Fuzzy statistical Approach for Time series analysis

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Abstract- In the present research paper shows that the fuzzy model for predictions and data analysis comprises for normalization using standardized procedure is comparatively all most unique with the ordinary normalization technique for transformation of the big data for analysis. The paper adopted simple descriptive measure and peace wise correlation techniques are applied for validation of the new technique. The new method is useful to analyse for various parameters for prediction and forecasting of the future conditions of the specified values environment under fuzzy environment.
Keywords – Membership function, Normalisation, Standardised fuzzy number etc.,

I. INTRODUCTION

Fuzzy logics and set theory are introduced by Zadeh for his exploratory data analysis. Fuzzy concepts are wider usage model techniques in all fields of science and engineering. At present applied mathematical techniques also plays a vital role in all fields of science and engineering .Apart from all these mathematical methods, Statistics applies in all sciences and engineering applications.A fuzzy techniques applied in statistics, is a fuzzy statistics, which is helpful to predict and forecast of the time series analysis. Especially, in natural hazards viz., floods,stromes, heavy rainfall etc are very need to predict and forecast to the humanity to reduce the socio-economic loss.Time series analysis is an important to predict and forecast the future conditions in the nature.The elements relates to fuzzy data handling can have different representations.Different types of procedures can represent a normalised possibility distribution, but here we will a normalised through mean .We show the representation criteria using mean normalised fuzzy data transformation is adopted at present. The criteria is not exclusive for a concrete representation of the fuzzy data analysis. From the very beginning of his 52 years-old theory, Professor Zadeh highlighted that "Probability theory/statistics and fuzzy logic should be viewed as complementary rather than competitive," and he anticipated and encouraged the materialization of such a complementarity. The analysis of fuzzy-valued data is also a topic receiving an increasing attention along the years. Some of the developed methodologies aiming to analyse fuzzy data consider a descriptive view and do not refer to models associated with the probabilistic framework. Nevertheless, most of the methodologies are based on the modeling of the random mechanisms generating fuzzy data within a probabilistic setting.

II. REVIEW OF LITERATURE

Jeo Sullivan et al (1994) ,introduced two methods , a first-order time-invariant fuzzy time series model and a first-order time variant model. These are compared with auto regressive models, all of which are time invariant. Qiang Song and Brad S. Chissom(1993), Based on the technology of Zadeh, studied about the fuzzy forecasting models with time variant and time invariant and also some special properties of explored in his article. Srinivasan D et al (1994),proposed new approach for electrical load forecasting using fuzzy logics and neural networks. In this article, the proposed model analysis comprises the load forecasts annually.

Tahseen Ahmed et al(2008),In this article, He proposed fuzzy metric as a trend predictor for forcasting. The new method is applied for forecasting TAIEX and enrollments' forecasting of the University of Alabama. S.R.Singh(2007), studied for the fuzzy models to forecast different type of data sets. A new method of fuzzy time series forecasting based on difference parameters. Further, the proposed method has also been implemented on a real life problem of crop production forecast of wheat crop and the results have been compared with other methods.

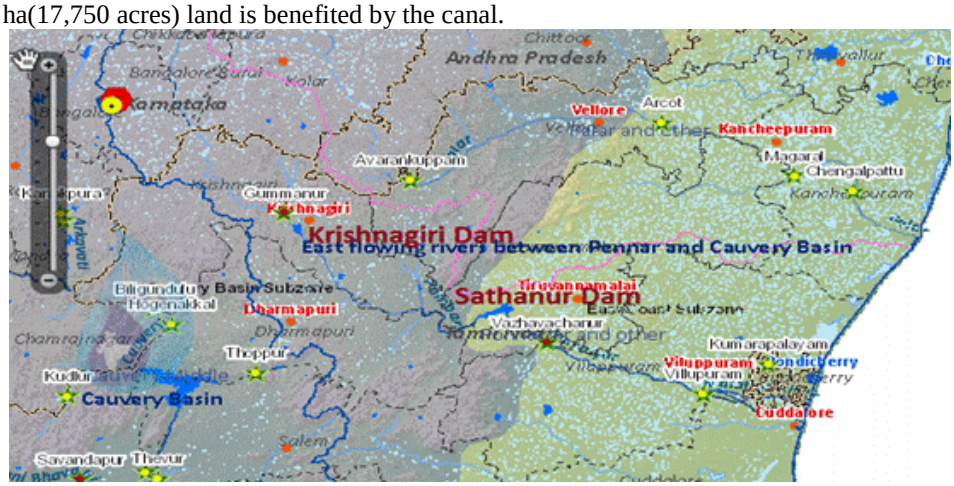
Chen Yongqi(2012),proposed a Least squares support vector fuzzy regression model for time series analysis. In this article , no of equations derived by using the least squares principle.It was developed by Legender for making different equations using partial derivatives with respect to the identified parameters. Then we get the equations, that should equal to the number of parameters.This technique is useful to make equations to obtain the possible parameters by solving the derived equations. P.C.Nayak et al (2004), derived different types of artificial neural networks and fuzzy logic approaches and they applied on different variety of problems.In this study , they combined neural networks and fuzzy logics and made a neuro-fuzzy computing techniques for various problems. This paper presents the application of an adaptive neuro fuzzy inference system (ANFIS) to hydrologic time series modeling,

and is illustrated by an application to model the river flow of Baitarani River in Orissa state, India. Mehdi Khashei et al (2011) ,proposed different methods to generate the data by using ANN and ARIMA models for time series analysis. I.Rojas et al (2002),proposed a RBF neural network model under radial basis for time series prediction.

III. METHODS AND DISCUSSIONS

3.1 Study Area :

The below map shows that the reservoir capacity of 7,321,000,000 cu ft with a full level of 119 ft(36 Meters).An area of 7,185 ha(17,750 acres) land is benefited by the canal.



At present, the article comprises with respect to the fuzzy sets, which follows in the following terminology. Now the concepts high lighten for fuzzy time series analysis for future predictions.

3.2 Fuzzy sets and membership functions

Let $\mathcal{E}$ be a set. IA be a indicator function the characterised by $\mathcal{E}$, is as follows

IA : $\mathcal{E}$ follows $\{0,1\}$, it contains the values between 0 to 1 only.

$$IA(\mathcal{E}) = \begin{cases} 1, if\ \mathcal{E}\ belongs\ to\ A \\ 0, if\ \mathcal{E}\ not\ belongs\ to\ A \end{cases}$$

The above function is a membership function . In this case , there are only two cases of memberships :1 for full membership and 0 for non - membership.

By sing the standard normal variate ,we transform entire data in to sstandard form and again convert in to the normal form using fuzzy approach.

After that calculated different descriptive measures using spss,we get the following standard parameters.

Let A=(m,α,δ), where α,δ represents the extremes of the data sets and m represent the model.Then the second equivalent form of A =(l.m.u), where l≤m≤u)and l(=m-α) and u(=m+δ)represents the lower and upper edges of A and it is a bounded form.The fuzzy numbers with the following membership functions are typical examples are as follows:

$$\mu a(x) = \begin{cases} \frac{x-l}{m-l} = \frac{x-l}{\alpha}, & x\acute{\epsilon}(l,m) \\ 0, otherwise \end{cases}$$

Standard normal form

$$\mu a(x) = \begin{cases} \frac{x-\beta}{m-l} = \frac{x-\beta}{\alpha}, & x\acute{\epsilon}(l,m), mean, \beta\ and\ sd, \alpha \\ 0, otherwise \end{cases}$$

By using the transformation we get the following statistical analysis.

Table :3.1 Descriptive Statistics

	Mean	Std. Deviation	N
Daily data	77.0719	1.46628	16
Normalised standard data	.5232	.32950	16

Table:3.2:Correlations

		Daily data	Normalised standard data
Pearson Correlation	Daily data	1.000	-1.000
	Normalised standard data	-1.000	1.000
Sig. (1-tailed)	Daily data	.	.000
	Normalised standard data	.000	.
N	Daily data	16	16
	Normalised standard data	16	16

Table 3.3 : Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	1.000[a]	1.000	1.000	.00000	1.000	3152519739159345 6.000	1	14	.000

Table:3.4:Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	79.400	.000		5169947194.678	.000
	Normalised standard data	-4.450	.000	-1.000	-177553364.912	.000

Then, we conclude that the entire data shifted into another standardised form ,but calculated measures does not change. Therefore, we conclude that the data can not change if transform general to Gaussian approach.

IV. CONCLUSION

In this article, the proposed method obtained by taking the standardised fuzzy oriented approach for generation of the data to obtain different parameters of the any model. The method is quite appropriate to apply various approached for building a model in standard fuzzy environment. Usually, in a present research, when we apply fuzzy concept, the data should transfer ungrouped to the specified one, which means that it is a normalized form. In the same way ,in this article shows that we can transfer ungrouped to Gaussian and Gaussian to normalized, the parameters almost same in the both methods. But the proposed method in this article, aims that the standard parameters are the functions of the given data. If a measure ,calculated with the help of all individuals , then the parameter is highly significant measure to entire data and it is a standard representation of the model.

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