

Scheduling Algorithm to Solve Problem in Ophthalmology

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Abstract

Scheduling algorithm facilitates decision making in a better way. This paper aims to raise the awareness in ophthalmologists, helps them to take a decision & solve their problem of long waiting time of patients in the clinic or hospitals. Common people in the world faces so many problems in day to day life for getting done their eye check up. If the ophthalmologists take certain measures, the problem can be solved easily. The measure taken will be advantageous to the staff as well. The paper explains the problem with simple solution through the scheduling algorithm technique.

Keywords

Scheduling, Round Robin, priority Scheduling, Shortest job First, Average waiting time.

Introduction

Scheduling is the method by which threads, processes or data flows are given access to system resources (e.g. processor time, communications bandwidth). This is usually done to load balance and share system resources effectively or achieve a target quality of service. Ophthalmology is the branch of medicine that deals with the anatomy, physiology and diseases of the eye. An ophthalmologist is a specialist medical and surgical eye problems. Since ophthalmologists perform operations on eyes, they are both surgical and medical specialists. A multitude of diseases and conditions can be diagnosed for the eye. Any problem related to eye is admitted to a particular eye hospital. For appointment of a patient in a hospital/private clinics, the most widely used method is FCFS. Ophthalmology is a standalone unit, & every problem is centralized at one place. This scheduling algorithm aims to streamline everything. Every single process is carried out through scheduling in an organized manner. i.e.- scheduling appointment to a patient for a regular eye check up, or scheduling emergency cases when it comes, taking patient to the OPD & providing a doctor immediately or scheduling appointment to patients for a surgery. Some work has already been done regarding check up of patient but in a different sector(i.e.- malaria, for parasite checking) where it is shown that round robin scheduling is best suited in comparison to all the other three algorithms (FCFS, SJF, & PRIORITY

SCHEDULING) regarding the problem of long waiting time at outpatient clinic before consultation. Round Robin algorithm minimizes the average waiting time of patients. This leads to saving patient's specialist time & possibility of testing more patients.

Objective

My objective is to propose an algorithm better than round robin which can serve to minimize more average waiting time of patients. We can say it's an improved round robin scheduling for ophthalmology.

Existing System

The present system is scheduling algorithm to solve problem in diagnostic related health care. This scheduling algorithm focuses on application of analytical method to facilitate better decision making by diagnostic centre specialists. Common people in the real world face so many problems in diagnostic centre. The problem that has been discussed in present/existing system is;

The problem of long waiting time at clinic before consultation: Patient needs to make an appointment for diagnostic centre specialist. Various algorithms have been proposed to reduce waiting time of patient. It is shown by various scheduling algorithm like FCFS, SJF, PRIORITY SCHEDULING, ROUND ROBIN. Round Robin proves to be best suited among all the other three algorithms.

Problem In Existing System

The existing System is Scheduling algorithm to solve problems in diagnostic related health care. In this the problem of long waiting time at outpatient clinic before consultation is discussed. The existing system considers that round robin is best suited algorithm among all the other three. The proposed system aims to provide a better algorithm than round robin. The existing system deals with scheduling algorithm for diagnostic related health care which can be applied to various other sectors, which has still not been worked upon.

Proposed System / Model

The proposed System deals in scheduling algorithm to solve problem in ophthalmology. It is based on algorithm to solve problem of long waiting time at ophthalmologist's clinic before consultation. This scheduling algorithm schedules every single process i.e.- registering a patient for a normal eye check up, for any emergency case, or registering any minor or major surgery. It minimizes average waiting time of patients. This leads to saving patient specialist time & possibility of testing more patients . The proposed system aims to provide a more improved round robin algorithm by combining two scheduling algorithms together

(i.e.- priority & SJF).

Methodology Used

In the proposed system, the patient is registered for any emergency case, minor surgery, major surgery & a normal eye check up. Here the first priority is given to emergency case & the rest of the cases are prioritized on the basis of shortest job (i.e.- least amount of time is required in normal or routine check up, then the minor surgery & max time is needed in major surgery). The jobs will be processed in the same order resulting in average waiting time less than the round robin scheduling algorithm.

The proposed algorithm is explained by an example-

S. No.	Name	Age	Sex	Address	Type of case	Arrival time
P1	Twinkle	23	F	Aliganj	Emergency	14
P2	Prakash	24	M	Kapoorthala	Major surgery	15
P3	Soni	56	F	Alambagh	Minor surgery	16
P4	Akash	34	M	Faizabad Road	Normal check up	17
P5	Smriti	27	F	Telibagh	Emergency	18
P6	Kushal	32	M	Charbagh	Minor surgery	19

When incorporated through Round robin scheduling algorithm, we get the following result:

time quantum = 2

Gantt Chart=

P1	P2	P3	P4	P5	P6	P1	P2	P3	P4	P5	P6	P1	P2	P3	P5	P6	P2	P3	P6	P2	P2	P2	P2
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Process	Burst time	Waiting time	Turnaround time
P1	6	20	26
P2	15	32	47
P3	8	30	38
P4	4	16	20
P5	6	26	32
P6	8	32	40

average turnaround time=33

average waiting time=26

The same job when incorporated through the proposed algorithm, we get the following result:

Gantt Chart=

P1	P5	P4	P3	P6	P2
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process	Burst time	Waiting time	Turnaround time
P1	6	0	6
P2	6	6	12
P3	4	12	16
P4	8	16	24
P5	8	24	32
P6	15	32	47

Average turnaround time= 15, Average waiting time= 22

Conclusion

In this system we are trying to schedule the check up of patients in a manner so as to reduce long waiting time. An algorithm has already been designed to solve the above problem. I have tried to design an algorithm in order to enhance the efficiency of the existing system. This system will help in treatment of more patients within less time. Even we can find so many problems in ophthalmology and maximum problems are solvable through various applications. We hope this paper raises the awareness and adoption of scheduling algorithm applications amongst ophthalmologists all over India. The future scope of this project is this system can be implemented using fuzzy logic which can even improve the system in a better way.

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