

E-Ticketing system by using Heuristic principles

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Abstract

E-Ticketing System is the source of booking tickets online these days, and many of the E-Ticketing service providers are failing to provide a comfortable website or interface. Many customers are facing problems while using the website's user interface, and are unable to book the tickets comfortably, sometimes there may be clumsiness in the UI, bugs, and errors may arise while using the website.

In this project, we tried to design a user-friendly website by following the Heuristic Principles and considering the impacts of UI/UX on our website.

Our website provides a better solution for customers who are facing problems while booking E-Tickets. Tools like HTML, CSS, JavaScript are used to design the website. We followed the Heuristic Principles to increase the usability of our website and to have a great User Experience.

We designed a user-friendly E-Ticketing website that helps to book tickets to the desired destination without facing any difficulties while using our E-Ticketing website. We got great results with the User Interface design of our website by using the required tools for designing our website.

We conclude that using the Heuristic Principles and the required tools we can make an amazing website. We feel that the User Interface and User Experience plays an important role in the usability of a website. So, we used all the tools effectively to design a responsive and good user interface. We made sure that customers of all ages can use our website easily and comfortably to book their E-Tickets through our website.

Keywords:

Heuristic Evaluation, Heuristic Principles, User Experience, User Interface, Cognitive Walkthrough, Usability Testing.

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List of acronyms

Acronym	Unfolding
CSS	Cascading Style Sheets
HTML	Hypertext Markup Language
SEO	Search Engine Optimization
UI	User Interface
UX	User Experience
W3C	World Wide Web Consortium

1 Chapter: Introduction

The E-Ticketing system is the process of booking a ticket for the desired location virtually without stepping out of your house. E-ticket or electronic ticket is a paperless document used for ticketing passengers in the railways or airways industry. All major transport systems are now using this method of E-Ticketing.

Generally, people who want to book tickets for their upcoming travel will approach any respective website and reserve their seats virtually for their upcoming journey. We found that the website which provides these kinds of ticketing services are lacking a good user interface and user experience.

Our project mainly focuses on the problem that is being faced by many customers who are using online websites to book tickets for their journey virtually. Some of the issues are bad user interface and experience, clumsiness on the website, bugs, and errors while using the website, etc.

We had solved most of the issues using required tools like HTML, CSS, JavaScript, and other functionalities. HTML, CSS is used to design the structure and style of the website, whereas JavaScript is used to make the webpages interactive to the user. We used these tools effectively to design our website user-friendly and increase the usability of our website.

This project solves the issues and problems that are faced by the customers while booking their E-Tickets online. Our website gives the best user experience and usability to customers of all age groups as it is so easy to use our website. In the next chapters we are going to discuss about Survey of related work, Problem statement, Objectives, Main contribution, Solution, Conclusion and Future work of our project.

2 Chapter: Survey of related work

2.1 Using of UI/UX Design

2.1.1 User Interface Changes:

A user interface (UI) refers to the interaction between a system and a user. Via commands or methods for working with each other Input data, the framework, and use the contents. User interfaces range from systems like computers, mobile devices, games, etc. to software applications and usage of the content [1]. User experience (UX) refers to the overall experience associated with the user experience, perception (emotion and thinking), response, and behaviour a user, through his or her direct or indirect use, feels and thinks a scheme, product, content, or service [2]. UX is a concept related to HCI that is not only widely applied in the development of software and hardware but also in services, products, procedures, culture, and society. UI/UX is an interface through which an individual can interact with a system or website in a computer and communication environment, the application, classified into software and hardware interface [3].

2.1.2 Design and interaction are closely linked to interfaces:

The design of interfaces plays a role in visually connecting the device. The UX interface is also driven by the usability of the interface. The scheme, material, and facilities, the affinity of the customer, and the benefit of the consumer. The new UI / UX is mentioned in this research.

Some of the UI/UX design elements are:

- 1) Evolution of minimal design
- 2) Increase in micro interaction
- 3) Moving pictures become popular
- 4) Rich colour and sensuous typography
- 5) Long scrolling and parallax technique websites.

Here is an example of UI/UX Design interface diagram.

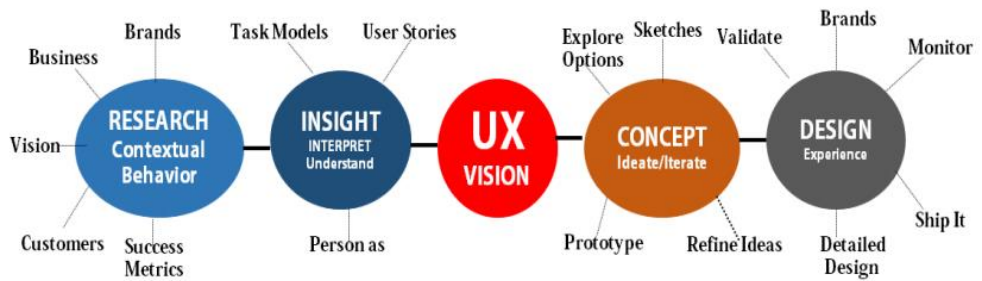


Figure 1: UI/UX Design Interface [3]

2.2 Working of E-Ticketing System [4]

E-Ticketing is one of the foremost critical administrations in ECommerce. An E-Ticket may be a paperless electronic document used for ticketing travellers, basically within the commercial airline industry. There are illustrations of Web ticketing. The establishment of an E-Ticketing system can decrease cost and improve the client's benefits as it is open transportation such as railroad, metro, buses, implementation strategies have been blended due to varying business environment and travel culture.

E-ticketing or electronic ticketing is the way to finance the deals prepare for visitor travel exercises without having a paper ticket. E-Ticketing decreases ticket handling costs eliminates paper shapes and increments the adaptability of passengers and travel specialists in making changes to travel plans.

E-Ticketing system has become an important issue for organizations in recent years to introduce the E-Ticketing system. Specifically, the issue with customer satisfaction in E-Ticketing has become a major issue of focus, forcing the organizations to investigate the specific values that shape customer outcomes when choosing the E-Ticketing method.

3 Chapter:

Problem statement, objectives, and main contribution

The main agenda of the problem is to design a user-friendly website by following the Heuristic principles and how UI/UX design impacts the website. E-Ticketing system has become the most used method to book travel tickets in all types of transport systems. As the importance of the E-Ticketing system is increasing rapidly the websites offering several kinds of services should be designed in a more user interactive manner. And we found through our own experience that some of the websites that are offering these services are not user-friendly, and customers are facing a lot of problems in understanding the website.

The main objective of the project is to design a website in a way that UI/UX design is suitable for the E-Ticketing system by applying Heuristic Principles and to design a user-friendly website that impacts the usability of our website. Secondly, we focus on the User Experience i.e., to meet the needs of the user and provide relevant experiences to the user.

The main contribution of the project is, to provide a good UI/UX design which helps to grab user prospects' attention, to use your product or service, become loyal to your business, and make them use your next product. Tools like HTML, CSS, JavaScript are used to design the User Interface. Python programming language with Django framework is used to develop the website [5].

4 Chapter: Solution

4.1 Modeling

The E-Ticketing system is the process of booking tickets online virtually through relevant websites. We found that the customers are facing issues regarding the user interface and the usability of the website. The website that is facing issues with the customer's usability is IRCTC which is an E-Ticketing system.

We considered this issue as our objective of this project. The customers are facing problems with the user interface and the user experience of this website. So, we tried to solve these issues by considering the general problem faced by the customers. Many of the users are complaining that the website is so clumsy and are facing problems regarding the usability of the website. We found that there are many solutions to the problem.

These problems faced by the customers inspired us to create a user-friendly website. Our aim is to design a website that solves all the problems regarding the UI/UX.

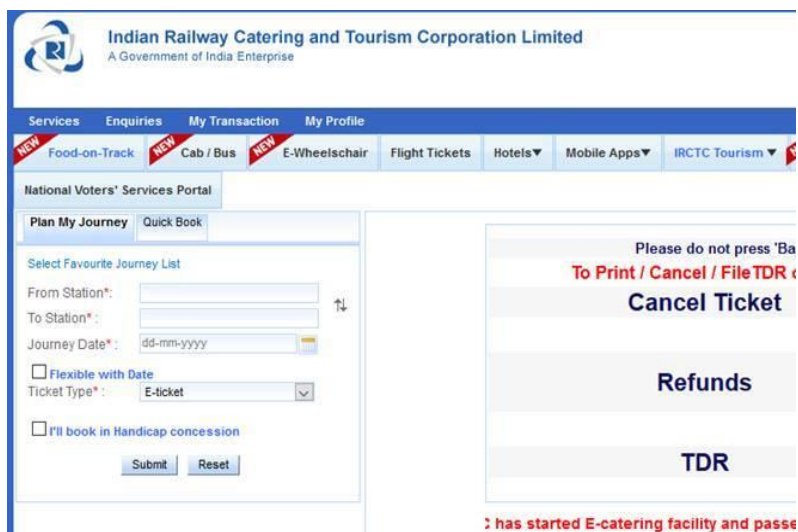


Figure 2: IRCTC homepage [6]

We came up with a model to design our E-Ticketing website, this model helps us to design our website based on our ideas and thoughts [7].

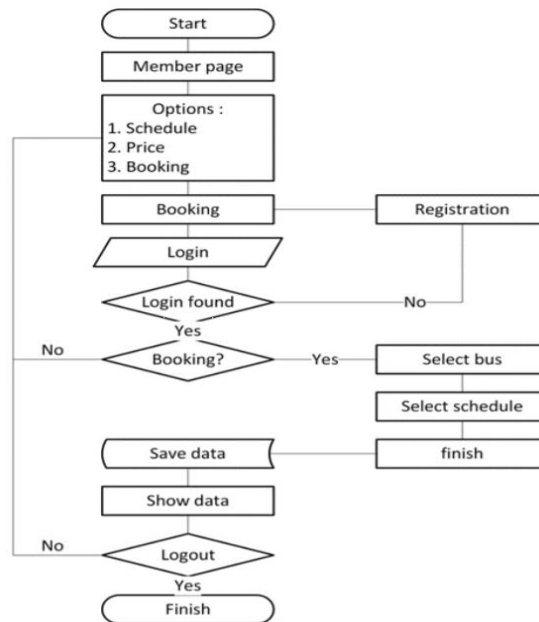


Figure 3: Flowchart of a sample E-Ticketing System [3]

4.2 Implementation

To develop a website with great User Interface design, we need to follow some essential principles known as the Heuristic principle. There are 10 Usability Heuristic Principles for User Interface Design [6]. Here we discuss every principle, and how these principles are used to design our website.

Visibility of System Status

The user should keep informed about the status of the website within a reasonable amount of time.

Match between system and real world

The website is to be designed in a way that it matches the real-world user's language, i.e., avoiding technical explanations.

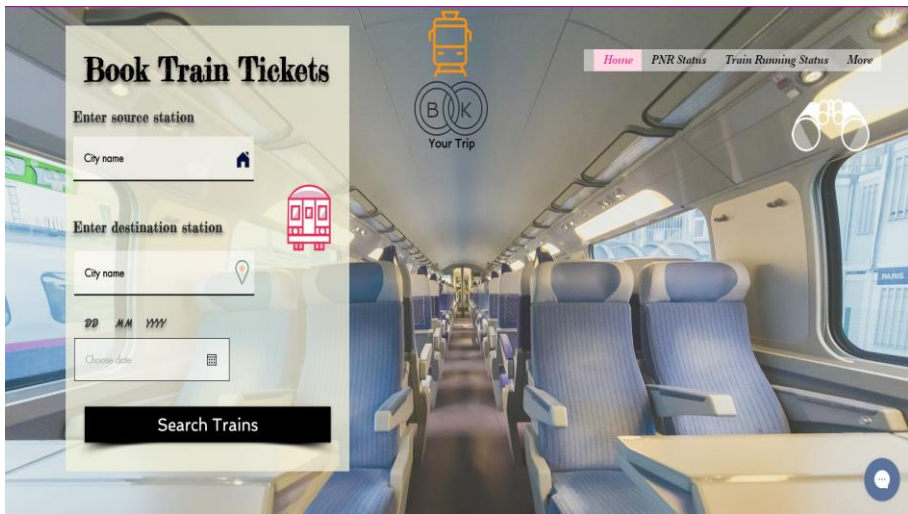


Figure 4: Homepage (new website) of our website

User control and freedom

Users should be given an option for emergency exits. For example, while a user is performing any transactions there should be an option to cancel at any time.

Consistency and Standards

It is essential to create a user interface that is consistent throughout all devices.

Error prevention

The website should be designed in a way that, not only to handle the errors but also to prevent the website from occurring errors.

Here is a contact page of our website.

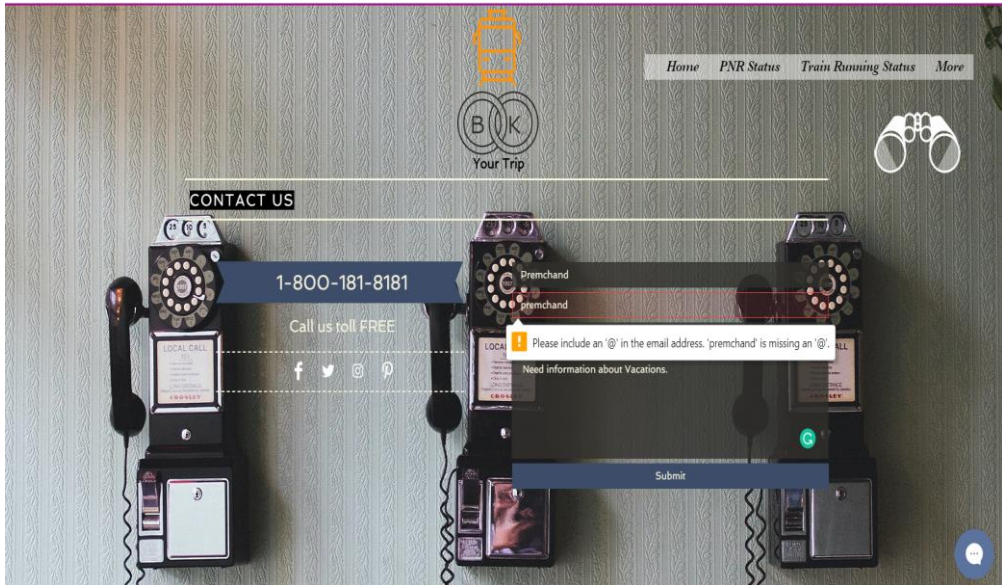


Figure 5: Contact page

Recognition rather than recall

By making objects, actions, and options visible we can minimize the user's memory load.

Flexibility and efficiency of use

It should be more flexible for users to use the website efficiently.

Aesthetic and minimalist design

The website should not contain any irrelevant information rather its design should in an aesthetic and minimalistic way.

The below Figure 6: Webpage with less aesthetic and minimalist design shows a website with less aesthetic and minimalist design.



Figure 6: Webpage with less aesthetic and minimalist design

In Figure 7: PNR Status Webpage shows the more aesthetic and minimalist design.

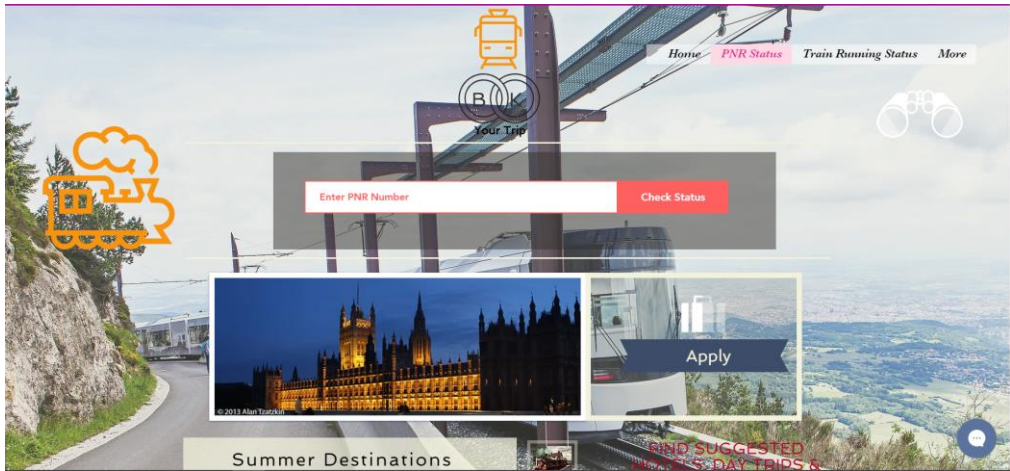


Figure 7: PNR Status Webpage

Help users recognize, diagnose, and recover from errors

Users should be able to recognize error messages and to be guided by the website to diagnose the errors and finally recover from the errors.

Help and documentation

The documentation should give the required information about how a website is designed/developed.

HTML, CSS, JavaScript tools used to design our website. We followed the Heuristic Principles to increase the usability of our website.

- HTML is used to design the structure of the website.
- CSS is used to design the style of the website
- Whereas JavaScript is used to make the webpages interactive to the user.

4.3 Validation

We validated our website by checking our document against a formal standard, such as W3C for HTML document types. We tested our website's code against the industry standard to allow browsers to read it in the same way.

We validated our website to increase

- Compatibility
- SEO [9]
- Accessibility

Chapter:

Conclusion and future work

We conclude that our E-Ticketing website is designed in a way that achieves a good User Experience (UX) and Effective User Interface (UI) design. It also follows all the Heuristic principles by using these resources so that users can comprehend the UI well. Finally, we designed the best website for the problems mentioned that can be used irrespective of his/her age.

In the future, this website can also be updated in aspects like additional booking features such as food ordering, luggage allowance for travel, and many more. We can also update you with the latest payment methods and services. In future, this also can be implemented as a mobile application.

- (ATAWAD e-ticketing) i.e. Anytime, Anywhere, Any Device can be implemented in future [10].
- User Interface can be updated/maintained in future based on the User Experience.

Reference

- [1] H. S. Joo, “A Study on UI/UX and Understanding of Computer Major Students,” *Int. J. Adv. Smart Converg.*, vol. 6, no. 4, pp. 26–32, 2017, doi: 10.7236/IJASC.2017.6.4.4.
- [2] H. Joo, “A study on understanding of UI and UX, and understanding of design according to user interface change,” *Int. J. Appl. Eng. Res.*, vol. 12, no. 20, pp. 9931–9935, 2017.
- [3] N. Sharad, *Understanding current UI trends and it's practical use in Interface Designing*. 2019.
- [4] M. Mahmoud, Z. Alfawaer, and S. Zoubi, “MOBILE E-TICKETING RESERVATION SYSTEM FOR AMMAN INTERNATIONAL STADIUM IN JORDAN,” *Acad. Res. Int.*, vol. 3, pp. 848–852, Jan. 2011.
- [5] A. Holovaty and J. Kaplan-Moss, *The Definitive Guide to Django: Web Development Done Right*. Apress, 2009.
- [6] J. K. Puthur, A. p. George, and L. Mahadevan, “Understanding citizen’s continuance intention to use e-government services: the case of the Indian railway e-ticket booking site,” *Int. J. Bus. Inf. Syst.*, vol. 34, no. 2, pp. 183–203, Jan. 2020, doi: 10.1504/IJBIS.2020.108343.
- [7] E. S. Soegoto, R. Setiawan, and R. Jumansyah, “Impact of E-Ticketing Application on Bus Transportation in Bandung,” Jan. 2020, pp. 25–28, doi: 10.2991/aebmr.k.200108.008.
- [8] J. Nielsen, “10 usability heuristics for user interface design,” *Nielsen Norman Group*, vol. 1, no. 1, 1995.
- [9] L. S. Park, J. Yu, S. Yu, and L. Liao, “Search engine optimization for category specific search results,” US9116994B2, Aug. 25, 2015.
- [10] “International Conference - The Future of E-Ticketing Through Technology Application. Articulating Traveller Information, Interoperability and NFC | CIVITAS.” <https://civitas.eu/content/international-conference-future-e-ticketing-through-technology-application-articulating> (accessed Nov. 21, 2020).

Appendix:

Code for the Home page

```
<!DOCTYPE html>
<html lang="en">
<head>

  <meta charset='utf-8'>
  <meta name="viewport" content="width=device-width, initial-scale=1" id="wixDesktopViewport" />
  <meta http-equiv="X-UA-Compatible" content="IE=edge">
  <base href="https://premchands10.wixsite.com/bookyourtrip/">
  <meta name="generator" content="Wix.com Website Builder"/>

  <link rel="icon" sizes="192x192" href="https://www.wix.com/favicon.ico">
  <link rel="shortcut icon" href="https://www.wix.com/favicon.ico" type="image/x-icon"/>
  <link rel="apple-touch-icon" href="https://www.wix.com/favicon.ico" type="image/x-icon"/>
  <!-- Safari Pinned Tab Icon -->
  <!-- <link rel="mask-icon" href="https://www.wix.com/favicon.ico" -->

  <!-- Legacy Polyfills -->
  <script src="https://static.parastorage.com/unpkg/core-js-bundle@3.2.1/minified.js" nomodule=""></script>
  <script src="https://static.parastorage.com/unpkg/focus-within-polyfill@5.0.9/dist/focus-within-polyfill.js" nomodule=""></script>
  <script src="https://polyfill.io/v3/polyfill.min.js?features=fetch" nomodule=""></script>

  <!-- lodash window -->
  <script>
    (function () {
      var resolve
      window.lodashPromise = new Promise(function (_resolve) { resolve = _resolve })
      window._onLodashLoaded = function () {
        resolve()
      }
    })()
  </script>

  <!-- Performance API Polyfills -->
  <script>
    (function () {
      var noop = function noop() {};
      if ("performance" in window === false) {
        window.performance = {};
      }
      window.performance.mark = performance.mark || noop;
      window.performance.measure = performance.measure || noop;
      if ("now" in window.performance === false) {
        var nowOffset = Date.now();
        if (performance.timing && performance.timing.navigationStart) {
          nowOffset = performance.timing.navigationStart;
        }
        window.performance.now = function now() {
          return Date.now() - nowOffset;
        };
      }
    })();
  </script>
```

Code for PNR status

```
</head>
<body class='device-windows' >
<script type="text/javascript">
  var bodyCacheable = true;

  var exclusionReason = {"shouldRender":true,"forced":false};
  var ssrInfo = {"renderBodyTime":247}
</script>

<script>window.clientSideRender = false;</script>

<!--pageHtmlEmbeds.bodyStart start-->

<!--pageHtmlEmbeds.bodyStart end-->

<script id="wix-first-paint">
  if (window.ResizeObserver &&
    (!window.PerformanceObserver || !PerformanceObserver.supportedEntryTypes || PerformanceObserver.supportedEntryTypes.indexOf('paint') === -1)) {
    new ResizeObserver(function (entries, observer) {
      entries.some(function (entry) {
        var contentRect = entry.contentRect;
        if (contentRect.width > 0 && contentRect.height > 0) {
          requestAnimationFrame(function (now) {
            window.wixFirstPaint = now;
            dispatchEvent(new CustomEvent('wixFirstPaint'));
          });
          observer.disconnect();
          return true;
        }
      });
    }).observe(document.body);
  }
</script>
```

Code for Train live status

```
<!-- thElements js -->
<script src="https://static.parastorage.com/services/editor-elements/dist/thunderboltElements.dd62e356.bundle.min.js" defer="" onload="window.ThunderboltElementsLoadedResolve()"></script>

<script async id="wix-perf-measure" src="https://static.parastorage.com/services/wix-perf-measure/1.258.0/wix-perf-measure.bundle.min.js"></script>

<!-- components registry runtimes -->
<script></script>

<!-- initial assets -->
<script>
  window.initialAssets={siteAssets:{}};
</script>

<meta http-equiv="X-Wix-Meta-Site-Id" content="f77ae622-5d36-4508-8eff-65a56398ccaf">
<meta http-equiv="X-Wix-Application-Instance-Id" content="5556c969-7bb1-42f5-9a8d-b066a67e652b">

<meta http-equiv="X-Wix-Published-Version" content="90"/>

<meta http-equiv="etag" content="bug"/>
```