier et al., 2023).

Suryanto, Triyanto, and Ristian assert that the primary attribute of the Boyer-Moore algorithm is its right-to-left string matching, which delineates its distinctive methodology (Bussi res et al., 2025).

The primary principle of the Boyer-Moore method is to juxtapose the pattern under examination with the text. The comparison is conducted ²from right to left, commencing with the rightmost character in the pattern about the text. Upon a match, the comparison proceeds with the character to the left until the initial character of the pattern is reached". (Harpad & Salmon, 2021)

The Boyer-Moore method exhibits substantial character shifts, enhancing pattern searching efficiency by swiftly ascertaining the absence of the target string through the examination of a limited number of characters, hence facilitating a transition to the subsequent location. The Boyer-Moore algorithm utilises a preprocessing phase to generate occurrence and shifting functions for the evil character and good suffix heuristics, respectively. ¹The Boyer-Moore algorithm employs two heuristics to determine the jump distance: the bad character heuristic, also known as the occurrence heuristic, and the good character heuristic, commonly referred to as the match heuristic. Data for each heuristic is stored in an array created at the commencement of the matching process.

Guidance

"Guidance is the assistance rendered by an expert to an individual or group, facilitating the identification of their abilities or interests and the maximisation of their potential" (Putra et al., 2023).

“Guidance is the act of offering support from an expert to one or more individuals, including children, adolescents, or adults, enabling them to cultivate their skills and achieve independence” (Purwanto et al., 2022).

“Learning guidance aims to assist individuals in confronting and resolving academic challenges by establishing supportive teaching and learning environments to prevent learning difficulties” (Zhang et al., 2024).

Field Work Practice

Fieldwork practice at the vocational high school level is a compulsory activity for 12th-grade students during the odd semester, spanning 3 to 4 months. The implementation of PKL At A Vocational High School In Bandung requires participation from 12th-grade students, organized into groups of 5 to 10 individuals for approximately 3 months.

“Field Work Practice constitutes a structured and systematic training and educational process, conducted under proficient supervision within a designated field, aimed at fulfilling the demand for skilled labour in that domain” (Putra et al., 2023).

The Field Work Practice is an integral component of the dual education system, operating as a collaborative initiative between vocational schools and industry, conducted within the industrial sector (Amutha Arumugam et al., 2021).

“Field Work Practice provides a practical learning experience for students in Vocational High School, carried out through hands-on work in the labour market for a designated duration, aligned with the curriculum and job market requirements.”

This study establishes a system utilising Laravel and MySQL that employs the Boyer-Moore algorithm for data retrieval. This solution enables online mentorship and journal verification, consequently enhancing the efficient implementation of Field Work Practice at a vocational school in Bandung.

METHOD

This research utilises a mixed-methods approach to create a web-based mentorship system for Field Work Practice at a vocational high school in Bandung. The study will engage 12th-grade students and mentors, focusing on the integration of the Boyer-Moore algorithm into a Laravel and MySQL framework to enhance data retrieval performance. The development method will adhere to the Software Development Life Cycle (SDLC), encompassing the phases of planning, design, implementation, testing, and maintenance. Quantitative data will be collected by evaluating data retrieval speed before and after the algorithm's installation, while qualitative data will be gathered through surveys and interviews to assess user experiences and satisfaction.

The assessment of the system's efficacy will rely on user input and statistical analysis of retrieval times, aiming to exhibit substantial enhancements over prior methodologies. The findings from this investigation will inform subsequent enhancements of the system, including the possible incorporation of partner supervisors as additional user roles. The project aims to refine the mentoring process in Field Work Practice, consequently enhancing outcomes in vocational education.

DISCUSSION

Analysis of the running system

Observations at a vocational high school in Bandung indicate that temporal and spatial limitations impede the supervision of Field Work Practice reports, as it transpires solely after school hours. This constraint limits mentorship time for both students and educators, and the documentation for Field Work Practice remains in printed form, which is inefficient.

A web-based mentoring system is necessary to address this issue in Fieldwork Practice. This technology enables students and professors to participate in mentoring flexibly, eliminating the need for in-person meetings and thereby enhancing the efficacy of final report preparation. Currently, students are required to consult with their supervising professors for guidance immediately after classes conclude or upon departing the school after 6 PM.

Proposed System

1. Usecase Diagram

A use case delineates a system's functionalities from the user's viewpoint. A use case delineates standard interactions between a system user and the system via a story illustrating the system's use.

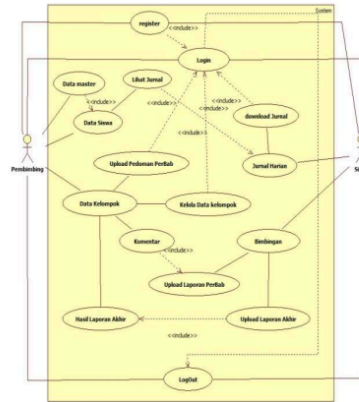


Figure 1. Usecase Diagram

2. Class Diagram

Class diagrams facilitate the visualisation of a system's class structure and are the most prevalent sort of diagram. Class diagrams illustrate the relationships among classes and the descriptions included within each class in a system model. This is a class diagram for a fieldwork guidance system.

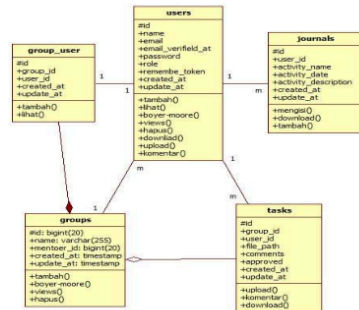


Figure 2. Class Diagram

3. Table Structure Design

Database design involves defining the content and structure of data required to facilitate diverse system objectives. The objective of database design is to fulfil the informational requirements of specific users and the system.

Database Name: projectpk1

This database contains several tables, including:

- 1) Users table
- 2) User_group table
- 3) Groups table
- 4) Journals table
- 5) Tasks table

4. Menu Structure Design

The menu structure is a fundamental aspect of programme design that aids users in system navigation. This ensures that customers experience no hassles when selecting their preferred menu items using the system.



Figure 3. Menu Structure Design

System Implementation

System implementation is the phase of executing a system to enable its operation.

This is a demonstration of the installation of the fieldwork practice guide system:

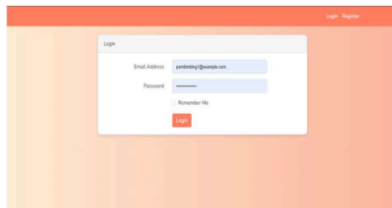
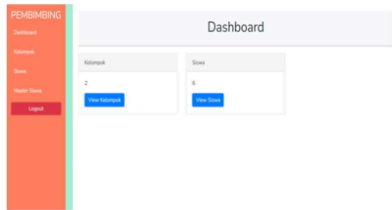


Figure 4. Login View



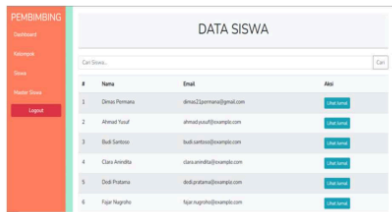
Registration form with fields for Name, E-Mail Address, Password, Confirm Password, and Register as (Student/Teacher). A Register button is at the bottom.

Figure 5. Registration View



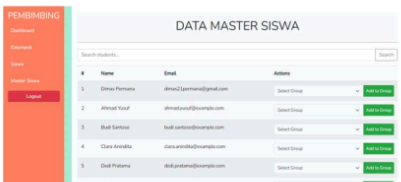
Dashboard view for a supervisor. It shows a sidebar with navigation links (Dashboard, Supervisor, Student, Master Data, Logout) and a main area with two cards: 'Kelas' (2) and 'Siswa' (4), each with a 'View Data' button.

Figure 6. Supervisor Dashboard Display



#	Name	Email	Mail
1	Dimas Permata	dimas23permana@gmail.com	View Data
2	Alvinul Yusuf	alvinul.yusuf@example.com	View Data
3	Budi Santoso	budi.santoso@example.com	View Data
4	Citra Anindita	citra.anindita@example.com	View Data
5	Dodi Pratomo	dodi.pratomo@example.com	View Data
6	Fajar Nugroho	fajar.nugroho@example.com	View Data

Figure 7. Student Data Display



#	Name	Email	Actions
1	Dimas Permata	dimas23permana@gmail.com	Select Group Add to Group
2	Alvinul Yusuf	alvinul.yusuf@example.com	Select Group Add to Group
3	Budi Santoso	budi.santoso@example.com	Select Group Add to Group
4	Citra Anindita	citra.anindita@example.com	Select Group Add to Group
5	Dodi Pratomo	dodi.pratomo@example.com	Select Group Add to Group

Figure 8. Master Data View

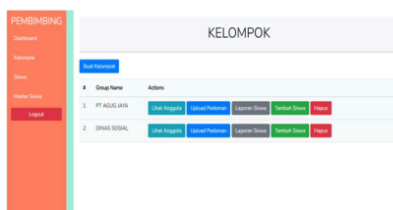


Figure 9. Group Data Display

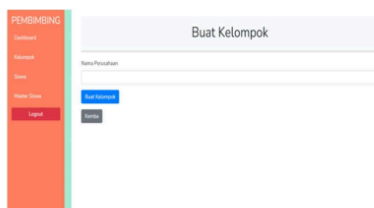


Figure 10. Create Group view

CONCLUSION

Following research at a vocational high school in Bandung and the application of the Boyer-Moore algorithm for student name searches within the Field Work Practice mentorship system, we determined that the developed system effectively offers functionalities that facilitate Field Work Practice activities, including journal entry, report generation, and the ability to download all created journals. The creation of a student name search system utilising the Boyer-Moore algorithm enhances mentors' ability to locate student journals with greater efficiency. The utilisation of web-based technology facilitates enhanced accessibility to the system, regardless of temporal and geographical factors.

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