



# A Critical Review for Developing Affinity Set Method for Multi Classification and Prediction

Hamdan O. Alanazi <sup>#1,2</sup>, Abdul Hanan Abdullah <sup>\*1</sup>, Moussa Larbani <sup>#3</sup>

<sup>1</sup> Department Computer Science, Faculty of Computing, Universiti Teknologi Malaysia, 81310 Johor, Malaysia.

<sup>2</sup> Department of Medical Science Technology, Faculty of Applied Medical Science, Majmaah University, Kingdom of Saudi Arabia.

<sup>3</sup> Faculty of Economics, IUM University, Jalan Gombak, Kuala Lumpur, 53100, Malaysia.

**Abstract-** Machine learning, a branch of artificial Intelligence targets to make predictions more accurate. Machine Learning methods have been widely used. The notion of affinity set which is one of the machine learning methods can be defined as the distance or closeness between two objects. Unlike the fuzzy Set and Rough Set, the affinity can deal with third objects and deals with time dimension. In addition, it could deal with entities or abstract side by side with real objects. Indeed, the existing models of affinity are developed for binary classification or prediction. This review highlighted that the existing models of affinity set should be developed in order to provide a multi classification or multi prediction.

**Keywords-** Affinity Set, Multi classification and Multi prediction.

## I. INTRODUCTION

Nowadays, computers are playing a major role and have become part and important of the life. Machine learning aims to mimic the intelligent abilities of humans with machines [1]. The theory of the affinity set is introduced by [2] and defined this set as the distance between two objects, where the distance measurement could be real or abstract. This means the affinity set is a natural liking for or attraction to objects or abstracts. In order for this to happen, the affinity needs two elements namely the subjects between whom the affinity takes place and the affinity itself. Unlike the fuzzy Set and Rough Set, the affinity can deal with third objects and deals with time dimension. A notable feature is that it could deal with entities or abstract side by side with real objects. In the study of [3] have used Affinity Set for measuring the performance of non-profit organization. In the study of [4], they have provided a topology concept of Affinity Set as the data mining tool to classify and focus on the key attributes causing delayed diagnosis. Study of [5], introduced the first classification model by using affinity Set. The existing models of Affinity Set would not be able to provide a multi classification and prediction. Thus, the affinity set method should be improved to provide a multi classification and prediction.

## II. AFFINITY SET METHOD

In 2006, Prof. Larbani and Prof. Chen introduced the theory of the affinity set (AS) and defined this set as the distance or the closeness among the entities, where measuring the distance might be an arithmetical measurement or abstract [2]. Unlike other machine learning methods, they originally explored the possibility of proposing a time-dependent set theory, which refers to the relationship between an element and the set to which it belongs. Fig.1 shows a diagram that clarifies the relationship between The Affinity Set (AS) and the elements during an epoch of time. The affinity method can be used for classification and prediction. In addition, AS might for analyzing the relationship between inputs and the outputs of the dataset [2]. In 2009, these authors developed a predictive model for delayed diagnosis. They compared the result based on the accuracy of their model with the SVM, an NN, a rough set (Rosetta), and logistic regression. It was found that the Affinity set Model was more accurate than ANNs, Rough Set and logistic regression models. Logistic regression performed poorly in this comparison [5].

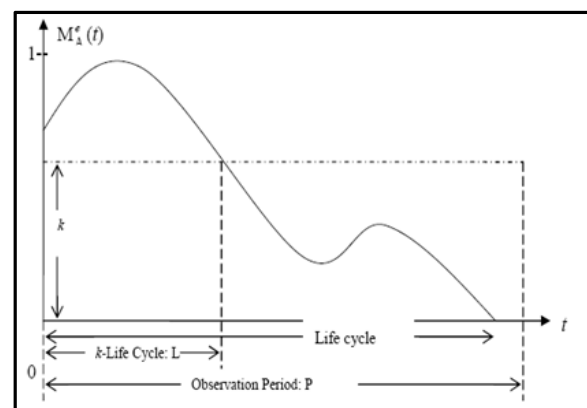


Fig.1: The relationship between The Affinity Set (AS) and the elements (e) during an epoch of time [5]

### III. CRITICAL REVIEW ON EXISTING AFFINITY SET MODELS

A critical review of existing models of affinity set has been done and illustrated as shown in table 1.

As shown in the Table 1, there are some existing models of affinity Set have been developed for analysis and classification. However, the developed model for classification was for binary classification and prediction

### V CONCLUSIONS

Machine learning methods are using widely for providing a classification and prediction. Some of the machines learning methods are able to provide a binary prediction side by side with a multi prediction. However, some of the methods would not be able to provide a multi prediction or classification. The existing models of affinity set models are used to obtain a binary classification. This paper is shown that the affinity set method need to be evolved to be able to provide a multi classification and prediction.

TABLE 1

A Critical Review on existing Affinity Set Model Author(s) and Year	Title	Contribution	Multi Classification
Huang and Chen - 2012 [3]	Qualitative data envelopment analysis by affinity set: a survey of subjective opinions for NPOs	They have used Affinity Set for measuring the performance of non-profit organization.	X
Chen et al. - 2009 [5]	Introduction of affinity set and its application in data-mining example of delayed diagnosis	They have used Affinity Set as a Binary classification or predictor for delayed diagnosis.	X
Larbani et al.- 2009 [6]	A Fuzzy Set Based Framework for Concept of Affinity	They have introduced a frame work of the Fuzzy Set.	X
Chen et al.- 2009 [4]	Made use of Affinity Set to find vital traits of Delayed Diagnosis	They provide a topology concept for the Affinity Set which could be used as a data mining tool to categorize and concentrate on the important traits which cause delayed diagnosis.	X
Chen and Larbani- 2006 [2]	Developing the affinity set and its applications	They have introduced the concept and theory of Affinity Set and its application. In addition, they present the mathematical model of the Affinity Set.	X

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