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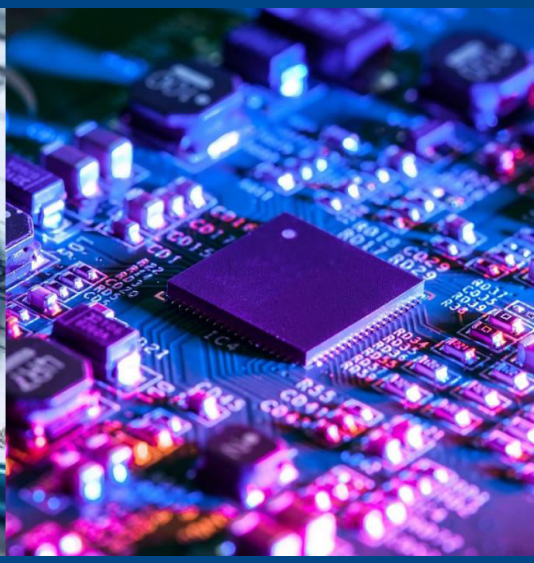

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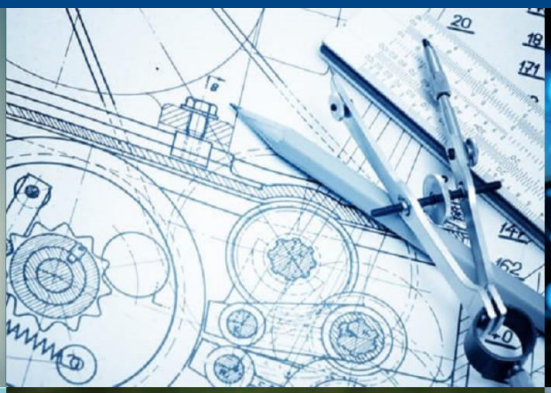

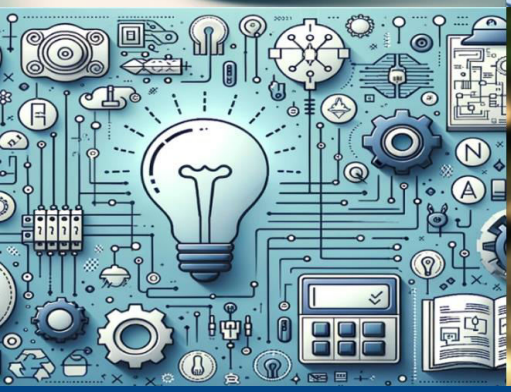

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Smartstudy Cantilan: A Weighted Matching Mobile App for Academic Peer Pairing

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ABSTRACT: SmartStudy Cantilan is a mobile application developed to help students at North Eastern Mindanao State University find compatible study partners using a weighted matching algorithm based on subject, schedule, learning style, year level, and language preference. The system was developed using Agile methodology with HTML, CSS, JavaScript, PHP, and MySQL. Evaluation through the ISO/IEC 25010 software quality model showed positive results in functionality, usability, performance efficiency, and reliability, with mean ratings ranging from 3.85 to 4.05. The findings indicate that the system effectively supports academic collaboration and peer recommendation among students.

KEYWORDS: SmartStudy Cantilan, Weighted Matching Algorithm, Study Partner Recommendation, Academic Collaboration, ISO/IEC 25010

I. INTRODUCTION

Collaborative learning has become an important approach in higher education as it allows students to share ideas, clarify difficult topics, and improve academic understanding. With the growth of mobile and digital technologies, students can now be connected through applications that support study organization and peer collaboration. This study proposes SmartStudy Cantilan, a mobile application developed for students at North Eastern Mindanao State University that recommends compatible study partners using a weighted matching algorithm based on subject, year level, schedule, preferred learning style, and language. The system addresses limitations of existing peer-matching platforms, particularly in rural settings with limited resources and connectivity, by providing a lightweight and transparent recommendation process. This research is relevant in enhancing academic collaboration and supporting the development of efficient, explainable recommender systems for education.

II. LITERATURE SURVEY

Recent studies in collaborative learning and educational technology emphasize the growing use of digital platforms to support student interaction and peer learning in higher education. Globally, recommender systems and weighted matching algorithms are widely used to identify suitable study partners by analyzing user preferences such as subject area, schedule, and learning behaviour. Locally, research highlights that although digital learning tools are increasingly used in Philippine universities, students in rural areas still face challenges such as unstable internet connection, limited device access, and difficulty in finding structured systems for forming study groups. Existing literature suggests that lightweight and accessible mobile-based systems are needed to support effective peer collaboration in resource-limited environments.

III. DESIGN AND METHODOLOGY

The methodology of SmartStudy Cantilan systems being developed follows the Agile Software Development Life Cycle (SDLC) model where, using this model, users develop it through iteration, continuously testing the actual development to further improve the system while meeting the needs of the users.

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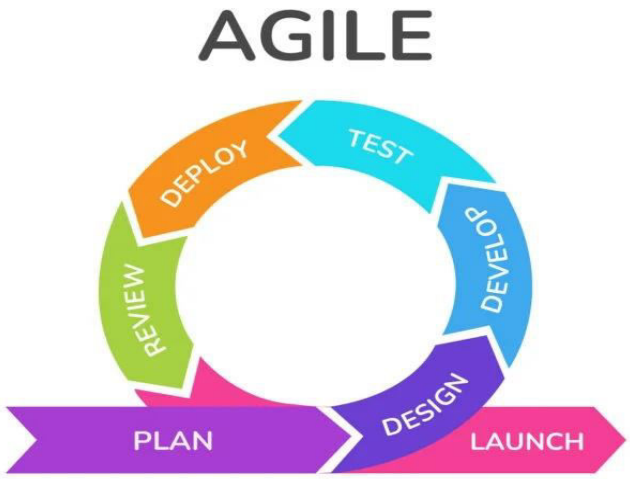

Figure 3.0 Agile Method

In the design the structure of the system, including the database structure, user-level user interface design, and algorithm implementation. Development phase: Coding the system using HTML, CSS, JavaScript, PHP, MySQL and bootstrap including using the Camera Webrtc (imagga api) for the video-based study sessions. Testing- the system has been found to be working properly with required results before being deployed.

$$CS = (W_1 \times C_1) + (W_2 \times C_2) + (W_3 \times C_3) + (W_4 \times C_4)$$

Figure 3.1 Weighted Matching Algorithm

- CS = Compatibility Score
- W = Weight assigned to each variable
- C = Matching value (1 if matched, 0 if not matched)

The SmartStudy Cantilan system implements a Weighted Matching Algorithm to recommend compatible students that can be study partners among its users. There are profile variables that the algorithm analyzes in the matching process, such as subjects, year level, schedule availability, and mode of meeting.

Table 3.1 Weighted Matching Percentage

Criteria	Weight
Course	15%
Year Level	15%
Subject Preference	30%
Study Technique	20%
Schedule Availability	20%
TOTAL	100%

Table 3.1 shows the weighted matching criteria used by SmartStudy Cantilan in matching students. Each profile variable is given a percentage weighting on how important it is when determining two students' compatibility. Subject preference has the most weight, because students studying the same subject are likely to be more compatible to study with. The other variables, which includes course, year level, study technique and schedule availability, contributes a score in giving the system the ability to target students w/in similar contexts of study and habits. These form the weights used in the weighted matching algorithm to come up with compatibility score and recommended study partners.

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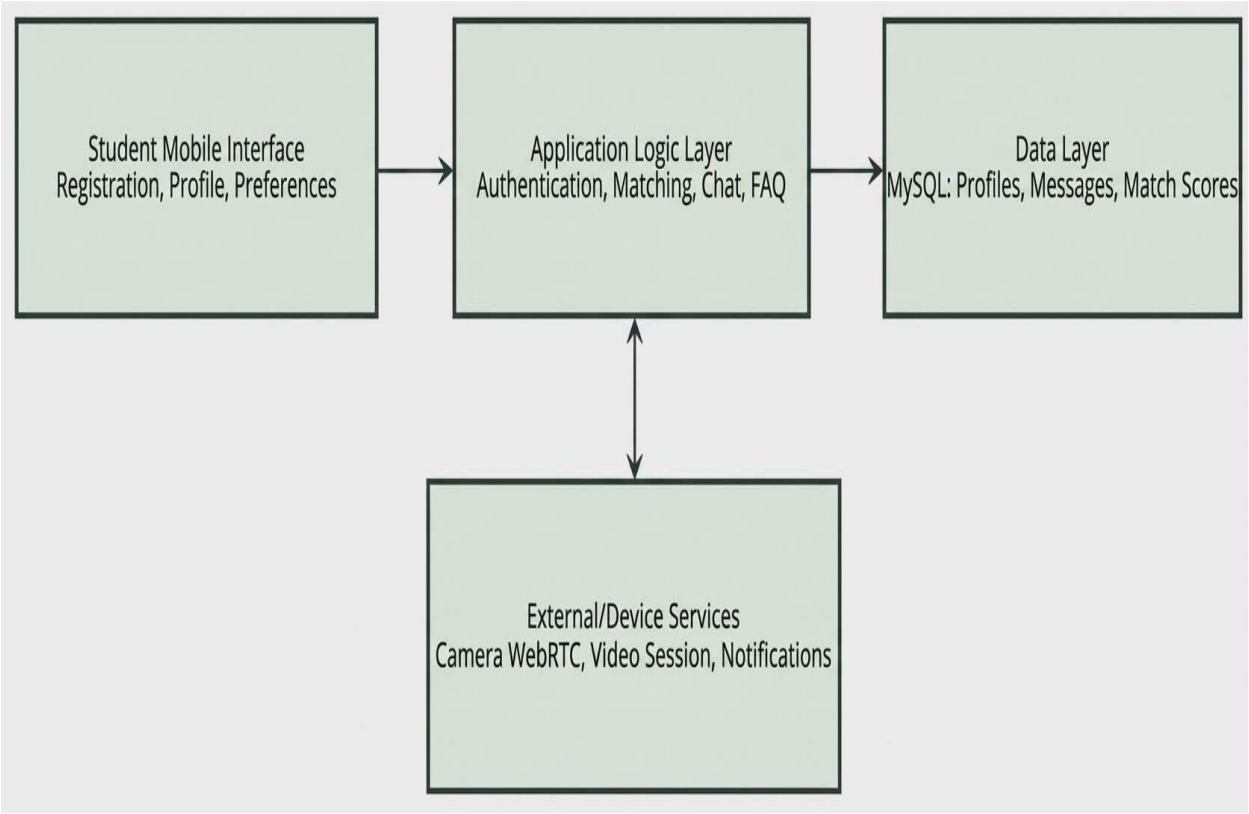
IV. RESULTS AND DISCUSSION

The development of SmartStudy Cantilan successfully produced a mobile application that recommends compatible study partners using a weighted matching algorithm based on course, year level, subject preference, study technique, and schedule availability. The system was developed using HTML, CSS, JavaScript, PHP, MySQL, Bootstrap, and Camera WebRTC with Imagga API integration. The application was evaluated using the ISO/IEC 25010 software quality model through survey questionnaires answered by selected college students from North Eastern Mindanao State University.



Based on the system implementation, users can register and input academic profiles including course, year level, study preferences, and availability, which are processed by the AI matching algorithm to generate compatible study partners with match scores ranging from 73% to 100%. The dashboard provides access to core features such as pairing, messaging, and support tools, while the chat and video call functions enable real-time academic communication. Overall, the results show that SmartStudy Cantilan effectively supports peer-assisted learning through accurate matching, user-friendly design, and reliable communication features suitable for low-connectivity academic environments.

Table 4.10 Overall Result

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Question	Weighted mean	Verbal Interpretation
1. Functionality	3.89	Agree
2. Performance Efficiency	3.88	Agree
3. Compatibility	3.99	Agree
4. Usability	4.05	Strongly Agree
5. Reliability	4.00	Agree
6. Security	4.20	Strongly Agree
7. Maintainability	4.09	Strongly Agree
8. Portability	4.18	Strongly Agree
TOTAL	**4.04**	**Strongly Agree**

The findings support previous studies which stated that recommender systems and collaborative learning platforms improve student interaction and engagement. Similar to the studies of (Kumar and Sharma), the system demonstrated that peer-matching technology can support collaborative learning through communication and recommendation features. The results also align with the findings of (Wang and Zhao), which emphasized that weighted matching algorithms improve recommendation accuracy by analyzing user preferences and compatibility factors. Overall, the results indicate that SmartStudy Cantilan is a functional and reliable mobile application capable of supporting peer-assisted learning in rural academic environments.

V. CONCLUSION

The study successfully developed SmartStudy Cantilan, a mobile application that uses a Weighted Matching algorithm to pair students based on academic and personal learning preferences such as course, year level, subject interest, study techniques, and schedule availability to promote collaborative learning among students in Cantilan, Surigao del Sur. The system was developed using the Agile Software Development Life Cycle and evaluated using the ISO/IEC 25010 Software Quality Model, obtaining satisfactory to high ratings in usability, reliability, performance efficiency, and functional suitability (3.88–4.05 weighted mean). Results indicate that the application is intuitive, functional, and suitable even in low-connectivity environments, making it a viable tool for supporting peer-assisted learning and improving student collaboration in rural tertiary education settings.

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