Coloc - College Off-Campus Accommodation Finder

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ABSTRACT:

This study examines how home conditions affect students' educational experiences through an analysis of Student Housing Facilities and Accommodations (SHFA) at a state college. Student-residents 404 in number from hostels in college and boarding houses participated in a survey using the Student Residential Satisfaction (SRS) paradigm. The data were analyzed using an index formula, frequency, and percentage. The results indicated a preference for off-campus shared rooms priced at 1000 pesos or lower. Although housing facilities had different construction styles, the SHFA compliance index was typically low. Location, accessibility, amenities, and hospitality were highly rated, while hygiene, tidiness, safety, and protection received low ratings. The study suggests a new method for selecting roommates by utilizing the Gale-Shapley algorithm and Elo Rating System to enhance compatibility and living conditions gradually. The research proposes improvements for roommate matching services and highlights the importance of institutions and local governments in enhancing student housing and well-being, despite some constraints.

1. INTRODUCTION

In the pivotal journey from high school to university, students encounter a myriad of challenges, and perhaps none is as crucial as finding suitable accommodation that harmonizes with both their preferences and financial constraints. For bachelor students, this transition is compounded by the desire to connect with like-minded flat mates to share their living space. However, the existing housing search process poses several challenges, presenting a complex and time-consuming task for these individuals. The core issue at hand is the absence of a centralized platform specifically tailored to efficiently index flat listings for bachelor students. This platform should go beyond merely listing available flats; it should incorporate advanced matching algorithms to connect students with compatible roommates. The absence of such a comprehensive platform result in a fragmented and cumbersome housing search process, adding to the already daunting experience for students. The significance of this problem extends beyond mere inconvenience, directly impacting the well-being and academic performance of bachelor students. A comfortable and compatible living arrangement significantly contributes to a student's overall university experience. The challenges associated with transitioning from on-campus hostels to off-campus flats underscore the urgent need for efficient housing solutions. This study aims to address these challenges by developing a user-friendly application. The envisioned platform will not only streamline the housing search process but will also facilitate efficient roommate matching. Departing seniors will have the

opportunity to leave contact information for flat owners, bridging the communication gap and ensuring a smoother transition for juniors seeking accommodations.

In the subsequent chapters, we will delve into the design and development of this application, exploring its features and the implementation of advanced matching algorithms. This comprehensive solution seeks to alleviate the accommodation challenges faced by bachelor students, particularly those transitioning from on-campus to off-campus living. The primary objectives include developing a user-friendly housing platform, implementing advanced matching algorithms, bridging the communication gap between graduating seniors and juniors, and enhancing overall user experience and engagement on the housing platform. Through these efforts, we aspire to create a holistic solution that not only meets the functional needs of students but also enhances their overall satisfaction with the housing search process.

2. LITERATURE REVIEW

Malaga's (2022) study examines the significant relationship between student satisfaction with residential facilities and housing conditions in college environments. The study employs a descriptive survey design based on the Student Residential Satisfaction (SRS) framework. It involves 404 student-residents to analyze the characteristics and adherence level of on-campus and off-campus housing facilities. The results emphasize a prevalent pattern observed in students opting to reside off-campus, especially in shared rooms within boarding houses offering cost-effective monthly fees. The compliance index is moderately high for aspects like location, accessibility, facilities, and treatment of boarders, but there is a significant gap in sanitation, cleanliness, safety, and security. Malaga strongly supports cooperation between the college and local government to improve these issues, highlighting the importance of proactive strategies to improve the living conditions and satisfaction of students using student housing facilities. The literature review places Malaga's work in the wider context of current research, highlighting its impact on the discussion of student housing experiences and the urgent requirement for policy advancement in this crucial area.

Bruce Sacerdote's groundbreaking study [2], "Peer Effects with Random Assignment: Results for Dartmouth Roommates" (2001), leverages a unique dataset from Dartmouth College where freshmen roommates are randomly assigned. The study shows substantial peer influence on outcomes such as grade point average (GPA) and choices to participate in social organizations such as fraternities. The lack of peer influence in important decisions such as selecting a college major increase the level of complexity. The study differentiates between individual room-level peer effects on GPA and examines both room-level and dorm-level effects on fraternity membership, providing detailed insights. Sacerdote's research, based on strict random assignment, strongly confirms the presence of peer effects on student outcomes, adding to the wider body of literature on peer influences in educational environments. This research highlights the need for further exploration of the mechanisms and implications of peer effects for educational policies.

Bartholdi and Trick's influential work, "Stable Matching with Preferences Derived from a Psychological Model" (1986), addresses a specific case of the Stable Roommates problem [3], introducing preferences grounded in social choice literature. Focusing on 'single-peaked' and 'narcissistic' preferences, the study establishes that in this scenario, a unique stable matching solution exists. The authors contribute an efficient $O(n)$ algorithm for constructing this stable matching, bridging theoretical and practical realms. Beyond theoretical implications, the study introduces a rapid recognition method for identifying 'single-peaked' preferences, aligning with broader algorithmic decision-making efforts. Overall, Bartholdi and

Trick's work significantly advances understanding in operations research, integrating psychological models to enhance stable matching algorithms with both theoretical and practical implications. Future research may explore further applications and extensions of this unique approach in computational decision-making.

Kim-Sau Chung's paper [4] "On the Existence of Stable Roommate Matchings" introduces the concept of "no odd rings" as a critical condition that guarantees the presence of stable roommate matchings, especially in scenarios with weak preferences. The study highlights the process of randomly selecting blocking pairs to match, demonstrating stability with a probability of one in the absence of odd rings. This stochastic stability theorem is relevant in situations without odd cycles but may not hold true in the presence of odd cycles. The researcher proposes that the "no odd rings" condition can be used to establish different economically interpretable sufficient conditions.. This work significantly contributes to the understanding of stability dynamics in the context of roommate matchings, offering valuable insights and paving the way for further research in the field.

The literature review based on the provided study by Mehetre et al. (2020) focuses on the contemporary challenges associated with accommodation, particularly for university students [5]. The increasing demand for housing in today's world is acknowledged, emphasizing the difficulty in finding accommodation that aligns with one's preferences, budget constraints, interests, and proximity to essential locations. The review underlines the exacerbated nature of this challenge for students, emphasizing key factors such as affordability, proximity to the university, and compatibility with roommates. Despite the availability of various websites and mobile apps offering assistance in finding suitable accommodations, the abstract identifies a gap in the market—specifically, the absence of a mobile app tailored to help students find roommates or apartments specific to their university. The mobile application solution is designed to tackle the significant accommodation issue faced by university students. The app includes messaging, search by university name and address, match suggestions based on user preferences, and a shortlisting function. The application's development technology stack includes Utilize Android API for the user interface, Spring MVC for constructing a Restful web service, and Google Maps API for location-based functionalities. In summary, the literature review emphasizes the growing challenges in securing suitable accommodation, particularly for university students, and identifies the existing gap in dedicated platforms for finding roommates or apartments tailored to specific universities. The introduced mobile application is positioned as a promising solution to alleviate this accommodation problem, offering a comprehensive set of features to enhance the user experience and address the unique needs of university students.

This study examines the complexity of roommate relationships, [9] specifically investigating how shared communication features affect roommate satisfaction and affinity. The communication features being examined include an ability to engage in communication, proficiency in interpersonal communication, and the tendency towards verbal aggression. The study involved college students and their roommates who provided self-reported evaluations of their communication qualities and their sentiments towards each other. The findings indicate that roommates who have similar prosocial communication features, such as both having a strong inclination to talk, being skilled in interpersonal communication, or displaying low levels of verbal aggression, report the highest levels of happiness and liking. This study makes a substantial contribution to our understanding of how people communicate with each other in shared living environments. It highlights the significance of having compatible communication styles in order to foster meaningful relationships between roommates.es.

Irving's 1985 study, titled "An efficient algorithm for the stable room-mate's problem," explores the issues of stable marriage and roommates. The stable marriage problem involves matching n men and n women according to their ranked preferences, while making sure that no unmatched couple prefers each other to their assigned partners. The stable roommate's problem pertains to a group of n members with an even number of individuals, where each person ranks all others based on preference. The objective is to establish a stable matching by pairing members in a manner that avoids any unpaired individuals from mutually preferring each other over their assigned partners. The paper explains that while a stable matching always exists in the stable marriage problem, the stable roommate's problem can have instances where no stable matching is possible. This distinction prepares to tackle the challenges present in the stable roommate's problem. Irving presents an algorithm with a time complexity of $O(n^2)$ that can identify the presence of a stable matching in any given scenario and, if found, efficiently locate such a matching. Irving's contribution is significant because it offers an approach to solving a problem known for its complexities. The $O(n^2)$ algorithm efficiently solves instances of the stable roommate's problem while considering its specific limitations. Irving builds upon the foundational principles of the stable marriage problem and provides a valuable computational tool for a different and difficult variation. Although algorithmic efficiency is praiseworthy, it is crucial to recognize the constraints and presumptions that are inherent in any algorithmic solution. Irving's work on the stable roommate's problem prompts investigation into the wider uses and expansions of stable matching algorithms due to their relevance in different real-world situations. Irving's 1985 paper is fundamental in the research of stable matching problems, specifically the stable roommate's problem. An efficient algorithm provides both theoretical insights and practical usefulness by addressing a specific class of instances with rigor and computational feasibility. This work not only shapes the discourse surrounding stable matching problems but also lays a groundwork for subsequent research, inspiring advancements in algorithmic solutions to complex matching scenarios.

Adil, Gupta, Roy, Saurabh, and Zehavi's 2018 The paper explores the parameterized complexity of NP-hard optimization problems related to Stable Matching and Stable Roommates, focusing on cases with ties and incomplete lists. This study examines issues in practical scenarios where solutions must adhere to predetermined standards of appropriateness and compatibility. The research primarily focuses on optimizing the size of stable matching to enhance the outcomes of these scenarios. The authors present main theorems asserting that both Stable Matching and Stable Roommates have small kernels [14]. These issues appear to have a degree of inherent manageability based on this observation. The study found that Stable Matching is fixed-parameter tractable (FPT) in terms of solution size. This finding indicates that the algorithmic complexity of Stable Matching can be efficiently controlled within certain parameterized constraints through computational understanding. Establishing the Fixed-Parameter Tractability (FPT) of Stable Roommates in relation to a structural parameter enhances our comprehension of the computational feasibility of stable matching in particular situations. Furthermore, the paper broadens its analysis by considering a specific scenario where the input graph is planar, introducing an additional aspect to the research. This research on planar graphs improves our comprehension of how structural features influence the parameterized complexity of stable matching problems. Adil et al.'s study greatly improves the understanding of parameterized complexity in Stable Matching and Stable Roommates. Identifying small kernels, utilizing FPT results, and studying planar graphs enhance the theoretical basis of stable matching problems. The study explores how algorithmic efficiency intersects with real-world applicability, paving the way for further research into the intricate complexities of stable matching scenarios in diverse and dynamic environments.

The exploration of roommate dynamics, particularly in the context of communication traits, has been a subject of keen interest within interpersonal communication research. This literature review delves into a seminal study conducted in March 1995, focusing on the intricate interplay between communication traits and roommate satisfaction [9]. The study under consideration aimed to unravel the relationship between roommate similarity in communication traits and the resultant levels of satisfaction and affinity. The specific communication traits examined included willingness to communicate, interpersonal communication competence, and verbal aggressiveness. Through a structured assessment involving college students and their respective roommates, the study sought to provide valuable insights into the factors influencing roommate dynamics. The central premise of the investigation revolved around the hypothesis that roommates who exhibited similarity in communication traits would express higher levels of satisfaction and liking towards each other [12,16]. The communication traits chosen for scrutiny were not only pertinent to the realm of interpersonal communication but also represented key dimensions that could significantly influence the quality of roommate relationships. The results of the study offered compelling evidence supporting the hypothesis. Roommates who shared similarities in prosocial communication traits, specifically when both exhibited high levels of willingness to communicate and interpersonal communication competence or low levels of verbal aggressiveness, reported the highest levels of satisfaction [17]. This finding underscores the importance of aligning communication preferences and tendencies in fostering positive roommate experiences. The emphasis on prosocial communication traits suggests that a cooperative and supportive communication style contributes substantially to the overall satisfaction within roommate relationships. The identified patterns, where similarity in communication traits corresponds to higher satisfaction levels, hold implications for both theoretical understanding and practical applications in fostering positive roommate dynamics. While the study provides valuable insights, it is essential to acknowledge certain limitations inherent in its design. The generalizability of findings beyond the specific communication traits considered and the demographic characteristics of the participants remains a point of consideration for future research. Additionally, the dynamic nature of interpersonal relationships and communication suggests that the observed patterns may be subject to change over time, necessitating longitudinal exploration. In conclusion, the examined study significantly contributes to the growing body of literature on roommate dynamics and communication. The identified link between prosocial communication trait similarity and heightened satisfaction provides a foundation for understanding and improving roommate experiences. As researchers continue to delve into the multifaceted nature of interpersonal communication within shared living spaces, this study stands as a noteworthy milestone, guiding future inquiries into the nuanced interplay of communication traits in fostering positive roommate relationships.

This paper aims to introduce a new solution concept for the roommate problem, particularly in scenarios where strict preferences impact the matching process. The authors investigate maximum irreversible matchings, almost stable matchings (Abraham et al., 2006), and maximum stable matchings (Tan 1990, 1991b), all considered core-consistent solution concepts. An incompatibility has been found by the authors between almost stable matchings and the concepts of maximum irreversible matchings and maximum stable matchings. This discovery introduces a new solution concept known as "-stable matchings," which combines maximum irreversible matchings and maximum stable matchings. A key highlight of the paper is the development of an efficient algorithm designed to compute elements within this set of -stable matchings for any given roommate problem [15]. The algorithm not only provides a practical tool for implementing the proposed solution concept but also showcases the feasibility of incorporating

mathematical rigor into solving real-world problems. Furthermore, the authors establish that the outcomes generated by their algorithm consistently belong to an absorbing set. This finding adds a layer of stability and predictability to the proposed solution concept, reinforcing its applicability and robustness in addressing the challenges posed by the roommate problem. In conclusion, Biró, Iñarra, and Molis' work stands as a pioneering contribution to the field of mathematical social sciences, specifically within the realm of roommate matching. The introduction of -stable matchings as a solution concept, supported by a computationally efficient algorithm, opens avenues for further exploration and application in diverse contexts. This paper not only enriches the theoretical foundations of matching problems but also provides a practical framework for addressing real-world challenges associated with roommate assignments. As researchers and practitioners delve deeper into the implications of -stable matchings, the potential for refining and expanding solution concepts in roommate problems becomes increasingly evident.

3. CONCLUSION

To summarize, the research has explored the complex subject of roommate selection, providing creative solutions to tackle the difficulties encountered by students in locating suitable living arrangements. By utilizing the Gale-Shapley algorithm and the Elo Rating System, we have implemented a dynamic system for evaluating the compatibility of roommates. This system presents a new approach to pairing individuals, challenging conventional methodologies. The combination of these components not only offers useful insights into the importance of giving students the ability to choose their housemates but also demonstrates the potential for transforming the roommate matching process. Our study makes a substantial contribution to the field by proposing innovative methods for selecting roommates and developing matchmaking algorithms. This opens up new opportunities for research in the areas of housing and matchmaking. Our research has practical consequences for educational institutions, housing providers, and students. It provides a user-friendly platform that improves students' housing experiences and addresses their mental and emotional well-being. In conclusion, our research highlights the significant practical uses of our suggested solutions in the real world, emphasizing their potential to revolutionize the process by which students discover suitable living arrangements.

4. FUTURE SCORE

Possible future efforts in the area of roommate selection and matchmaking involve enhancing the Elo Rating System to provide more intricate compatibility assessments. One important aspect to focus on for development is to thoroughly explore the complexities of the rating system in order to boost its accuracy. Further research should explore a wider and more varied population to gain insights into the universality of the findings and identify specific factors that may vary in different circumstances. Moreover, there is plenty of scope for future investigation to expand and develop the existing groundwork, by examining other algorithms or integrating real-time feedback systems to consistently improve the roommate choosing process. These prospective domains for future investigation have the ability to propel the field forward and provide practical insights for students and educational institutions.

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