



Data Mining Model for University Hostel Space Allocation (DMM-UHSA)

Ejiofor C. I.¹ & Mgbeafuluike .I.²

Department of Computer Science, Chukwuemeka Odumegwu Ojukwu University,
Igbariam Campus, Nigeria^{1,2}

Abstract: Model based hotel space allocation has been developed with integral design functionalities exposed using Unified Modeling Language (UML). This process was undertaken with the aim of eliminating Manual based hostel space allocation which could be difficult in addressing student preferences. The designed model: Data Mining Model for University Hostel Space Allocation (DMM-UHSA) comprises of five model components: Allocator, Inferencer, Preprocessor, Knowledgebase and Viewer. These components identify the structural composition of the model.

Keywords: Data mining, Students, Hostel

I. Introduction

Hostel space allocation is an integral facet of most university based education. It provides an avenue for students to obtain a convenient residential location during their course of study either semester or session base (Agbem, 2010). These hostels are usually located in carefully chosen locations within the university in order to achieve: educational knowledge without stress (Oladiran, 2013). These hostel spaces have been built using university generated funds, funds from cooperative bodies or supports received from larger governments (internal or external). With these hostel spaces in place, students pay a fee in order to obtain allocated hostel space. These spaces are given to students on a periodic basis upon their confirmation on their diligent application of hostel allocation space requirements (Norazah and Iftekhar et al., 2015).

Overtime due to the quest of university education and the attainment of a paper based certificate at all cost, university hostels are facing tremendous challenges from limited allocation space, to inadequate hostel equipment, faulty structures and the sexual pervasiveness cost by these hostel systems (Isak, 2003). These hostel systems have also provided for poor reading structures due to overcrowdedness of students located in these hostels. The underfunded educational institution has indeed provided another serious challenge hampering adequate space allocations (Ha, 2008; Hassanain, 2007).

With these challenges in place, it is difficult to place students in hostel allocation based on their preferences: sex, level, course of study, bed space, and status and hostel bed space. In fact in some institution there is no distinction between male and female hostels, neither is there available land space to specially allocate this hostel space.

These lingering issues have been traced to student poor academic performance and the decline in education system (Oladiran, 2013). With this in focus, it is the intent of this research paper to develop and design a data mining model with the capability of addressing student hostel space allocation with associated preferences.

II. Material and Method

This section provides a brief review of related works on hostel space allocation which has been explored over the years. It also touches on data mining. This section provides and identifies certain limitations opening the way for future progression. These limitations provide an avenue in implementing a novel technique; model based on identified limitation. Tables 2.1 provide a brief review of related literatures pertaining to hostel space allocation.

Table 2.1: Review of Related works on Data mining

SN	Author (Year)/Title	Goal	Strength/ Finding	Limitation/ Weakness	Further Research
1.	Oladiran, (2013) A Post Occupancy Evaluation Of Students' Hostels Accommodation	investigate students' hostel accommodation and users' satisfaction..	Strong descriptive finding	No model based solution was implemented	No model based solution
2.	Norazah and Iftekhar et al., 2015 Students' Attitude and Satisfaction Living in Sustainable On-Campus Hostels	Determine if hostel quality and location affect student performance	Customer satisfaction as regard to student	No model based solution was implemented	No model based solution
3.	Isak, 2003 Resident Student Perceptions of On-Campus Living and Study	Measures resident student perceptions of on-campus living and study	Customer satisfaction as regard to student	No model based solution was implemented	No model based solution

The research work reviewed from Table 2.1 captures some fundamental issues which will prompt future research on data mining utilized. This literature was mostly descriptive with little attention paid to model design and development implementing data mining. Therefore base on the limitation of these literatures, it is the intent of this research paper to provide a model for allocating student hotel space been on respective preferences.

III. Data Mining Model for University Hostel Space Allocation (DMM-UHSA)

The designed data mining model aimed at allocating university hostel spaces will gradually eliminate the challenges faced in placing student based on their study preferences. The model employ implement five components: Allocator, Inferencer, Preprocessor, Knowledgebase and viewer. This model component forms the fundamental building block of the model. The model employs fundamental data mining tools: Genetic Algorithm (GA) and Fuzzy Inference System (FIS). These data mining tool: FIS, collect information from student with regards to their preferences with student sorted into various categories while GA, being a search algorithm finds hostel space based on the student category. Figure 3.1 graphically depicts the Data Mining Model for University Hostel Space Allocation (DMM-UHSA)

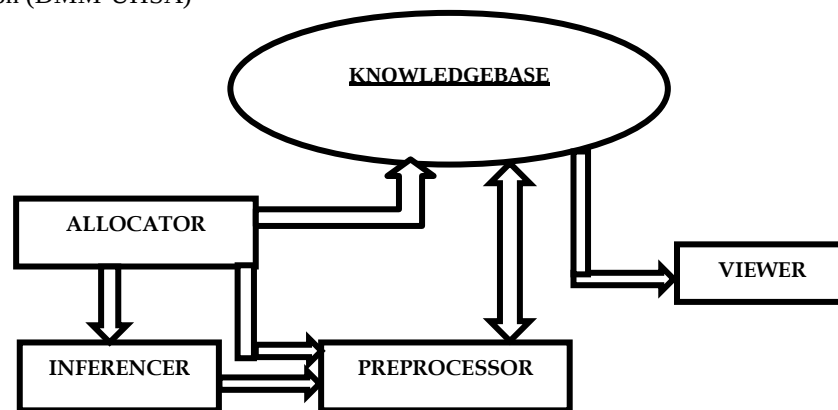


Figure 3.1 Data Mining Model for University Hostel Space Allocation (DMM-UHSA)

The elucidation of the model components are:

Allocator: The allocator served as the main input to the model. The hostel allocation module allows students to enter their preferences. These preferences integrate with the inference which invariably applies linguistic labels associated with linguistic variables in achieving preferred preferential student hostel space. It is the responsibility of the allocator to interface with the preprocessor accepted hostel spaces and storing it in the model knowledgebase.

Inferencer: The inferencer interface with the allocator in obtaining needed preferences. These preferences are entered with the allocator module and are sent to the inferencer module of the model. The student preferences are categorized and generate varied student preferences. Tis information is sent to the GA to search for these best hostel spaces in student. The categorized information is sent into the preprocessor.

Preprocessor: The preprocessor model student preferences with the aim of searching for optimum hostel space. The list of available hostel space sent into the preprocessor is the list of hostel spaces available. The preprocessor integrate with knowledgebase, allocator and the inferencer in collecting hostel space and student information. This module is largely dependent on the three aforementioned components. The preprocessor selector and operator will be employed in this model. The preprocessor component of the model utilize a value encoding method with components comprising of the category value, sex, level, course of study, bed space status and hostel bed space

Knowledgebase: The knowledgebase houses information about hostel space and students and who the hostel spaces are allocated to. The knowledgebase interact primarily with the viewer in providing need output, the allocator in accepting user preferences and the preprocessor in accepting the best searched result.

Viewer simply provides model base information to the end users. Therefore this is sees model based output.

IV. Design of Data Mining Model for University Hostel Space Allocation (DMM-UHSA)

The design ofData Mining Model for University Hostel Space Allocation (DMM-UHSA) was handled using Unified Modeling Language (UML), been an object oriented support tools. The quest for UML in designing the integral functionalities was inspired due to: environmental acceptance, simplicity of implementation and large user communities. The main aim of design was the showcasing of the identified objects and the synchronous message exchange between these objects. Figure 4.1 portray Sequence Diagram identifying the Data Mining Model for University Hostel Space Allocation (DMM-UHSA). The sequence diagram comprises of five model objects: *Allocator*, *Inferencer*, *Preprocessor*, *Knowledgebase* and *Viewer*. These objects interact in a synchronous manner. The Allocator accepts student preferences, these preferences are sent to the Inferencer. The preferences are subsequently stored in the Knowledgebase. The preferences are simultaneously passed by the knowledgebase

- Oladiran O. J (2013), A Post Occupancy Evaluation of Students' Hostels Accommodation retrieved online from journalarticle.ukm.my/7010/1/78-186-1-PB.pdf
- Norazah M. S. and Iftekhar A. C. (2015), Students' Attitude and Satisfaction Living in Sustainable On-Campus Hostels, Malaysian Journal of Business and Economics, Vol. 2, No. 1, 2015, 35 – 47