Addis Ababa Science and Technology University

College of Electrical and Mechanical Engineering

Department of Software Engineering

Course: Communication and Presentation Skills (SwEg8113)

Assignment 1: Make a critical Review on MSc Thesis work

Thesis title: “Rule Based Expert System for Classifying HIV Patients Taking ART At Asella and Adama Hospital”

**Prepared by : Yordanos Gebeyehu ID: GSR363/14**

Submitted to: Solomon Tefera (PhD)

Feb 9, 2022

**Problem identification**

I consult one senior staff in our department who was PhD candidate from abroad to indicate or locate Msc thesis research area and he gave me an idea to read on knowledge extraction and business intelligence and I start explore the basic ideas on that domain. After understanding the area am selected healthcare service since in our country the health care sectors lacks patient handling system. From health care I decide to focus on HIV patients who are in ART because one of my uncle suns was affected by this disease and was starting the treatment but after 2 years of treatment he decided to terminate it and focus on religious matters. But after 5 years he become paralyze and again starts the treatment. So, this makes me ambitious to focus on HIV patients.

**Statement of the problem**

* The hospital couldn’t easily trace the patient’s status in terms of clinical and socio-demographic category.
* Patient’s data is not used by the hospital to give smart consultation service which recognizes their living standard.
* Negligence of consultation physician to serve the patients in patient manner
* Number of patients that terminate the treatment increase through time.

**Research questions**

1. What are the challenges of classifying patient’s data in clinical and socio-demographic category?
2. What kind of rule extraction algorithm is to be used?
3. What type of behavior does the data have?
4. Is it possible to use rules extracted from data mining to construct knowledge based system?
5. How it is possible to use MVC architectural pattern in knowledge based system?

**General objective**

The general objective of this research is to investigate the applicability MVC design patterns and data mining techniques in the development of rule based expert system for classifying HIV/AIDS patients in ART.

**Specific objective**

In this research paper the following specific objectives are included

• To review different literatures those have relation with the study.

• To collect and analyze working data

• To analyze and identify appropriate data mining rule based classification algorithms.

• To acquire knowledge from classification algorithms for constructing knowledge base

• To analyze and design the prototype system

• To evaluate the performance of the prototype system

• Concluding and recommending from the result

**Significance**

It demonstrates how knowledge is formed using mined rules that are generated by data mining algorithms. The hospitals are able to give smart consultation service in an easy and fast way which takes in to consideration of clinical and socio-demographic status of patients.

**Scope of the study**

The scope of the study focuses on extracting rules, comparing rule extraction algorithms efficiency; form knowledge based and develops standalone consultation/decision support application.

**Limitation of the study**

Due to time limitation, the HIV patients’ health condition in terms of another related health problem like blood pressure, diabetes etc are not detected. The prototype doesn’t provide detail consultation service and the application isn’t web based.

**Methodology and methods applied**

After reading the material given by you, I suggest the quantitative research design for my study because the patient data was taken from Adama and Assela hospital database to acquire knowledge. The purpose of the research is explorative since it looks patterns that affect patients in terms of clinical and socio-demographic categories.

The research method is; for data collection from database and questioner while for quantitative data analysis it is laboratory experiment since the data is mined by using data mining algorithm.

So, this section of the study should be done again by including sampling techniques.

**Literature review (conceptual or related)**

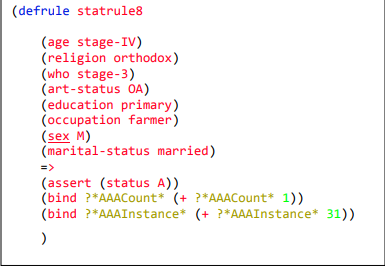
Conceptual topics which have relation with the thesis (artificial intelligence, knowledge based system, data mining) were reviewed.

Related works which have relation with the thesis are identified and using tabular format their work was illustrated.

**The Findings, Discussions, Conclusions and Recommendations)**

RIPPER and PART algorithm of Weka and 10-fold-cross validation test option/mode was used to classify instances.

To develop the prototype, was using JESS (java expert system shell) and java. The classification rules generated by Weka were stored in database. 182 rules are selected from the total rules extracted from the PART algorithm (6273 rules) from 14 attributes to implement the prototype of this research. By JESS, these rules are defined by the defrule keyword or the language and the assert function is used to assert the new attribute value if LHS variables are satisfied.



The **bind** keyword is used to count and add the number of instances in which the fact is exactly matched from the total number of records.

The extracted rules were not evaluated by experts because in their working system they can now the number of patients taking or terminating the treatment but they don’t have any mechanism to know the reason that patients terminate the treatment.

When we came to result of the prototype, it enables the consultation physician to easily know the status of patients whether they are terminating or continuing taking ART and if they terminate it also show that, what are the factors that lead them to terminate taking ART? But when knowledge was retrieved the number of match rules as compared to the total number of instances was not that much in number.

The findings of the research, shows it is possible to form knowledge based system from the mined data. But to optimize the performance of the system, I should organize again by mining the data using more competitive algorithms and the result of knowledge representation should show more number of match rules as it is compared with number of instances. Plus the system should be designed again to give detail consultation service till it do what the real consultation physician do. Finally it will be recommended for the hospital to use the application to simplify their task and also give fast and easy service for patients. Researchers also can modify this work by using machine learning technique and implement mobile based consultation service.

**References (completeness, relatedness, standards)**

ISO-690 Numeric Reference standard was used to quote ideas taken from different literatures, journals, articles, etc I think it is right.

**The Document (Language, topics/sections, consistency, formatting)**

Actually before submitting the document to the department, was giving it for one of our staff/colleague who have better knowhow on English grammar and at that time he was finished and defensed his thesis one semester before me. His thesis was examined by Germen professor evaluator and he gave comment to edit the document for him. So, I think he can edit the faults of my thesis in terms of language usage, consistency of statements and topics/sections and formatting by using knowhow he achieved from that professor. But to submit the paper for journal publication, it should be edited because still I have limitation on rewriting what I understand from the literature in detail on my own words.

**Defense session (your preparation of the slides and content,  
confidence, understanding examiners’ questions, your response to  
the questions)**

The slide was good but i lost confidence on what I achieve from the result since the number of match rules as compared to number of instances are less and plus to that the system lucks exact consultation service beyond filtering and giving report on the factors that affect patients to stop taking ART. Actually they were asking two questions; one regarding on demonstration and the other was document organization. I made demonstration for first question but for the second one am accept the comment. After modifying the document based on given comment, the document was submitted to the department.