



Invited Talk 1

Experimental Designs for fMRI Studies in Small Samples

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Abstract

Noted Optimal Design Theorist C S Cheng and his research collaborator M H Kao investigated the scope of study of optimal experimental designs in the context of fMRI studies. We intend to review some aspects of this problem and, that too, from a small sample perspective. An experimental subject [patient] is presented with a mental stimulus [e.g. picture] for a certain duration of time. During this presentation, the patient absorbs a sequence of mental stimuli along with a provision for intermediate 'resting periods' as well. The measurement refers to the 'output' in a well-specified reference 'brain voxel' and the purpose is to examine the response profiles to understand the nature and extent of local brain activity in response to the stimuli.

A linear model is envisaged and its purpose is to explain the mean response in terms of a constant [unknown parametric effect] and, additionally, a set of what are referred to as 'h-parameters'. The h-parameters are also unknown. The inference problems center around h-parameters. Usual optimality considerations [such as A- and D-optimality] apply.

In this presentation the linear model will be presented, estimation issues will be discussed and related concepts such as 'orthogonality' and 'balance' will be elaborated.

Invited Talk 2 Challenges in Decision-Making

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A decision-making process is characterized by the pair (Ω, OP) where Ω is a set of alternatives and OP is an optimality principle. (OP is different from optimality criteria) OP can be expressed by a choice function operating on any subset $X \in \Omega$. In a general decision-making problem, both these may be unknown and information required to solve it is extracted during the decision-making process. With Ω known, we have a choice problem and with both Ω and OP known we have a general optimization problem. Alternatives and their attributes (criteria) present a vast panorama. Take the case of several alternative designs for an engineering system whose performance measures can be found out only through wet or dry simulations. In the case of selecting one or a few 'best' populations (of outcomes like yields of a crop variety) in terms of some unknown parameter like the mean, one sometimes assumes a certain distribution of the outcome and take a sample actual observations to proceed. Of course, we deal with decision problems where the attributes can only be guessed or predicted at the time of decision-making and can be determined only when an alternative has been implemented. There are, however, many situations where, however, the attributes are known with certainty right at the beginning. . .

To illustrate how an innocent-looking optimization problem may be quite difficult to solve, we consider the Secretary Selection Problem. There are n candidates who can be ranked according to some selection criterion (criteria) from 1 (best) to n (worst) and there is no tie. We interview i randomly selected candidates one by one and select the best of these i candidates. Let r be the rank of the selected candidate in the population of candidates. Let a be the over-head cost, k the cost of interviewing a candidate and c a constant in the cost of 'regret' that we could not select the best candidate and have selected one with an expected rank $E(r)$, which can be simply taken as $c [1 - E(r)]$. Thus, the problem reduces to finding an integer $i < n$, such that the total cost

$$T(i) = a + k i + c [1 - E(r)]$$

is a minimum. We can make the formulation more acceptable by requiring that

$$\Pr\{|r - r_0| \geq m\} \leq \alpha \quad (\text{pre-assigned small})$$

where r_0 and m are very small integers.

This is a chance-constrained non-linear integer programming problem. A simple algorithm has been offered by Mukherjee & Mandal. Assessing the extent of agreement among multiple rankings in case of several judges ranking the interviewed candidates by using Kendall's coefficient of concordance or similar measures is not a big problem. However, development of a consensus ranking (in case there is sufficient agreement among judges) is a complex issue. Going by the Kemeny-Snell distance approach, this becomes an NP-hard problem. The problem becomes more complex if we have to work with time-dependent constraints as in the case of some experts being available only intermittently to conduct interviews. Some of the open problems in decision-making are illustrated by the following concerns:

*People may have uncertain aspirations that vary from one context to another

*Existing frameworks do not adequately deal with outcomes that arise over time. Outcomes could arise over different time horizons and could have different profiles for different alternatives. One can possibly consider some normalized aggregate net benefit (taking costs r negative outcomes into account) discounted back to the point of decision-making to simplify matters..

*Decision complexity is too much to determine an optimality principle not so uncommon in the socio-economic context.

*Probability Theory may not be sufficiently robust to errors in assumptions

Estimation of small probabilities of very improbable (negative) outcomes based on sparse data or even no data at all may be a pretty difficult task in risk calculation. One can take recourse to Fault Tree Analysis for this purpose.



Invited Talk 3

Qualitative measurements Issues with reference to happiness, Well-being and SDG's

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Abstract :

The ultimate purpose of any society or government is to make the life of its people happy and prosperous. Inclusive and holistic development is must for harmonious and peaceful coexistence of humanity. To ensure this United Nation has set an agenda in the form of Sustainable Development Goals (SDG-2030) for making world a better place leaving no one behind. To achieve these goals different measurable targets have been provided. These targets are reflected in different types of measurable indicators which depend upon different quantitative variables along with many hidden qualitative variables too which are not easy to capture and monitor. The confounding effect of these qualitative variables related with attitude, behaviour, social and cultural aspects can influence the target indicators and thereby conclusions drawn may be misleading. This may affect the ultimate goal of SDG's too. The high correlation between mental sickness and economic growth or environmental pollution and GDP needs to be understood with reference to these issues. In this paper we discuss some appropriate techniques from this point of view. The objective is to identify the challenges of qualitative variable's measurement and come up with idea of universally comparable indicators reflecting happiness and Well-being to achieve SDG's within scheduled time frame.

Keywords: Statistics, SDG, Attitude, Behaviour, Social Factors, Cultural Factors, Holistic Development, Indicators, Rasch Model.



Invited Talk 4

Optimal Cut-Off Point and Index for Medical Diagnostic Test

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Abstract:

Rationale: The optimal cut-off point determination for medical diagnostic tests, which outcome measures is quantitative, is of prime interest as it classifies a person with or without disease. In practice most of the approaches for optimal cut-off point determination are based on maximization of sensitivity and specificity computed at different threshold values within the range of test outcome. However, the existing methods such as Youden index or Euclidean distance, require true status of a diseased/non-diseased. The optimal cut-off point of tests with quantitative outcome is required to classify a person with or without disease.

Objective: A novel approach for optimal cut-off point is proposed which does not need prior knowledge of status of underline person.

Methods: The proposed optimal cut-off point for a medical diagnostic test is based on well-known Schutz coefficient. The method only requires outcome measures of medical diagnostic test. A lognormal distribution fit to the outcome shows that the optimal cut-off point is equivalent to the mean of lognormal distribution. Further it is shown that our proposed index is also equivalent to the well-known Youden index, which requires the true status of the patients. The efficiency of the proposed method is illustrated by real life examples and simulated data for different set of distributions. The performance and accuracy of proposed method is compared against sensitivity/specificity-based approach and with Youden index as well.

Keywords: Medical Diagnostic Test, Optimal Cut-off Point, ROC, Youden Index, Lorentz Curve, Schutz Coefficient



Invited Talk 5

Queuing Model For K-Parallel And Series With Applications

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Abstract

As we are aware that, Queuing models create lot of interest due to their ready applicability in the analysis of several congestion control systems. In this paper, we developed and analyzed K-parallel and series queuing systems which were connected in a single network in which the service follows Poisson processes. The arrivals are in bulk and follow a compound Poisson process. The difference differential equations are used to find the joint probability generating function of number of customers in each queue is derived. The model performance measures such as average number of customers in each queue, the probability of the system emptiness, the average waiting time of a customer, throughput of the queues and the variability of system size distribution in each queue are derived and analyzed through numerical illustrations. The utility of this model in queue line control is demonstrated through applying it at TirumalaTirupatiDevasthanam which deals with pilgrims is also discussed. It is observed that the load dependent strategy reduces the congestion in queues and mean delays.



Invited Talk 6 Spatio-Temporal Statistics

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Abstract :

Spatio-temporal statistical models are used to model the data that are collected from spatio-temporal processes that are common in the real-world, representing variety of interactions across processes and scales of variability across time and space. Statistical models for spatio-temporal data are increasingly used in environmetrics, climate change, epidemiology, remote sensing, dynamical risk mapping and in many more fields. Such models have to take into account the temporal as well as spatial correlations. There are several specialized analytical methods for the analysis of such data, which include autocorrelation analysis, spectral analysis and wavelet analysis to name a few. In this talk, we will introduce various types of spatio-temporal data, different types of their visualizations and some of the methods of analysis of such data. We will also introduce a Stochastic Heteroscedastic Process (SHP) useful for the analysis of Spatio-Temporal data.



Invited Talk7 On Statistical and Dynamic Models for Forecasting Effect of Climate Change on Wheat Production

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Abstract

Climate change has become a burning problem at the global level. Agricultural production is badly effected by climate change in our country. For food security, it is very much needed to study the effect of climate change on agricultural production in India. Rice and wheat are the two major crops of our country.

In the present research work, an attempt is made to study different forecasting statistical models like ARIMA, ARIMAX, ANN and Hybrid (ARIMAX +ANN) models for forecasting effect of climate change on wheat production in North Eastern Plain Zone (NEPZ) of India. North Eastern Plain Zone contributes about 33.2 % of total wheat grown area and about 25 % of total wheat production in India. Study was also done on the DSSAT (Decision Support system for Agro-technology Transfer) dynamic crop simulation model. Hybrid model was found the best among statistical models used in the study while, dynamic model surpassed the statistical models in forecasting the effect of climate change on wheat production.



Invited Talk 8

Bayesian Analysis of Some Probability Models in MultiBUGS

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Abstract:

This paper deals with the Bayesian modeling of some probability models based on reliability data in MultiBUGS are presented and various ways of summarizing posterior inference are discussed. BUGS (Bayesian inference Using Gibbs Sampling) is a piece of computer software for the Bayesian analysis of complex statistical models using Markov chain Monte Carlo (MCMC) methods. It has been developing and rapidly growing in popularity for a number of years, and is probably best known in its WinBUGS incarnations. MultiBUGS is the newest innovation: an open source version, which can run on Windows and Linux, as well as from inside the increasingly popular R. The important feature of the software includes its straightforward implementation on posteriors arising from the models of practical interest and its capability to deal routinely with the changes in model specification.



OP1

Capturing Exchange Rate Volatility

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Abstract:

Volatility of exchange rates is important because of the uncertainty it creates for prices of exports and imports, for the value of international reserves and for open positions in foreign currency, as well as for the domestic currency value of debt payments and workers' remittances, which in turn affect wages, prices, output and employment.

The Indian Rupee is back in the news following a sharp depreciation in its value versus the US Dollar during 2019 after a prolonged period of relative stability. It has weakened by a little over 4% since mid July 2019 and nudged the 72 mark to a US Dollar on 23 August 2019 before retracing its steps.

The fall in the Indian rupee is influenced to some extent by the overall economic slowdown and the sell out in the equity markets in the first couple of months of 2019 leading to capital withdrawal by foreign portfolio investors. The capital outflow particularly has hit the currency's valuation.

In this paper the most significant contribution has been a change in the focus of research on exchange rate volatility from a traditional emphasis on events in India to a more comparative approach that examines the experiences of many countries simultaneously. The focus is on using GARCH to understand the behavior of British Pound, United States Dollar, Euro and Japanese Yen versus Indian Rupee.

Keywords: volatility; exchange rate; current account deficit;

*S. Ravi Kumar Raju

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OP2

Case Study of Correlation between Attendance of Students and Their Marks in University Examination

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Abstract:

In today's digital world the students have to just type what they want in Google or Wikipedia to get the required information. But do they understand all the information that is available to them. Unfortunately, the answer is NO. Knowledge cannot be acquired in a short time, even if it is accessible very easily. The process of acquisition and assimilation of knowledge is gradual and continuous. Hence it is logical to think that regularity in attending the classes in college plays a very important role in getting more marks in the university examination. Instead of just accepting this hypothesis as a logical conclusion, the



teachers of Dept. of Statistics of Dr. Ambedkar College, Nagpur conducted a case study to find correlation between attendance of students and the marks secured by them in RTMNU examination. The collected data of students of department was subjected to quantitative analysis consisting of Shapiro-Wilk normality test for testing normality of parent population. For inferential purpose the data was treated with Student's t test for testing the significance of observed sample correlation coefficient between attendance of students and their marks in university examination. The results revealed that there is a positive relation between attendance of the students and their score in university examinations. This result will definitely motivate the students for attending classes regularly. Also, for achieving the objective of their future professional life, it will be beneficial for the students to obtain the in-depth knowledge of their corresponding subjects by attending their classes regularly.

Keywords: Shapiro-Wilk normality test, Whisker Boxplot and qqplots, Student's t test, p-value.

*Presenting author

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OP3

A Study of Optimal Solution By Reducing The Set of Activities for Heterogeneous Resource Allocation Problem

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Abstract:

In a simple resource allocation problem the resources contain the units of same nature and there is an allocation of a single resource among numerous activities. The level of each activity is represented by a continuous variable and is associated with a convex performance function. The resource allocation problem considers minimizing the sum of all performance functions so that the sum of all (non negative) activity levels does not exceed the amount of available resources.

In heterogeneous resource allocation problem (HRAP), the units of resources do not have the same characteristic. Each activity requires one or more units of each resource that possess particular characteristics. These heterogeneous resources are allocated to the set of activities. In this paper an attempt has been made to develop the procedure to reduce the set of activities that can be eliminated from the original problem in such a way that the optimal solution of original problem can be obtained from the optimal solution to the reduced problem.

Keywords : Activity, Resources, heterogeneous allocation



OP4

Diet Problem as an Application of Linear Programming Problem

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Abstract:

Linear programming is a technique for determining an optimum schedule of interdependent activities in view of the available resources. The word programming means determining the plan of action from amongst several alternatives and the word linear refers to the fact that the relationships involved are linear.

The various nutrients like carbohydrates, proteins, fats and minerals in different food items like, wheat, rice, milk, carrot, groundnuts, etc. are helpful for maintenance, growth, reproduction and health of human being.

In this paper the various food items are taken as decision variables and constraints are designed corresponding to different nutrients. In the construction of constraints we have assumed that any intake of more than the minimum requirement of nutrients is not harmful to the human body.

This paper contains diet problem as an application of linear programming problem in which the objective is to find the optimum solution to the diet problem that is to find the quantity of food items that should be consumed to minimize the cost of diet which will fulfil the minimum requirement of nutrients.

Keywords: Nutrients, Diet, Objective Function, Decision Variables, Constraints.

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OP5

To Testify the Solution of Secretary Problem with Measurable Character Using R Programming

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Abstract:

Optimal Stopping problem or Secretary problem deals with the sequential decision procedure. In many search problems decision maker must take decision when to stop search for required unit. Secretary problem is solved by many researchers with different concepts and procedures.

Kane(2001) made some modifications in the Secretary Problem. Looking from the realistic point of view, observer may want to select the unit matching the minimum expected standard in his mind and preferably better than that or the best one. Thus, before starting search, observer has some measurable character say 'm' in his mind with which units can be compared. Solution of the problem was obtained by defining two random variables X and Y where X is real rank of the selected unit and Y is the number of the unit at which unit is selected. Probability distribution $P(x,y/r,N)$ which is the joint distribution of X and Y is given based on parameters 'r' and 't'. This version of Secretary Problem is called as Secretary Problem



with measurable character. In the present paper, R program is written for the above referred probability distributions. R has its own programming language and is very convenient for Statistical computing. Also, it is free downloadable. After writing R program for various distributions in the referred paper, it becomes convenient to run the program with chosen values of N , r and t .

Solution of Secretary Problem with measurable character is testified using R program written in this paper which gives rise to some interesting results.

Keywords: Optimal stopping, Secretary problem, Measurable character, Stopping rule, Real rank

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OP6

Use Sampling Procedure in National Assessment Survey in India for selection of sections and students in the schools

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Abstract:

National Assessment Survey (NAS) is a large scale assessment study conducted in India since 2001 at grade 3, 5 and 8. Till 2016, 4 rounds of each grade have been completed at different period of time for each grade independently. In 2017, NAS was conducted at grade 3, 5 and 8 on a single day over 2.2 million sampled students from about 1.2 lakhs schools in all districts in the country. Schools were sampled for each district by stratified sampling procedure with PPS at National level. Then list of sampled schools for each districts supplied to the state then district level team, for further selection of sections, students and administration of NAS. However, selection of section (if more one sections) and selection of students from selected section had to be done unbiased by the field investigators, on the days of assessment. So to avoid sampling error and biasness, the field investigators used the simple random sampling procedure designed by the team NAS. The procedure is so simple that it can be understood and performed by any level field investigators. Using this procedure, one can cross check the sampling was



conducted with unbiasedly or not. Assurance of quality was also taken care during the whole exercise of the NAS. Hence, it is an attempt to explain the procedure of simple random sampling used in NAS.

Keywords: national achievement survey, UDISE, stratified sampling, PPS, simple random sampling, NAS

*Presenting author

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OP7

Forecasts and Trend Analysis of Production of Wheat, Rice and Pulses in India Using Double Exponential Smoothing Method

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Abstract:

The aim of this study is to analyze the trend and predicting the forecasts of production of wheat, rice and pulses in India. The time series data from the year 1959-60 to 2016-17 is extracted from Department of Agriculture Government of India. Double exponential smoothing method is used to analyze the data. The forecasts with respect to production of Wheat, Rice and Pulses along with 95% confidence limits, accuracy measures viz. mean absolute percent error (MAPE), mean absolute deviation (MAD) and mean square deviation (MSD) are generated for the period 2017-18 to 2026-27. It was observed that there is an increasing trend of the forecasts of production of food grains in India under the study.

Keywords: Wheat, Rice, Pulses, Trend, Forecasts, Double Exponential Smoothing Method, India

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OP8

Factor Analysis of Mixed Data to explore precursors responsible for deciding treatment strategy for gestational diabetes during pregnancy

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Abstract:

Background: The prevalence of Gestational diabetes mellitus (GDM) in India is around 16.55%¹. Deciding appropriate treatment strategy on the basis of clinical parameters (precursors) is often a challenge for clinicians to avoid GDM related complications.

Material and Methods: A retrospective study on 801 pregnant women diagnosed with GDM was carried out in a single diabetic center from Nagpur. The data on parameters like age, obstetric history (OH) and glucose intolerance (GI), along with treatment i.e. diet-control or insulin were obtained for each woman. Factor analysis of mixed data (FAMD), was used to analyse and classify women on the reduced dimensions. The treatment was mapped on the reduced dimensions and the relatedness was quantified using multiple logistic regression (MLR). R-software was used for analyses.

Keywords: Gestational diabetes mellitus, Factor analysis of mixed data, Multiple logistic regression

*Presenting author

References:

¹Rajput R. and Jain D. European Medical Journal, 4(1), 2016, 84-90.



OP9

Machine learning approaches to detect enlargement of pancreas in paediatric acute pancreatitis

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Abstract :

Background: Imaging studies have shown enlargement of pancreatic parts in children diagnosed with acute pancreatitis; however, a little is known about the extent of enlargement in such condition as compared to age and gender matched normal children. We used machine learning approaches to arrive at a robust diagnostic evaluation criterion for acute pancreatitis in children based on dimensions of pancreatic parts.

Material and Methods: 62 children of acute pancreatitis ranging between 3.5 months to 13 years from a single hospital centre were included in the study. The pancreatic dimensions of head, body and tail by ultrasonography on diagnosed and 1116 age-matched normal children were referred. For each subject, the age-adjusted pancreatic dimensions were dichotomized referring to the respective part threshold, as obtained using ROC analysis. Logistic regression was performed to obtain a probability score for each individual and thereby a threshold probability score for disease classification. Alternatively, gradient boosting method was used on age-adjusted pancreatic parts to obtain a classification rule.

Keywords: Acute pancreatitis; ROC analysis; logistic regression; gradient boosting method

OP10

Estimation of the parameters of Poisson type-Gamma Class software reliability model using non-informative and gamma prior

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Abstract:

This paper deals with estimation of parameters of Poisson type-Gamma class model of software evaluation. The per-fault failure distribution is gamma and number of failures per time period follow Poisson distribution. Also called as S-shaped reliability growth model. Since little or no information is available a priori about the parameter β_0 (total number of failure) non-informative prior is proposed and natural conjugate prior for another parameter β_1 . Estimation of the parameters have been proposed under squared error loss function. These estimators have been compared with corresponding maximum likelihood estimators using Monte-Carlo simulation technique.

Keywords: -Poisson type-Gamma class, non-informative prior, gamma prior, maximum likelihood estimators, Monte-Carlo simulation technique



OP11

Construction Of Different Types Of Control Charts For Length Of Stay Of Patients In Healthcare Organisations

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Abstract:

Healthcare is an extremely important sector in service industry. Also it is related to human lives and there will always be a scope for all the healthcare systems (hospitals) to improve and provide good quality service. SPC is an effective and powerful graphical tool used to separate the variation due to chance and assignable causes. Its primary tool—the control chart—provide researchers and practitioners with a method of better understanding and communicating data from healthcare improvement efforts. Traditional Shewharts control charts are based on the assumption of normality and does not take into consideration the skewness of statistics under study. More often the skewness is too large to ignore. In such situations Traditional control charts are improper to give satisfactory performance or may give erroneous conclusions.

This paper proposes control charts based on skewness and kurtosis of patients length of stay. The asymmetric control limits are based on the degree of skewness estimated from the subgroups, and no parameter assumptions are made on the form of process distribution. These charts are simply adjustments of the conventional Shewhart control charts. The new charts are compared with the Shewhart charts and evaluated on the basis of performance measure false alarm rate.

Keywords: healthcare, control charts, skewness, kurtosis, length of stay

References :

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OP12

Bayes Estimates for the Parameters of Poisson Type Length Biased Exponential Class Model Using Gamma Priors

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Abstract:

For the sustainable development in the software industries, the reliability of software is necessary, as the demand of more reliable software is increasing. The reliability of the software is qualitative characteristic that need to be quantified using statistical techniques.

Here, the authors aimed to propose a software reliability growth model (SRGM). Generally, software failures occur randomly with respect to the time.

In this paper, considering the Poisson process of occurrence of software failures, the failure intensity of single parameter length biased exponential class SRGM has been characterized. The parameters namely; total number of failures i.e. θ_0 and scale parameter i.e. θ_1 of the proposed SRGM taken under study.

It is assumed that the experimenter may have past/prior experience about the parameters in the form of informative prior. The Baye's estimators can be proposed by combining experience with the data.

In present paper, Baye's estimates for the parameters θ_0 and θ_1 have been obtained considering gamma priors for parameters. The performance of proposed Bayes estimators against their corresponding maximum likelihood estimators have been checked on the basis of risk efficiencies obtained by Monte Carlo simulation technique under square error loss function.. It is seen that both the proposed Bayes estimators can be preferred over corresponding MLE for proper choice of prior parameters.

Keywords: Poisson process, gamma prior, Maximum Likelihood Estimator (MLE), Rayleigh Class, Software Reliability Growth Model (SRGM), Incomplete gamma function, Confluent Hyper-geometric function.

OP13

Permutation Generation Method and Study of Associated Random Variables

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Abstract:

Permutation is a well known concept. A permutation of n elements is a rearrangement of the elements of an ordered list into a one to one correspondence with itself.

A binary search tree is one of the most popular structures for data storage. A binary search tree is a structure of nodes each with no children, one left child, one right child or two children. Every binary search tree has different features associated with it.



If we choose a random permutation of integers $(1, 2, \dots, n)$ and construct a binary search tree then the features of the resulting binary search tree are clearly random variables having different properties. In this article we have proposed a new method of generating a permutation of integers and carried out a study of the random variables associated with the binary search trees constructed using the resulting permutations.

Keywords: Permutation, random variable, binary search tree, data structure.

*Presenting Author.

References:

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2. Mahmoud, H. M, (1992). Evolution of Random Search Trees, John Wiley and Sons, Inc.

OP14

A Study of Challenges in Survey Sampling: An Empirical Study

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Abstract:

Developing country like India adopt sample survey technique for collection of statistics for various purposes. The National Sample Survey engage in data collection on a variety of subjects and data tabulation throughout the year. The tabulation produces about four estimates every minute on some or other aspects of the socio-economic, demographic status in the country.

The problem is of designing surveys that control both sampling and non-sampling errors remain a serious challenge. The issues in survey design like defining the objectives, target population, resources of data collection cannot be handled properly, which leads to error.

The attempt of this paper is to focus on some of the practical problems encountered in sample surveys and how to minimize these problems. The study came across many survey sampling challenges faced by researchers like mode of data collection, telephonic survey, e-mail survey etc.

The paper conclude that challenges in survey sampling can be minimized by proper survey planning, sampling frame, survey design to make clear and straight objectives of both the descriptive and exploratory studies by acquiring rigorous sampling procedure, in order to produce national estimates of the variable being studied, so that researcher can get relevant unbiased data, and hence research results.

Keywords: National Sample Survey, sampling challenges, nationalestimates, unbiased data, e-mail survey

References:

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3. UmeshkumarDubey, D.P. Kothari, G.K. Awari, Quantitative Techniques in Business, Management, and Finance: A Case-Study Approach, Chapman and Hall/CRC, 1st Edition, London, New York, 12 Dec 2016



OP15

Another Look at Partial Random Permutations

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Abstract :

Permutations and Combinations have always played a significant role in many aspects of Discrete Mathematics and Statistics. The foundation of probability theory rests on these two important features. The study of random variables associated with randomly constructed permutations continues to attract the attention of many researchers worldwide

In this paper, we have proposed a new method of generating a partial random permutation of integers $(1, 2, \dots, n)$ using an important concept of data structure known as 'Stack' and studied the properties of the random variable associated with it .

Keywords: Partial Random Permutation, Stack.

OP16

Study of Stability Measure of Wheat Variety in India: A case Study

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Abstract :

Yield of a crop is jointly an effect of a variety (genotype) of seed and on the environment in which it is grown. Hence it is important to study the interaction effect of genotype and environment (G x E).

A genotype which shows relatively constant yield independent of changing environmental conditions is called a stable variety. There are various parametric and non-parametric measures defined to obtain stability of the variety.

In the present study we consider 6 varieties of wheat across four environments to study their stability. We obtain different parametric and non-parametric stability measures separately. Since there are several measures again it is difficult to compare the varieties for their stability. So we obtain their respective Principle Components and compare the two.

Keywords: Stability of breed, Adaptability, Crop Variety, Parametric Stability Measures, Non-parametric Stability measures, Principle Component analysis, Wheat Variety.

*Presenting Author.

Reference

1. EzatollahFarshadfar, SayedHoseinSabaghpour, HasanZali, Australian Journal of Crop Science, 6(3), 514-524 (2012)



Use of Non-parametric Control Charts In Medical Science : A Case Study

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Abstract :

Statistical process control is a method of quality control which helps to monitor and also ensure the process efficiency of manufacturing products defect free with least waste. Statistical quality control(SQC) gives different statistical tools and techniques which helps to measure, monitor, control and improve quality. A control chart is one of the primary techniques of SPC which helps to identify assignable cause of variations present in the production process.

Most of the times the control charts which are constructed for monitoring process average and process variability are studied under the assumption that the underlying distribution of the quality characteristic under consideration is normal. In such case Shewhart control charts are useful.

But in real life applications, there are many situations in which the distribution of quality characteristic under consideration does not follow normal distribution. In this paper we have studied like number of days stay in hospital after delivery which is obviously not normal also systolic blood pressure of patient after surgery over fifteen days and many more. In such cases Shewhart control charts fail to give proper interpretation. In this work we study some of these variables.

To handle such type of data, a distribution free control charts should be developed. Nonparametric control charts serve this purpose. The main advantage of nonparametric control chart is that it does not assume any probability distribution for the characteristics statistics of interest.

In this study we used sign test, signed rank test, Hodges-Lehman Estimator for construction of nonparametric control charts appropriate for the variables under consideration. Non parametric EWMA control charts are also constructed.

Keywords : Non-parametric control charts, Hodges-Lehman Estimator, Sign test.

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OP18

Statistical Analysis of Recycled Aggregate in Concrete for reuse of materials in Civil construction work

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Abstract:

The use of recycled aggregate in concrete (RAC), opens a whole new range of possibilities in reuse of materials in construction. The utilization of recycled aggregates is a good solution to the problem of an excess of waste materials. The experimental values of strengths of RAC are checked for normality so as to determine whether statistical analysis can be performed or not. By the check of normality, one way analysis of variance (ANOVA) is used as working method. The ANOVA method gives the variance and reliability of the given experimental data with particular relations. This paper briefs about the numerical analysis by statistical method and result of that analysis. This paper also gives the reliability on strength of mix design which is given in experimental data.

Keywords: Recycled Aggregate in Concrete, ANOVA, Reliability



PP1

A Statistical Study of Relationship Between Job Stress and Job Satisfaction With Reference to The Staff of RTM Nagpur University Affiliated Colleges

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Abstract:

This study investigates the impact of Job Stress on Job Satisfaction. This study also identifies different factors that will lead to Job stress and Job satisfaction. The factors of Job stress that have been investigated includes role of management, work place environment, relationship with colleagues, work load, responsibility ambiguity, demand of performance and family pressure while the factors of Job satisfaction that have been investigated includes role of management, work place environment, relationship with colleagues, work load, responsibility ambiguity and Salary. The sample for this study consists of staff from RTM Nagpur University affiliated colleges. In this study the sample from five colleges i.e. Institute of Science, Institute of Forensic Science, Shivaji Science College, Vasantrao Naik Government Institute of Arts and Social Sciences (formerly known as Morris College) and Dharampeth M.P. Deo Memorial Science College were collected. The results show that there is significant influence of all investigated Job stress factors on Job stress whereas only salary factor have significant influence on Job satisfaction. The results also show that there is significant relationship between Job stress and Job satisfaction.

Keywords: Conobach Alfa, Regression Analysis, Factor Analysis, Job Stress, Job Satisfaction

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PP2

Demographics of India

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Abstract:

This poster will contain information regarding various aspects of different states in India such as its population, ratio of males to females, literacy and crime. It will reflect the whole information in simple and colourful pictorial diagrams.

It will summarize the demographics of different states of India.

Keywords: Population, Crime, Demographic.

References:

1. India Census 2011, Ministry of Statistics.
2. National Crime Records Bureau, Ministry of Home Affairs.



PP3

A Study of Demographic, Economic & Distributional Factors on Consumption of Electricity

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Abstract

This poster will contain the information about consumption of electricity for various factors such as industry, agriculture, domestic, transportation, etc. of different states in India. It will summarize the consumption of electricity of different states of India.

Keywords : Demography, Economic, Electric consumption.

References :

1. Key world energy statistics. International energy agency
2. Electricity generation. Institute for energy research

PP4

Predicting Price Of Pre-Owned Cars

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Abstract:

PROBLEM STATEMENT: storm motor is an e-commerce company who act as an mediator between parties interested in selling and buying pre-owned cars.

We have collected data of the year 2015-16. We have recorded data about seller and car including. we used python to analysed the data.

Objective: storm motors wishes to develop an algorithm to predict the price of the cars based on various attribute associated with the cars.

FRAMEWORK:

- predict price of the car based on various attributes
- function approximation model to predict the price of the car
- independent variable : numerical and categorical

Keywords- correlation, linear regression , outliers, random forest

References :

1. Applied Regression Analysis : Draper N.R. And Smith H.
2. Linear Regression Analysis: Montgomery D.C.



PP5

Statistical Analysis of Errors in Long Gamma Ray Burst

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Abstract:

To study non-Gaussian features and directional dependence, in the Long Gamma Ray Burst we used Δ statistic based on extreme value theory. The dependence in direction could occur due to deviation from the cosmological principle or from directional systematic effects in the data itself. The non-Gaussian features could also be caused by systematic effects or by inaccurate treatment of uncertainties. For our Statistical analysis we use a set of Long Gamma Ray burst and its combination with Supernova Type Ia. Our results show sign of non-Gaussianity with weak but consistent direction dependence in the data.

Key Words: Long GRB, observational cosmology, cosmological parameters, dark energy.

PP6

Impact of crude oil price on exchange rate (Dollar to Indian Rupees)

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Abstract:

Crude oil prices play a very crucial role on the economic growth of any country. India is the third largest consumer of crude oil after United states of America and China. India imports more than 82.5 % of its crude oil and natural gas requirement. Most economists predict that India's crude oil consumption will be higher in the future and because of that, the dependence for the crude oil in the Indian economy will be high in the future.

Our objective is to study the impact of crude oil prices on exchange rate(Dollar to Indian Rupees).

In this paper, we have done statistical analysis of the time series data from 2012 to 2018; to find out the effect of crude oil price on exchange rate(Dollar to Indian Rupees).

Keywords: Crude oil price, exchange rate, correlation coefficient, simple linear regression

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