The Open University of Sri Lanka
Department of Electrical and Computer Engineering
Bachelor of Software Engineering Honors
Level 5
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Mini Project
A railway ticket reservation and scheduling system

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01. Introduction

In Sri Lanka, the railway ticket reservation system is designed for local and foreign passengers to search, book, and manage railway tickets through this online platform. This platform has been updated and maintained recently because this platform wants to achieve more reliable and accurate performance.

The Sri Lankan train ride is the most beautiful train ride in the world, and to experience this ride, passengers are trying to purchase tickets more convenient way. Due to increasing demand, especially in peak time periods like long weekends, the system faces performance challenges. Response delay, slow response, and searches are some challenges during this peak time.

In this mini project, I am focused on measuring response time (that means time taken for the system to respond to a user request), throughput (number of successful transactions (bookings/searches) per time), and resource utilisation (how well resources handle different loads).

Analyse the performances at different times of the day during the one month, identify high response time, and observe the most suitable methods to increase performance.

Objectives / Performance Goals

The main objectives that I have been trying to obtain,

- **Minimize response time -** Minimise time taken for the system to respond to a user request
- **Increase throughput -** Ensure more users can access the system simultaneously.
- **Recourse Utilisation -** Handle traffic efficiently during peak hours.

02. Modeling Approaches and Assumptions

Modeling Approach

This focuses on user-side performance meddling. Here doing black-box testing for the Sri Lankan Railway ticket reservation website. Performance is measured by how long the system takes to respond to common user actions such as searching trains and loading booking pages, and process to enter data as a user and time duration.

Manual data collection performance was measured by observing different types of times, four different durations, and for different destinations. Those rides are monitored for one month to improve accuracy.

Assumptions

All the data is presented based on only the user's experience.

Peak hours represent higher user traffic and, therefore, higher system load

The observed tasks (search, booking) are enough indicators of system performance.

Reservations are only made for general passengers to observe performance.

03.Data Description and Methodology

Data was collected for different types of times, train destinations, and train durations. To measure time, used a stopwatch and to browse network tools such as Microsoft Edge/Google Chrome. Those were used to record the duration between the request and receiving a response.

Collecting data is

- Action performance
- Action time
- Response time
- Errors and notifications

Method of collecting data,

- Search and notify daily for time slots
- Observed data are recorded in a table
- Compare and analyse the performance of the system

04.Detailed analysis and Findings

Google sheet for findings - Google Spreadsheet

This analysis shows that response time takes more time during the weekends and it varies during daytime and nighttime. Fast time is mostly noticed during daytime and on weekdays (2.9 sec), showing low server loading time. The longest response time (4.9 sec) shows the peak usage period of the system.

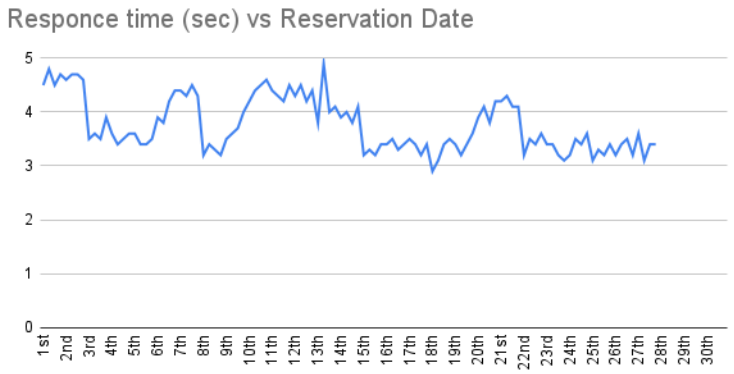
The bottleneck was the weekends, long weekends, and evening hours. Those times take more time to respond and a long time to load.

Loading a general web page is faster than searching for the train's web page.

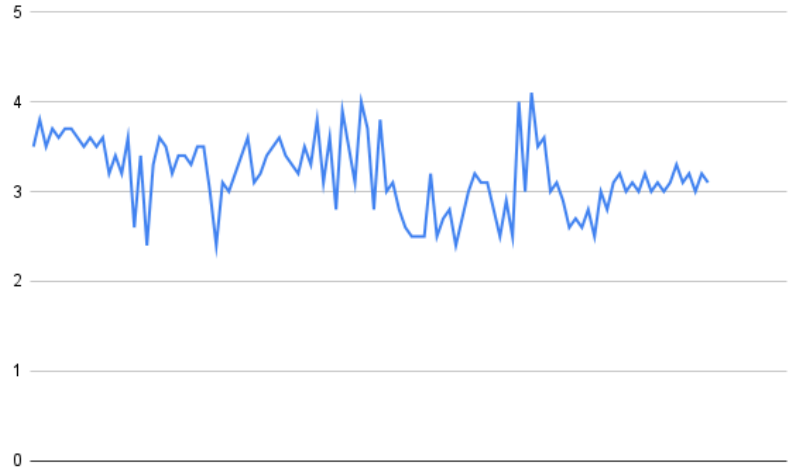
The fast performance in the afternoon suggests lower user demand, and it confirms that the system can deliver high throughput when fewer users are online.

05.Visualization

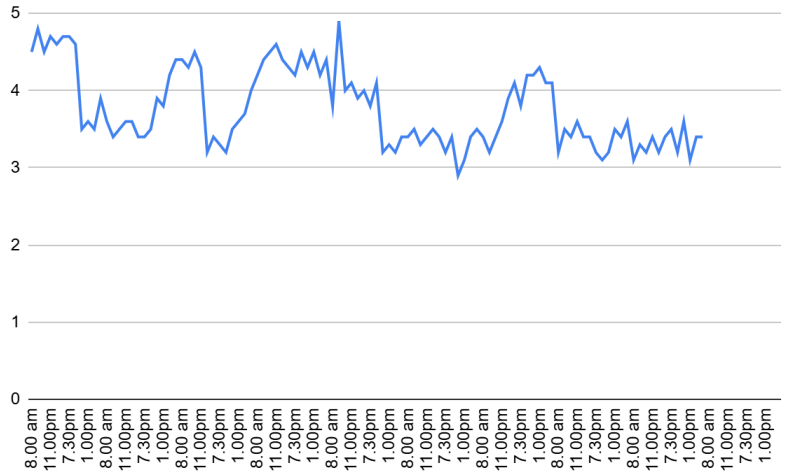
01. Response time varies with the Reservation date



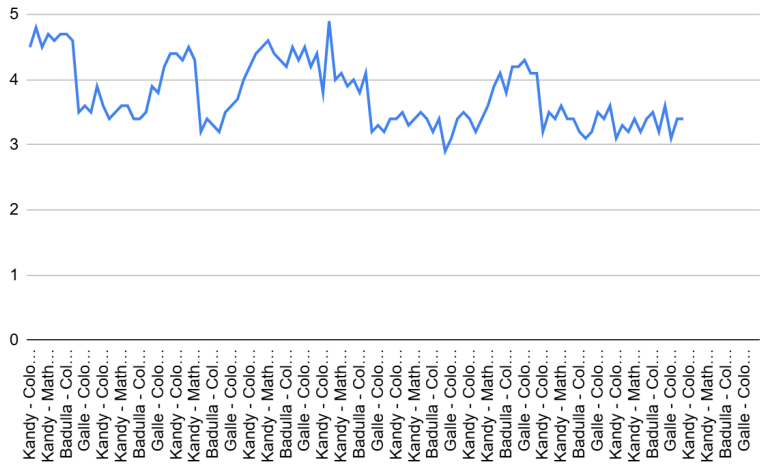
02. Response time varies with the Reservation date



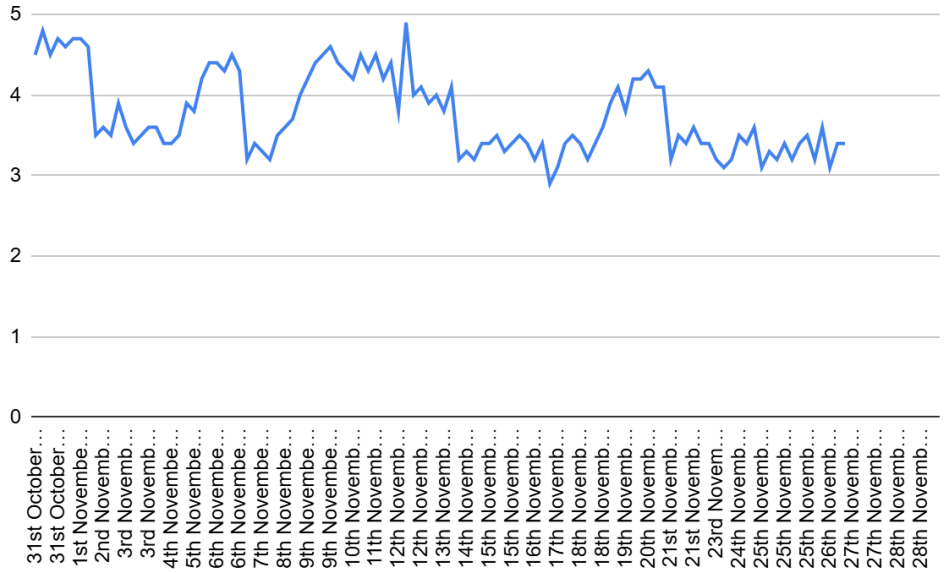
03. Response time varies with Train time



04. Response time varies with train destination



05. Response time varies with train ticket reservation time



06. Limitations & Future Extensions

- This data collection only limited to manual data collection. Automated load testing data using JMeter can be done for performance testing.
- When loading not-available trains, take more time to respond, and do not send a notification about the sudden time ride plan.

07. References

Sri Lanka Railways, “Online Ticket Booking System,” 2025.