CHAPTER – IX
CHAPTER - IX
CONCLUSION

9.1. CONCLUSION FROM VARIOUS MODELS

The first model in this research work details the diagnosis model, where a deep insight into the definition and different types of diabetes mellitus are dealt with. The genetic study reveals the fact that DR3, DR4 and certain alleles of DQ are powerful enough to create the disorder in the human body, Graphical demonstrations indicate in a pictorial way the extent of risk behind these diabetes causing genes. The model also finds that phenotypic characters of an individual like body mass index, skin thickness, saliva etc. play a vital role in the acquiring of the disorder. Beyond these two factors mutations which are sudden changes in the genes by environment factors of stress, exposure to chemical radiations, life style etc. play significant role in the cause of diabetes. Since these are sudden changes different types of mutations are shown to indicate that any one of these may affect the individuals to get the disorder. The model encircle around the fact that diabetes mellitus is occurring by genetic factors, phenotypic characters and sudden mutations of genes. As there is large amounts of information coupled with large amounts of uncertainty in acquisition of the disease, taken together constitute the ground of the next fuzzy – genetic model.
The levels of risk even after the acquiring of diabetes genes are found to be different. The risk eventually takes a transition from degrees of slight risk to highly significant risk. This forms the basis of analysis [86] in fuzzy set assigning to each diabetic individual a grade of membership. These grades signify the degree to which every individual is prone to the acquiring of this genetic disorder. The model gives a way to find the similarity between the observed allele patterns of diabetes genes and those which create different levels of risk in diagnostic clusters.

The uncertainty [87] prevailing in the acquiring of diabetes mellitus also leads to mathematical modeling where the correlation between various factors in the cause of diabetes in pima Indian population is discussed. Yule's coefficient finds a fact that age is a major factor in the cause of diabetes mellitus. Probabilistic analysis finds that each factor plays a vital role in the cause of the disease independently and all these factors together when unbalanced also leads to the disease.

The posterior probabilistic analysis [88] indicates that the diabetes pedigree function plays a major role and the hereditary nature of the disease is signified by this module of the research work. The analysis gives an eye opening that family history of an individual is vital in anticipating the disorder, and lifestyles can be changed to control the harmful effect of the diabetes mellitus. The data mining model takes Baye's probability method [89] to approximately predict the possibility of acquiring the disorder given the
parameters of the data sample. Analysis by logistic regression indicates that age, PLASMA (glucose concentrates in saliva) body mass index and diabetes pedigree function are significant in causing diabetes mellitus in the sample population taken. The ID3 algorithm [90] given the simple decision tree to find the significant parameters in the cause of diabetes mellitus in Pima Indian Population Sample. From the various methods of Artificial Neural Network Based Neuro-Genetic Analysis of Diabetes Mellitus it is observed that these models promise better predictions of the cases of Diabetes Mellitus due to various reasons defined as parameters. This is due to the contributions of the fields of computer science [91] and this type of investigation will help us to diagnose with better advanced methods in further studies of the medical research not only for diabetes but also for any type of disease. Hence all the factors genetic construction of an individual, family history, stress in life style, mutation in gene, obesity of an individual, age, glucose concentration in saliva are to be taken care in predicting [92] the onset and anticipation of this dreadful silent killer disease and to find a control of the same for a healthy living.

9.2. COMPARATIVE CONCLUSIONS FROM MATHEMATICAL, ARTIFICIAL NEURAL NETWORK, DATA MINING MODELS:-

Mathematical model applied to the problem of studying Diabetes Mellitus in Pima Indian Population analyzes [93] the eight factors like number of times pregnant, plasma in saliva, skin thickness, age, body mass index,
blood pressure, Insulin and diabetes pedigree function interdependently and also independently cause diabetes mellitus. No individual has all 8 factors. So every factor is a positive contributor to the diabetes disorder independently which proves our Null hypothesis. Here the maximum correlation between variable eight (age) and diabetic response indicates that age factor plays major role in diabetic disorders. Yule’s coefficient method [94] brings out a fact that age above 40 has more chances of putting a person at the risk of this disease. The Neural Network model stresses that diabetes pedigree function that is determined by hereditary or genetic factors of an individual plays a major role. This fact is also justified by the analysis of various genetic factors of diabetes in the diagnostic and fuzzy-genetic model. Data mining model [95] enables the prediction of diabetes probability given the eight risk factors by Naïve Bayesian classifier. Logistic regression method highlights the important role played by age, Body mss index, diabetes pedigree function, Plasma (glucose concentration in saliva) in the cause of diabetes in Pima Indian Population.

By the careful observations of mathematical and neural network model even though all the eight factors are equally responsible in the cause of the disease, diabetes pedigree function is significant in both the models along with age factor. The data mining model [96] further supports this fact that, along with other factors (like body mass index and Plasma) age and diabetes pedigree function(pdf) determined from genetic constitution of an individual plays a significant role in the cause of the disease. So taking into account the
significant findings of all the three models age and diabetes pedigree function or the genetic factors are vital and must be taken care by diet planning with calories adjustment, exercise, creating balanced mindset by changing of lifestyles to reduce stress and to control the harmful effects of this killer disease. Diabetes is a disorder not a disease. Hence to save the major organs of the human body, the study of various factors behind the cause of the disease and the control of the blood glucose level is an essential need for a healthy living. The Artificial Neural Network based Neuro-genetic analysis of diabetes mellitus gives a small contribution to signify the risk behind such a killer disease to the society by various models.

9.3. FUTURE ADVANCEMENTS IN COMPUTER AIDED DIABETES RESEARCH IN MEDICAL SCIENCE

In recent years, advances in diabetes research have led to better ways of managing diabetes and treating its complications.

Major advances include

- development of quick-acting, long-acting, and inhaled insulin.
- better ways to monitor blood glucose and for people with diabetes to check their own blood glucose levels by glucometer.
- development of external insulin pumps that deliver insulin, replacing daily injections.
- laser treatment for diabetic eye disease, reducing the risk of blindness.
• successful kidney and pancreas transplantation in people whose kidneys mal function due to diabetes mellitus.

• better ways of managing diabetes in pregnant women, improving their chances of a successful outcome by insulin injection.

• new drugs to treat type 1 and type 2 diabetes and better ways to manage this form of diabetes through weight control, exercise and stem cell technologies of medical research.