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(FAIYAZ AHAMAD)

# PREFACE

Nearly two decades back Respiratory Disorder system identification consisted of several ad-hoc approaches which were restricted to a very limited class of systems. However, with the advent of the various soft computing methodologies like neural networks, the fuzzy logic and the genetic algorithm combined with modern structure optimization techniques, a wider class of systems can be handled at present. Complex systems may be of diverse characteristics and nature. These systems may be linear or nonlinear, continuous or discrete, time varying or time invariant, static or dynamic, short term or long term, central or distributed, predictable or unpredictable, ill or well defined. System outputs may be measurable or un-measurable. Models of real systems are of fundamental importance in virtually all disciplines and hence there is a strong demand for advanced modeling, identification and controlling schemes. This is because models help in system analysis which in turn helps to get a better understanding of the system for predicting or simulating a system's behavior.

Respiratory Disorder is an endless incendiary lung illness. It influences right around 300 million individuals worldwide and causes 4000 passing in a year. The National Heart, Lung and Blood Institute characterizes Respiratory Disorder as a typical unending issue of the aviation routes portrayed by factor and repeating indications, wind current deterrent, bronchial hyper responsiveness (bronchospasm), and a basic aggravation. Open consideration in the created world has as of late centered around Respiratory Disorder as a

result of its quickly expanding Pervasiveness; influencing up to one in four urban youngsters all around. Respiratory Disorder is real general medical issue because of its serious nature and misdiagnosis.

The seriousness of Respiratory Disorder prompting to the phase of death is a direct result recently identification and conclusion of Respiratory. In the field of treatment of Respiratory the gatherings of master specialists are constrained. The inspiration driving taking up this examination work is the possibility that if these specialists' learning and experience can be made accessible to a wide segment of restorative experts and up to a few degrees helpless patients then this sickness can be analyzed at its initial stage and thus its treatment at appropriate time may ease the grievance of this malady. The present study is centered around advancement of a PC based Inference.

Development of new processes and analysis of the existing ones along with their optimization, supervision, fault detection, and component diagnosis are all based on the models of the systems. The challenges involved in modeling, identification and control of a nonlinear system are too many and attempt has been made to tackle them by applying various soft computing methodologies. In most of the conventional soft computing methods the system Modeling results are dependent on the number of training data used. It has been found that the modeling results improve as the number of training data increases. But in many complex systems the number of available training data are less and the generation of new data is also not cost effective. In such a scenario the system has to be modeled with the available data. The proposed modeling scheme been devised keeping such a possibility in mind. The results obtained by applying this proposed model are compared with the results obtained by using various statistical and genetic algorithm based fuzzy models and finally

the relative merits and demerits involved with the respective models are discussed. The work embodied in the present thesis is concerned with optimal design of the

Framework with capacity to analyze the level of seriousness of Respiratory Disorder in view of the learning and experience of specialists in this field conventionally existing soft computing based system models. The statistics based Full Principal Component Analysis and the hybrid validation technique are applied to augment a conventional Artificial neuro-fuzzy technique and the Following observations are noted:

- The results obtained by applying the proposed technique are comparable and in some cases superior to those obtained by using the conventional neuro-fuzzy model.
- Comparable or superior results are obtained with this proposed model even though the number of data pairs used for system modeling here are less as compared to that used in the conventional methods.
- It resulted in reduction of the number of computations involved. As the experiments were performed by using reduced number of specifically chosen data, the number of computations required to be performed also came down.

The preparation of created ANFIS has been completed with the aptitude information and experience of gathering of specialists. According to the discussion and direction of specialists, the demonstrative and information parameters chose are, Force Vital Capacity (FVC), Peak Expiratory Flow Rate (PEFR), FEF2575 (Force Expiratory Flow), and Force Expiratory Volume in One Second (FEV1). Information has been gathered from the records of spyrometry and specialists analysis. The later piece of study is committed to approve the DSS created. Approval has been proficient by utilizing a different section of information gathered. The execution of DSS created for the finding of Respiratory Disorder is very reassuring and satisfactory.