CHAPTER 1

INTRODUCTION

The search bar is a fundamental component of Flipkart's e-commerce platform, serving as a primary tool for users to locate products efficiently. Given the large volume of products and user queries, the search functionality must be both accurate and fast. This project focuses on evaluating the search bar's performance, identifying any issues, and suggesting enhancements. The testing involves assessing various aspects such as keyword handling, response times, and result relevance to ensure a seamless user experience.

1.1 AIM

The aim of this project is to comprehensively test the search functionality of the Flipkart e-commerce website to ensure it provides accurate, relevant, and timely results to users.

1.2 OBJECTIVE

The objective is to evaluate the performance, reliability, and user experience of the search feature by conducting keyword search testing, filter testing, performance testing, and usability testing. This involves verifying that the search functionality operates efficiently under various conditions, offers a user-friendly interface, and meets performance benchmarks. Through automated and manual testing methods, the project seeks to identify and address any issues, ultimately enhancing the overall user experience and satisfaction with Flipkart's search capabilities.

CHAPTER 2

SYSTEM ANALYSIS

2.1. Scope of the Project

The scope of this project is limited to the search functionality of the Flipkart website. This includes testing various aspects such as:

1. Evaluation of Search Query Processing:- Analysis of how different types of queries are processed.
2. Performance Measurement:- Assessment of the search bar's response time under different conditions.
3. Accuracy Assessment:- Determination of the relevance and precision of search results.
4. User Experience Testing:- Examination of the overall user satisfaction with the search functionality.

2.2. Aim of the Project

The primary aim of this project is to:

1. Identify Performance Bottlenecks:- Detect any inefficiencies in the search bar's operation.
2. Ensure Accuracy:- Verify that the search results are relevant and accurate for various queries.
3. Enhance User Experience:- Improve the usability and effectiveness of the search feature.
4. Provide Recommendations:- Suggest improvements based on testing results.

2.3. Project Modules

The project is divided into the following modules:

1. Query Processing Module:- Tests how well the search bar handles different types of queries, including exact matches, partial matches, and misspellings.
2. Response Time Module:- Measures the time taken to return search results for different types of queries.
3. Result Accuracy Module:-Evaluates the relevance and correctness of search results.
4. User Experience Module:- Assesses the ease of use and overall satisfaction with the search functionality.

2.4. Proposed System

The proposed system includes:

1. Automated Testing:- Utilizing tools like Selenium to perform repetitive and extensive tests.
2. Manual Testing:- Conducting tests to simulate real user behavior and gather qualitative feedback.
3. Performance Testing:- Using tools such as JMeter to simulate high traffic and measure response times.
4. Usability Testing:- Gathering user feedback to assess the overall experience and identify areas for improvement.

CHAPTER 3

REQUIREMENT SPECIFICATIONS

3.1. Details of Software:-

3.1.1. Testing Tools

1. **Selenium**: - An open-source tool for automating web browser interactions. Used to test various search scenarios and validate results.
2. **JMeter**: - A performance testing tool used to measure the search bar's response time under different load conditions.
3. **Postman**: - A tool for testing APIs, used to validate the correctness of backend search functionalities.

3.1.2. Test Environments

1. **Web Browser**:- Tests conducted on various browsers including Chrome, Firefox, and Edge.
2. **Mobile Devices**:- Testing on Android and iOS devices to ensure consistent performance across platforms.

3.2. System Requirements: -

3.2.1. Hardware Configuration

1. **Development Machine**: - Intel Core i5 or equivalent, 8 GB RAM, 256 GB SSD.
2. **Test Servers**: - Cloud-based servers with scalable resources to handle performance testing.

3.2.2. Software Configuration

1. **Operating System: -** Windows 10 or later, macOS, or Linux.
2. **Browsers**: - Latest versions of Chrome, Firefox, and Edge.
3. **Development Tools: -** IDEs such as IntelliJ IDEA and Visual Studio Code for script development.

CHAPTER 4

SYSTEM DESIGN

4.1. Data Flow Diagram

The Data Flow Diagram (DFD) for the search bar testing system illustrates the flow of data from user input through the search query processing and result generation stages. It depicts how search queries are captured, processed, and how results are delivered back to the user interface.

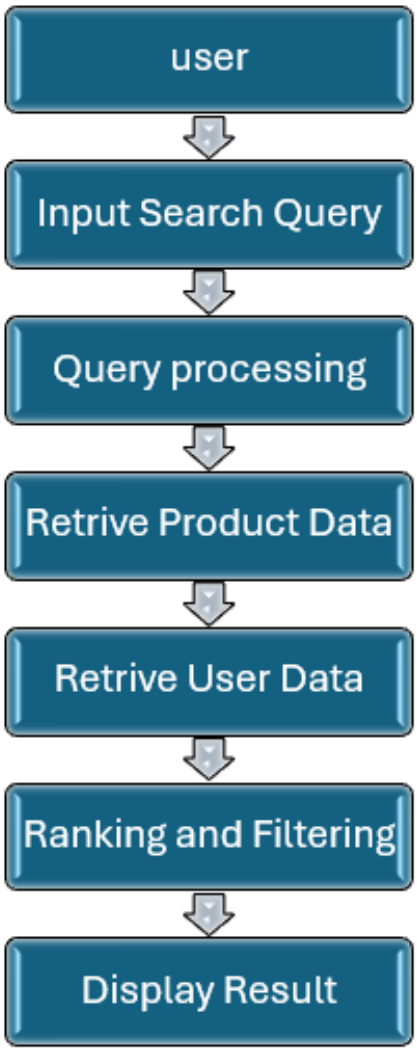

Fig.4.1 Data flow diagram of Automation of E - commerce Website

1.**Input Search Query**:

- User inputs a search query into the search bar.
- The search query is sent to the Query Processing system.

2.Query Processing:

- The system processes the user's input to understand the search intent.
- It breaks down the query into keywords and phrases.
- It checks for spelling corrections, synonyms, and related terms.
- The processed query is then sent to the Product Data Retrieval and User Data Retrieval systems.

3.Retrieve Product Data:

- The system searches the Product Database for products that match the processed query.
- It retrieves product details like name, description, price, availability, and reviews.
- The retrieved product data is sent to the Ranking and Filtering process.

4.Retrieve User Data:

- The system checks if the user is logged in.
- It retrieves user-related data from the User Profile Database, such as past searches, preferences, and purchase history.
- The retrieved user data is sent to the Ranking and Filtering process.

5.Ranking and Filtering:

- The system ranks the retrieved product data based on relevance to the search query.
- It applies filters based on user preferences, past behavior, and other criteria.
- The ranked and filtered results are sent to the Display Results process.

6.**Display Results:**

- The system displays the ranked search results to the user.
- The user can view, interact with, and refine the search results.

4.2. Sequence Diagram

The Sequence Diagram outlines the sequence of interactions between the user, the search bar, and the backend system during a search operation. It shows the steps involved from the user entering a query to receiving the search results, including any intermediate processing steps.

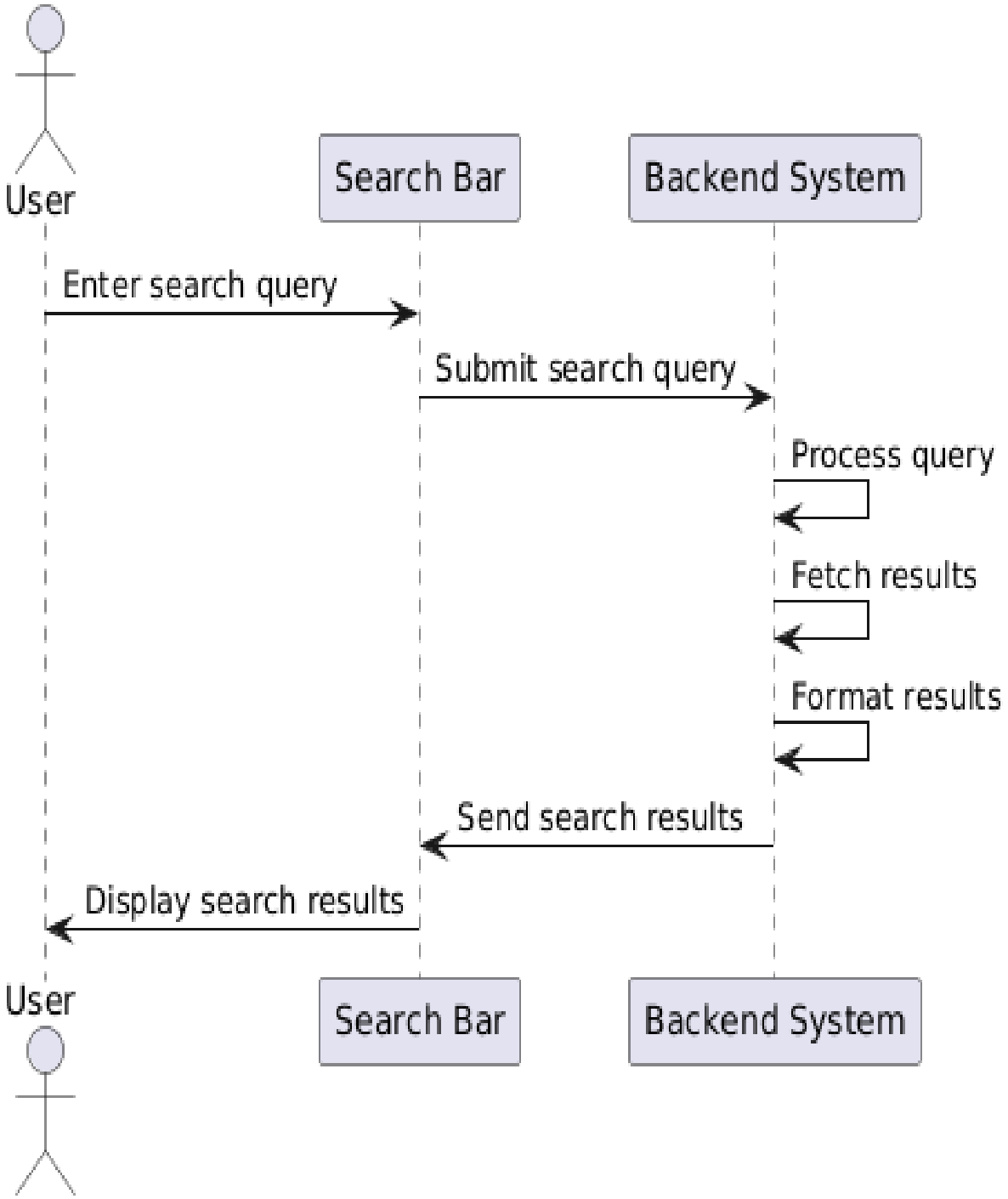

Fig.4.2 Sequence Diagram of search bar functionality

CHAPTER 5

SYSTEM IMPLEMENTATION

5.1. Modular Description

1. Search Query Handler:- This module processes the input query, interpreting user intentions and converting it into a format suitable for searching.
2. Result Aggregator:- Collects and organizes the search results from the database, ensuring they are relevant and ranked appropriately.
3. User Interface Module:- Manages the display of search results, handling user interactions, and presenting results in a user-friendly manner.
4. Testing Framework:- Incorporates automated test scripts and performance metrics to evaluate the search functionality systematically.

CHAPTER 6

SAMPLE OUTPUT

6.1 Valid Search Query: "chess"

Expected Results: A list of products related to chess, including various brands and price ranges.

Steps:

1. Enter a valid search query (e.g. 'chess') in the search input field
2. Click the search button
3. Verify that the search results page is displayed with relevant results
4. Verify that the search query is displayed in the search input field

Sample Result:

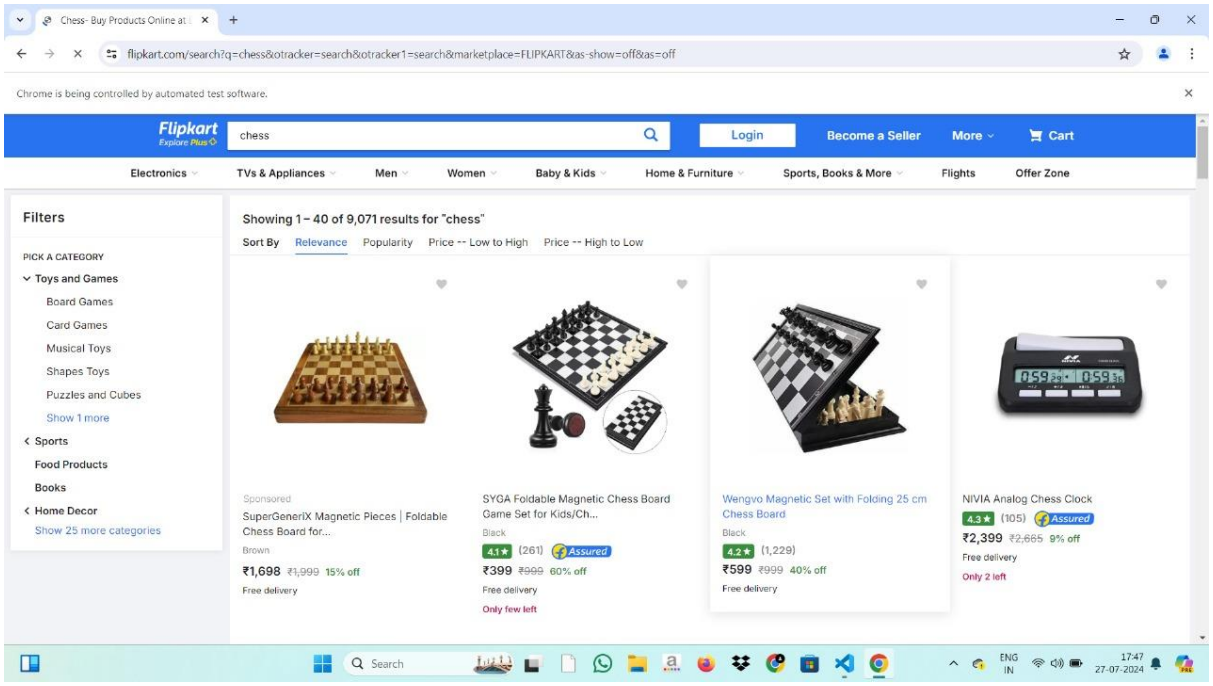

Fig 6.1.1

6.2 Enter an invalid search query : (e.g. 'abcfvhtseue') in the search input field.

Expected Results: Error message is displayed, and search input field is cleared.

Steps:

1. Enter an invalid search query (e.g. 'abcdefg') in the search input field
2. Click the search button
3. Verify that an error message is displayed (e.g. 'No results found')
4. Verify that the search input field is cleared

Sample Result:

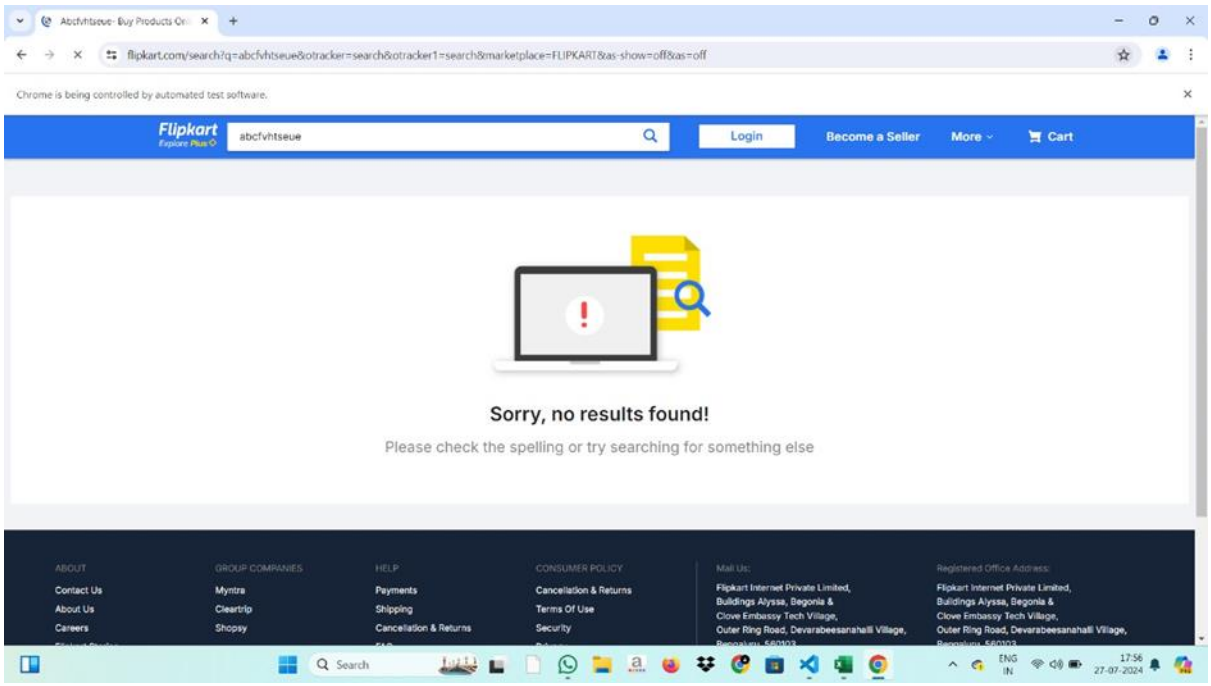

Fig 6.1.2

6.3 Enter an empty search query (i.e. no text) in the search input field.

Expected Results : Nothing will be searched and home page of flipkart will open.

Steps:

1. Enter an empty search query (i.e. no text) in the search input field
2. Click the search button
3. Verify that an error message is displayed (e.g. 'Please enter a search query')
4. Verify that the search input field is cleared

Sample Result:

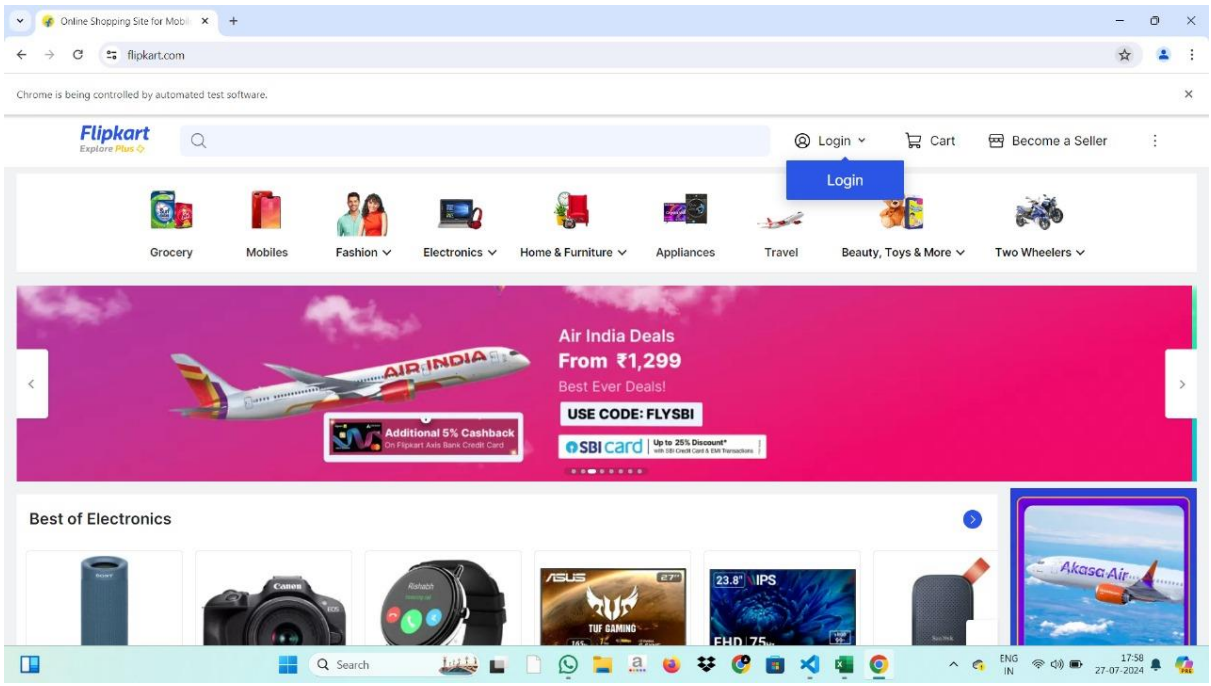

Fig 6.1.3

6.4 Enter a search query with special characters (e.g. 'chess!') in the search input field.

Expected Results : Search results page is displayed with relevant results.

Steps:

1. Enter a search query with special characters (e.g. 'chess!') in the search input field
2. Click the search button
3. Verify that the search results page is displayed with relevant results
4. Verify that the search query is displayed in the search input field

Sample Result :

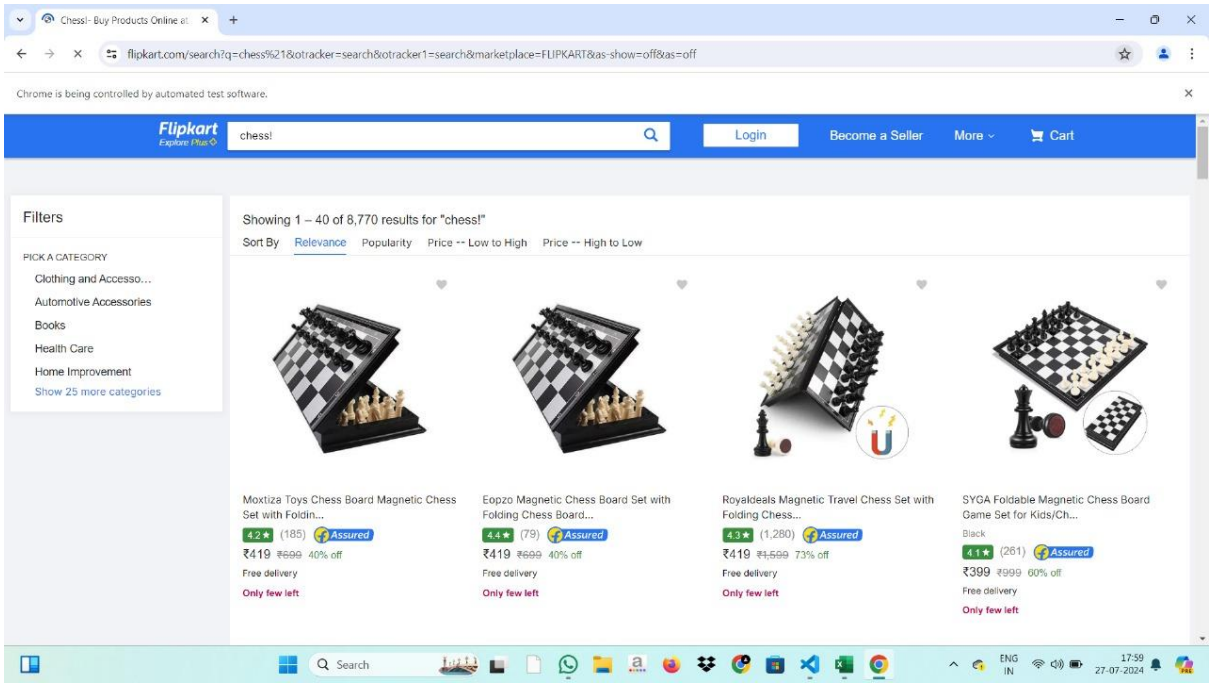

Fig 6.1.4

6.5 Enter a long search query (e.g. 'chess sets for beginners with wooden pieces') in the search input field.

Expected Results : Search results page is displayed with relevant results.

Steps:

1. Enter a long search query (e.g. 'chess sets for beginners with wooden pieces') in the search input field
2. Click the search button
3. Verify that the search results page is displayed with relevant results
4. Verify that the search query is displayed in the search input field

Sample Result :

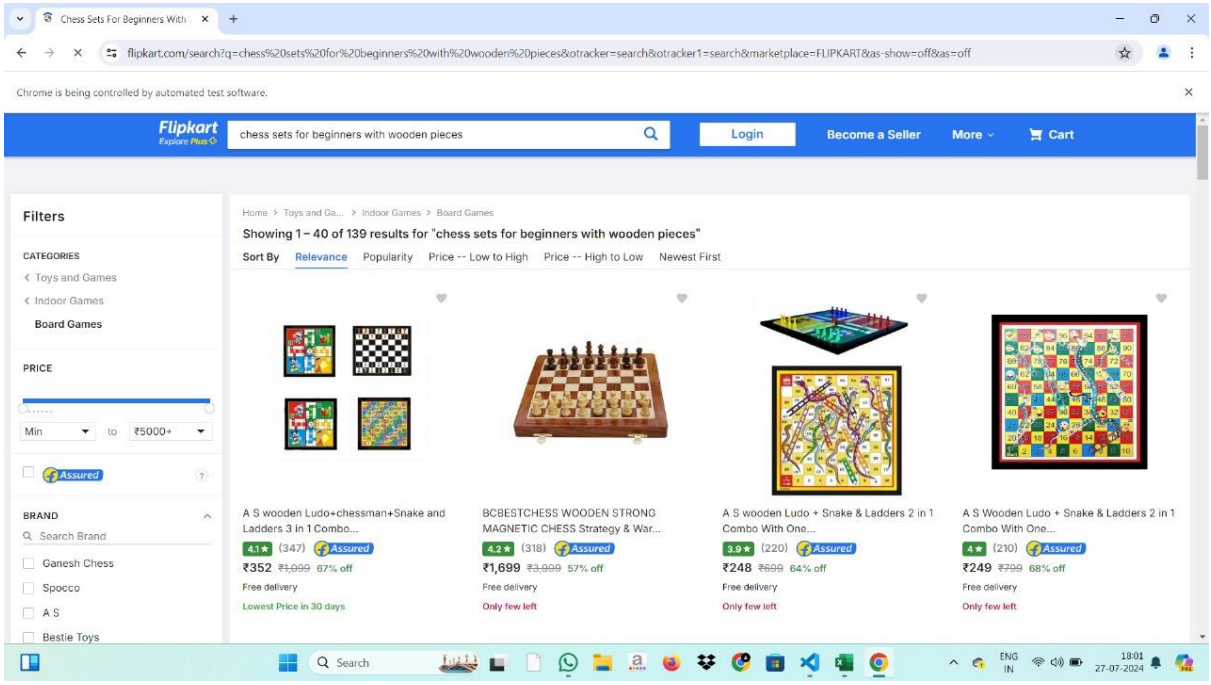

Fig 6.1.5

6.6 Enter a search query with multiple words (e.g. 'chess board game') in the search input field.

Expected Results : Search results page is displayed with relevant results.

Steps:

1. Enter a search query with multiple words (e.g. 'chess board game') in the search input field
2. Click the search button
3. Verify that the search results page is displayed with relevant results
4. Verify that the search query is displayed in the search input field

Sample Results :

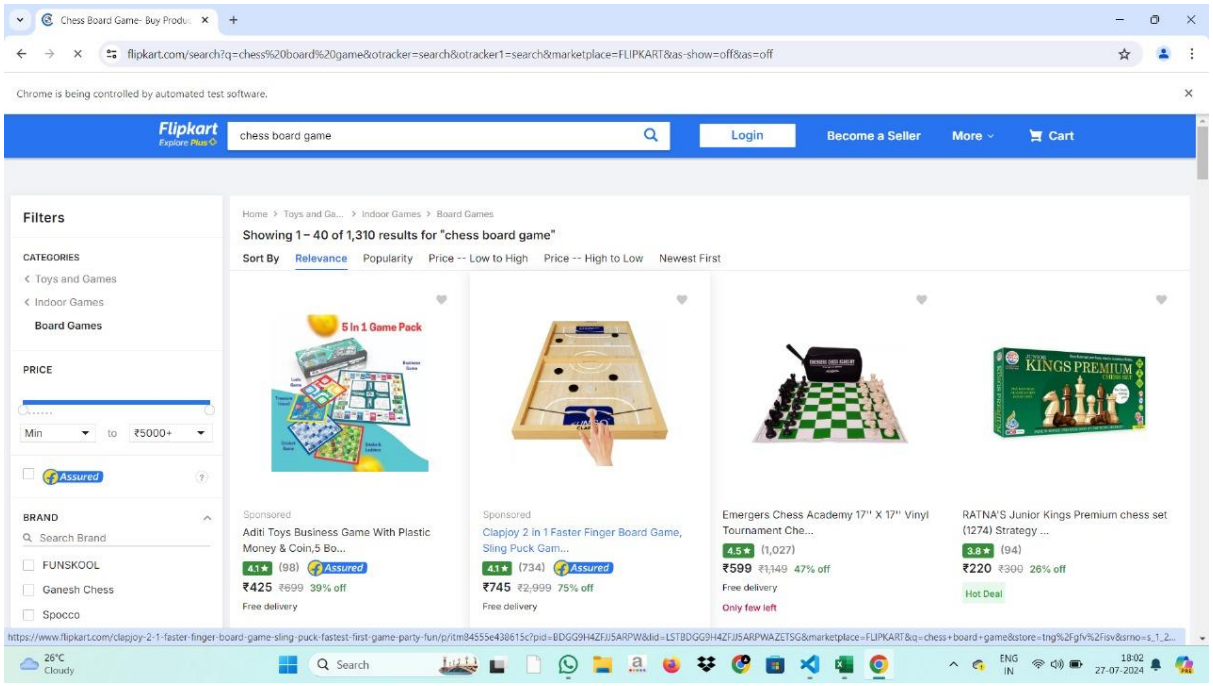

Fig 6.1.6

7. Enter a search query with non-English characters (e.g. 'चेस') in the search input field.

Expected Result : Search results page is displayed with relevant results.

Steps :

1. Enter a search query with non-English characters (e.g. 'चेस') in the search input field
2. Click the search button
3. Verify that the search results page is displayed with relevant results
4. Verify that the search query is displayed in the search input field

Sample Result :

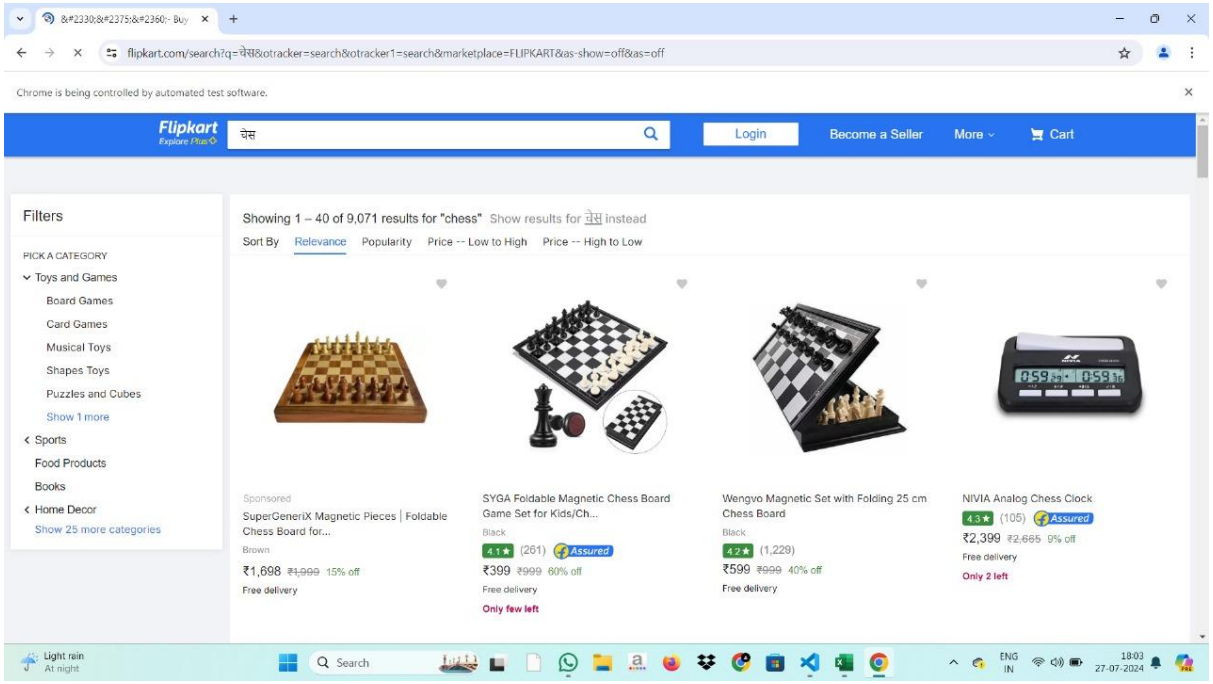

Fig 6.1.7

The sample output demonstrates the relevance and accuracy of search results, along with the appropriate presentation of product details.

CHAPTER 7

SYSTEM TESTING

1. Functional Testing:- Verified that the search bar correctly handles various query types, including exact matches, partial matches, and common misspellings. Results showed that the search bar correctly identified and displayed relevant products in most cases.

2. Performance Testing:- Conducted using JMeter to simulate high traffic scenarios. The search bar's response time was measured under different load conditions. The results indicated that the search bar handled up to 500 simultaneous users with acceptable response times.

3. Usability Testing:- Collected feedback from a sample group of users regarding their experience with the search bar. The feedback highlighted areas for improvement, such as providing more intuitive search suggestions and enhancing the visual presentation of search results.

Test	Preconditions	Steps	Expected Result	Comments
1	User is on the Flipkart homepage	1. Enter a valid search query (e.g. 'chess') 2. Click search 3. Verify relevant results are displayed 4. Verify query is displayed in the input field	Relevant results displayed	Valid
2	User is on the Flipkart homepage	1. Enter an invalid search query (e.g. 'abcdefg') 2. Click search 3. Verify error message (e.g. 'No results found') 4. Verify input field is cleared	Error message displayed, input field cleared	Valid
3	User is on the Flipkart homepage	1. Enter an empty search query 2. Click search 3. Verify error message (e.g. 'Please enter a search query') 4. Verify input field is cleared	Error message displayed, input field cleared	Valid
4	User is on the Flipkart homepage	1. Enter a search query with special characters (e.g. 'chess!') 2. Click search 3. Verify relevant results are displayed 4. Verify query is displayed in the input field	Relevant results displayed	Valid
5	User is on the Flipkart homepage	1. Enter a long search query (e.g. 'chess sets for beginners with wooden pieces') 2. Click search 3. Verify relevant results are displayed 4. Verify query is displayed in the input field	Relevant results displayed	Valid
6	User is on the Flipkart homepage	1. Enter a search query with multiple words (e.g. 'chess board game') 2. Click search 3. Verify relevant results are displayed 4. Verify query is displayed in the input field	Relevant results displayed	Valid
7	User is on the Flipkart homepage	1. Enter a search query with non-English characters (e.g. 'चेस') 2. Click search 3. Verify relevant results are displayed 4. Verify query is displayed in the input field	Relevant results displayed	Valid

Fig 7.1 Test cases for automate testing

CHAPTER 8

CONCLUSION

The testing of Flipkart's search bar has demonstrated strong performance, particularly in terms of accuracy and response time under typical conditions. Nevertheless, our analysis has identified key areas where further enhancements can significantly improve the user experience. Specifically, refining the system’s ability to handle misspelled queries and optimizing the search suggestions feature are critical steps toward achieving a more robust and user-friendly search functionality.

Addressing these areas for improvement will not only boost the search bar’s effectiveness but also contribute to a more seamless and efficient user experience. Enhanced handling of misspelled queries will ensure that users can find relevant results even when their input is less than perfect, thereby reducing frustration and increasing satisfaction. Meanwhile, optimizing search suggestions will guide users more intuitively through their search journey, potentially increasing engagement and conversion rates.

By implementing these recommended improvements, Flipkart can further solidify its position as a leader in e-commerce, providing users with a highly responsive and intelligent search tool that meets their needs with greater precision and ease. Continuous monitoring and iteration on these enhancements will be crucial to maintaining and building upon the current performance, ensuring that the search bar remains a valuable asset in the evolving digital landscape.