

Robust Regression Model for Prediction and Forecasting of Dengue Fever Attacked in Rural Areas of Andhra Pradesh, India

Khadar Babu Shaik^{1*}, N. Ramachandra² and M. V. Ramanaiah³

¹Assistant Professor (Sr), Department of Mathematics, VIT University, Vellore

²Research Scholar, ³Assistant Professor

Department of Statistics, Sri Venkateswara University, Tirupathi

*Corresponding Author E-mail: khadar.babu36@gmail.com

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ABSTRACT

Regression Analysis plays a role in Medical and Agriculture sciences. In, Statistics, it satisfies the standard basic assumptions and gives the ultimate results for certain applications. In this article mainly focus on Dengue fever prediction and forecasting for future in a standard specified rural areas in Nellore District of Andhra Pradesh, India. At, Present in Andhra Pradesh, the people are severely suffering with Dengue fever due to living with poor unhealthy environmental conditions. Here, the author mainly focuses on different poor environmental issues to attack different types of fevers like viral, Typhoid and Dengue. Due to these, the human body should reduce the resistance capacity to protect from different types of Virus, Bacteria etc., Therefore, the robust regression estimate and forecast the number of people should suffer with fever for future coming days due to the poor living standards.

Key words: Regression equation, The correlation coefficient, Robust Regression

INTRODUCTION

Regression Analysis is one of the most widely used statistical tool for multi factors in medical and agricultural applications. It is one of the best techniques due to able to estimate the inter and functional relationship between the variables using simple statistical computations. The standard basic approach is to take the data, fit a model and then evaluate by using the t, F and chi-square exact sampling distributions. In Mathematical and statistical theory, these distributions should satisfy the rules and regulations of the standard probability distribution like Gaussian. Regression and distributions plays a role for prediction and forecasting of the future data

sets. We can simulate the data by using the probability regression concepts. In the proposed paper, to study about the forecasting techniques for specified disease like dengue fever.

Review of Literature

The study focuses to identify the roots of diseases attacked in specified rural areas due to the lack of basic environmental and medical conditions occurred in their surroundings. For the identification of these multiple parameters using different samples collected through the direct survey at southern part of Andhra Pradesh, especially at Nellore District and it is the boarder of Tamil Nadu state.

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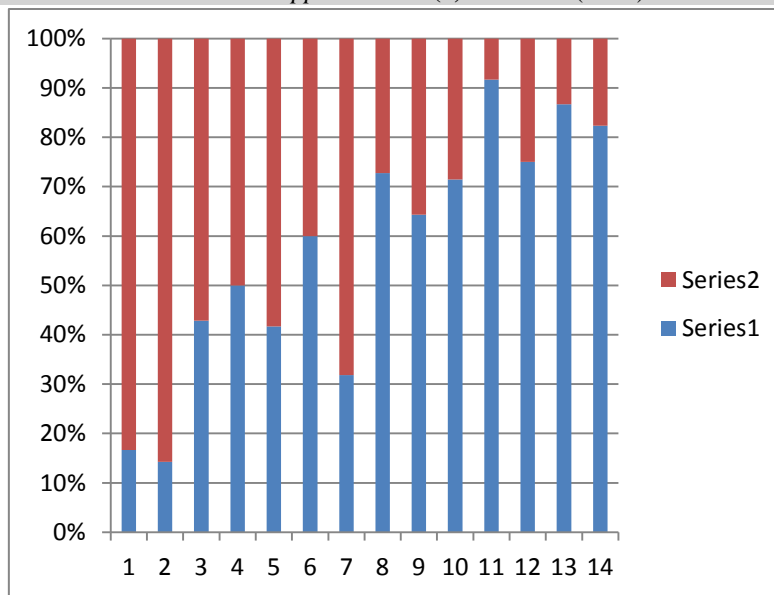
Samprit Chatterjee and Ali. S. Hadi¹, given some introductory concepts specifically related to the regression models in his book publication. Guang yong Zou², proposed a modified Poisson regression approach to estimate the variance directly and used 2 by 2 table for validation. In his study, we proposed use of Poisson regression with a sandwich error term to estimate relative risk consistently and efficiently. To implement the method, no extra programming effort is necessary. Compared with application of binomial regression, the modified Poisson regression procedure has no difficulty with converging, and it provides results very similar to those obtained by using the Mantel-Haenszel procedure when the covariate of interest is categorical. Although the binomial regression procedure is also satisfactory, special care is required when choosing starting values. Kemmig Yu and others³ studied about the quantile regression on biomedical and agricultural applications. It's also useful to develop and forecasting of some issues on medical applications. Ozlem G Alma⁴ proposes to study about the behaviour of the different robust regression models and compare by using the linear regression approach. Sk. Khadar Babu⁷ and his team worked on the application of synthetic generation of rail fall flow using regression models. They proved the concept is highly eligible to forecast and predict the rain fall values for future time.

METHODS AND DISCUSSIONS

Dengue is one type of fever caused by viruses and it was transmitted through mosquitoes. Main drawback of this disease is there is no specific medicine and antibiotics available to treat in hospitals. Dengue is prevalent through the tropics and subtropics. Actually, every fever should symptomized the severe joint and muscle pain, swollen lymph nodes, headache, fever, exhaustion, and rash. At present, by seeing the presence of fever, rash and headache are the very fundamental characteristics of the dengue fever. Regression analysis is also one of the useful and important tool to predict and forecast the standard

diseases in a specified areas and we can suggest to the government to take remedial steps to control and eradication of such diseases. The present article proposed to study the functional relationship between the male and female dengue patients with different levels of the severity of disease. For statistical analysis, chi square test is adopted for the different gender and the disease appearance in human body. For robustness, the Poisson regression model is considered for best fitting. The data collected from the different hospitals in specified areas in Nellore district of Andhra Pradesh. Forecasting is the process to advice for making predictions of the future based on past and present data and most commonly by analysis of trends. An example might be the estimation of some variable of interest at some specified future date. Prediction is a similar, but more general term. Both might refer to formal statistical methods employing time series, cross-sectional or longitudinal data, or alternatively to less formal judgmental methods. Usage can differ between areas of application: for example, in hydrology the terms "forecast" and "forecasting" are sometimes reserved for estimates of values at certain specific future times, while the term "prediction" is used for more general estimates, such as the number of times floods will occur over a long period.

Risk and uncertainty are central to forecasting and prediction; it is generally considered good practice to indicate the degree of uncertainty attaching to forecasts. In any case, the data must be up to date in order for the forecast to be as accurate as possible. Some forecasting methods try to identify the underlying factors that might influence the variable that is being forecast. For example, including information about climate patterns might improve the ability of a model to predict umbrella sales. Forecasting models often take account of regular seasonal variations. In addition to climate, such variations can also be due to holidays and customs: for example, one might predict that sales of college football apparel will be higher during the football season than during the off season.



Several informal methods used in causal forecasting do not employ strict algorithms, but instead use the judgment of the forecaster. Some forecasts take account of past relationships between variables: if one variable has, for example, been approximately linearly related to another for a long period of time, it may be appropriate to extrapolate such a

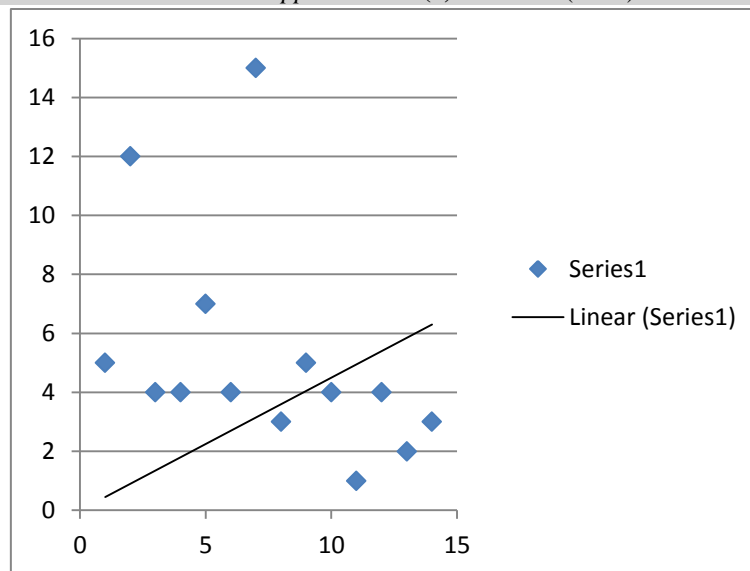
relationship into the future, without necessarily understanding the reasons for the relationship. For the Table 1, the total of expected values is reached to the total of observed values and it is 73. Actually, the expected total is 72.8474 is nearly equal to 73 only. Therefore, we can say that the Poisson distribution is the best fit for the medical data.

Table 1: Poisson probabilities for the collected data

X	f	fx	P(X)	EXP.Val
0	0	0	0.001911	0.139483
1	5	5	0.011962	0.8732
2	12	24	0.037442	2.733236
3	4	12	0.078132	5.703602
4	4	16	0.122281	8.926527
5	7	35	0.153103	11.1765
6	4	24	0.159744	11.66133
7	15	105	0.142863	10.42901
8	3	24	0.111795	8.161061
9	5	45	0.077763	5.67672
10	4	40	0.048682	3.553782
11	1	11	0.027706	2.022514
12	4	48	0.014454	1.055124
13	2	26	0.00696	0.508105
14	3	42	0.003112	0.227206
	73	457	0.001911	72.8474

By using forecasting technique for 15th day, the number of cases in a particular disease like dengue in a particular hospital is 2.230769. Which means that that the prediction of the future dengue cases in single hospital is

possible. Now, this technique is useful to forecast and prediction of future reading in medical applications. For data analysis, applied regression analysis is a primary source for agricultural and medical applications.



CONCLUSION

At present, in some places in Nellore district of Andhra Pradesh, dengue cases are noted frequently and the government of Andhra Pradesh is also very serious about the dengue fever in Andhra Pradesh. Here, the primary source for data collected from standard hospitals in Gudur town of Nellore district of Andhra Pradesh, India. The people from neighbour villages are coming for treatments in Gudur town. Now applied forecasting techniques for prediction of dengue cases for future time series values and also applied the applied regression concepts for data analysis. Finally, we conclude that these techniques are perfectly suitable for a particular seasonal diseases forecasting.

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