Stochastic Model to Determine the Expected Time to Recruitment with Three Sources of Depletion of Manpower under Correlated Interarrival Times

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Abstract— It is a common phenomenon that some personnel leave an organization after completing a certain period of services to that organization voluntarily or involuntarily due to death, retirement or termination. It usually happen that whenever the policy decisions regarding promotion and target of work or sales to be achieved are revised, then, there will be exit of personnel, which in other words called the attrition or wastage. In any organization like marketing, industrial, software, the depletion of manpower due to policy decisions is quite common. This results in manpower attrition and then recruitment becomes necessary. Frequent recruitment is not advisable due to the cost of the same. Hence recruitment is postponed till a point called the breakdown point of total depletion beyond which the normal activities cannot be continued due to shortage of manpower. This level of allowable manpower attrition is called threshold. In this paper a Stochastic model to determine expected time to recruitment with three sources of depletion of manpower attrition under correlated interarrival times has been derived. It provides the optimal solution because; it takes into consideration the cost of frequent recruitments, depletion of manpower and the cost of shortage of manpower. The Stochastic model discussed in the paper is not only applicable to industry as a whole but also in a wider context of other applicable areas.

Keywords— Attrition, Threshold, Depletion of Manpower, Correlated, Interarrival Times, Optimal Solution.

I. INTRODUCTION

In any organization it usually happens that whenever the policy decisions regarding pay, perquisites, promotion and targets of work or sales to be achieved are revised then there will be exit of personnel, which in other words is called the wastage. The concept of wastage is dealt in details by Barthlomew (1982). In the case of wastages has following i.i.d random variables and the threshold level of wastage being a

random variable, the expected time to recruitment has already been derived by Sathiyamoorthi and Elangovan (1998). It is a common phenomenon that some personnel leave an organization after completing a certain period of services to that organization voluntarily or involuntarily due to death, retirement or termination. It usually happens that whenever the policy decisions regarding promotion and target of work or sales to be achieved are revised, then, there will be exit of personnel, which in other words called the attrition or wastage. In any organization like marketing, industrial, software, the depletion of manpower due to policy decisions is quite common. This results in manpower attrition and then recruitment becomes necessary. Frequent recruitment is not advisable due to the cost of the same. Hence recruitment is postponed till a point called the breakdown point of total depletion beyond which the normal activities cannot be continued due to shortage of manpower. This level of allowable manpower attrition is called threshold. In this Chapter a Stochastic model to determine expected time to recruitment with three sources of depletion of manpower attrition under correlated interarrival times has been derived using the result of Gurland (1955) and Esary et al., (1973). Some quite interesting results cited in the recent literature by Arulpavai and Elangovan (2012, 2013). It provides the optimal solution because; it takes into consideration the cost of frequent recruitments, depletion of manpower and the cost of shortage of manpower. The Stochastic model discussed in the Chapter is not only applicable to industry as a whole but also in a wider context of other applicable areas.

II. ASSUMPTION

i. The depletion of manpower occurs whenever the policy decisions are announced.

ii. The interarrival times between decision epochs are random variables are constantly correlated and exchangeable but not independent.

iii. The depletion of manpower also occurs due to transfer of personnel and the interarrival times between successive epochs of transfer are i.i.d. random variables having exponential distribution with parameter λ.

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Sapna Sinha,Vishal Bhatnagar,Prateek Agrawal,Vikram Bali

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distributed systems generally to enhance the utility and precision of database searches Carefully applied they can increase system effectiveness streamline operations and reduce cost Since many of these techniques are derived from nature they offer considerable scope for research and development with the result that this field is growing rapidly Meta Heuristic Algorithms for Advanced Distributed Systems offers an overview of these techniques and their applications in various distributed systems With strategies based on both global and local searching it covers a wide range of key topics related to meta heuristic algorithms Those interested in the latest developments in distributed systems will find this book indispensable Meta Heuristic Algorithms for Advanced Distributed Systems readers will also find Analysis of security issues distributed system design stochastic optimization techniques and more Detailed discussion of meta heuristic techniques such as the genetic algorithm particle swam optimization and many others Applications of optimized distribution systems in healthcare and other key industries Meta Heuristic Algorithms for Advanced Distributed Systems is ideal for academics and researchers studying distributed systems their design and their applications **Advances in Distributed Computing and Machine Learning** Rashmi Ranjan Rout,Soumya Kanti Ghosh,Prasanta K. Jana,Asis Kumar Tripathy,Jyoti Prakash Sahoo,Kuan-Ching Li,2022-07-27 This book includes a collection of peer reviewed best selected research papers presented at the Third International Conference on Advances in Distributed Computing and Machine Learning ICADCML 2022 organized by Department of Computer Science and Engineering National Institute of Technology Warangal Telangana India during 15 16 January 2022 This book presents recent innovations in the field of scalable distributed systems in addition to cutting edge research in the field of Internet of Things IoT and blockchain in distributed environments Concurrency Control in Distributed System Using Mutual Exclusion Sukhendu Kanrar,Nabendu Chaki,Samiran Chattopadhyay,2017-08-04 The book presents various state of the art approaches for process synchronization in a distributed environment The range of algorithms discussed in the book starts from token based mutual exclusion algorithms that work on tree based topology Then there are interesting solutions for more flexible logical topology like a directed graph with or without cycle In a completely different approach one of the chapters presents two recent voting based DME algorithms All DME algorithms presented in the book aim to ensure fairness in terms of first come first serve FCFS order among equal priority processes At the same time the solutions consider the priority of the requesting processes and allocate resource for the earliest request when no such request from a higher priority process is pending Security in Distributed, Grid, Mobile, and Pervasive Computing Yang Xiao,2007-04-17 This book addresses the increasing demand to guarantee privacy integrity and availability of resources in networks and distributed systems It first reviews security issues and challenges in content distribution networks describes key agreement protocols based on the Diffie Hellman key exchange and key management protocols for complex distributed systems like the Internet and discusses securing design patterns for distributed systems The next section focuses on security in mobile computing and wireless networks After a section on grid computing security the book presents an overview of

security solutions for pervasive healthcare systems and surveys wireless sensor network security   End-to-End Quality of Service Abdelhamid Mellouk,2013-03-01 A modern communication network can be described as a large complex distributed system composed by higher interoperating smaller sub systems Today the proliferation and convergence of different types of wired wireless and mobile networks are crucial for the success of the next generation networking However these networks can hardly meet the requirements of future integrated service networks and are expected to carry multimedia traffic with various Quality of Experience QoE and Quality of Service QoS requirements Providing all relevant QoS QoE issues in these heterogeneous networks is then an important challenge for telecommunication operators manufacturers and companies The impressive emergence and the important demand of the rising generation of real time Multi service such as Data Voice VoD Video Conference etc over communication heterogeneous networks require scalability while considering a continuous QoS This book presents and explains all the techniques in new generation networks which integrate efficient global control mechanisms in two directions 1 maintain QoS requirements in order to maximize network resources utilization and minimize operational costs on all the types of wired wireless mobile networks used to transport traffic and 2 mix the QoS associated with home access and core networks in order to provide Quality of Service Quality of Experience expected by users of new services   **Using Machine Learning to Detect Emotions and Predict Human Psychology** Rai, Mritunjay,Pandey, Jay Kumar,2024-02-26 In the realm of analyzing human emotions through Artificial Intelligence AI a myriad of challenges persist From the intricate nuances of emotional subtleties to the broader concerns of ethical considerations privacy implications and the ongoing battle against bias AI faces a complex landscape when venturing into the understanding of human emotions These challenges underscore the intricate balance required to navigate the human psyche with accuracy The book Using Machine Learning to Detect Emotions and Predict Human Psychology serves as a guide for innovative solutions in the field of emotion detection through AI It explores facial expression analysis where AI decodes real time emotions through subtle cues such as eyebrow movements and micro expressions In speech and voice analysis the book unveils how AI processes vocal nuances to discern emotions considering elements like tone pitch and language intricacies Additionally the power of text analysis is of great importance revealing how AI extracts emotional tones from diverse textual communications By weaving these systems together the book offers a holistic solution to the challenges faced by AI in understanding the complex landscape of human emotions   **Seventh International Conference on Parallel and Distributed Computing, Applications and Technologies** ,2006-01-01   **Integration of Cloud Computing with Emerging Technologies** Sapna Sinha,Vishal Bhatnagar,Prateek Agrawal,Vikram Bali,2023-10-30 This book gives a complete overview of cloud computing its importance its trends innovations and its amalgamation with other technologies Key Features In depth explanation of emerging technologies utilizing cloud computing Supplemented with visuals flow charts and diagrams Real time examples included Caters to beginners as well as advanced researchers by explaining implications innovations issues and challenges of

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