

# SOME NEW FUZZY DATA ANALYSIS MODELS AND THEIR APPLICATIONS

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The concept of *fuzzy set theory* was originally introduced by Zadeh in 1965. It has a wide range of applications in data processing and decision making problems especially when the data is an unsupervised one, involving uncertainty and ambiguity. This thesis focuses on data processing. In particular, it analyzes the data which are qualitative in nature, i.e. all the models in this thesis, the input data is not obtained from any available raw numerical data but it resembles the feelings and the psychology of the human reasoning and behaviour. That is, the input data in the models are mainly linguistic expression like *Good, Important, Very Poor*, etc.

Different people have different ideas and thoughts. So it is very difficult to analyze these types of data using existing data analyzing models namely probabilistic and stochastic models etc. The choice of fuzzy set theory to analyze the data is more meaningful and appropriate for it is the only existing theory which tackles uncertainty and vagueness in a proper and in a more sensitive manner. This thesis constructs some new fuzzy data analysis models in which some of them are extensions of the

existing classical fuzzy data analysis models and some of them are new models which have been constructed to tackle specifically any social and psychological problem. It is important to state that these models can also be used to analyze any industrial, engineering and scientific problem. This thesis constructs the following fuzzy models namely (1) Fuzzy non-homogeneous data analysis model (2) Fuzzy analytical hierarchy process model (3) Fuzzy trapezoidal model, (4) Multi-fuzzy associative memories model, and (5) Fuzzy relational operators model and has applied them to real-world problems.

Parts of this thesis have been published as the following papers.

1. *Multi-FAM model and its applications to analyze habits and its consequences in HIV/AIDS patients*, Journal of Ultra Scientist of Physical Sciences, Vol.17(2), 241-246, (2005).