



Support For Mobile Devices

CERN Search Portal

AUTHOR:

Mehdi Golbaz
HCI Master Student
Salzburg University-FH Salzburg

SUPERVISOR:

Carina Antunes
Software Engineer
CERN (IT-CDA-WF)





ABSTRACT



The **CERN Search as a Service** project provides a platform for providing indexing and search functionality to a wide range of CERN information sources such as Indico, EDMS, SharePoint, Drupal and CERN's Web pages. The content of these indexes is available via the CERN Search Portal. [1]

The goal of the project was to extend the features of the search portal to include support for mobile devices.

Research of requirements, Design exploration and Frontend Development specifically in React/ Javascript and HTML/CSS were the main tasks for the project.

The end result was a set of guidelines, high fidelity mocks and a implementation prototype for the changes to the interface.

Future work will include the final implementation.





TABLE OF CONTENTS



INTRODUCTION	4
---------------------	----------



REQUIREMENTS	5
---------------------	----------



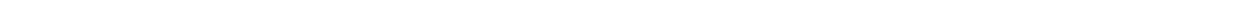
DESIGN PROCESSES	6
-------------------------	----------



IMPLEMENTATION	9
-----------------------	----------



CONCLUSION	15
-------------------	-----------



REFERENCES	15
-------------------	-----------



1. INTRODUCTION

The purpose of this report is to present the content and the progress of my project as an Openlab summer student at CERN during the summer of 2021. The length of my internship was 13 weeks (5 July - 30 September), during which I worked in the IT-CDA-WF section with the Search team.

The main goal of the project was to improve the CERN search portal, adapting the existing user interfaces to be supported in small screen devices and creating new ones where needed. The standards and patterns defined in this project will be adopted by the team and will lead to a more user friendly search experience, all of this while making the development process easier and leading to a consistent design in the long term.

The CERN Design Guidelines were a constant through all the process, being thoroughly studied and adopted, resulting in a minimal and user-friendly consistent design that matches effortlessly the rest of the CERN Web.

After three months of work, at the time that this report is being written, a prototype for a mobile responsive UI has been implemented. It includes a new landing page, a new help page, and finally a new result page. This prototype is however not fully functional, leaving routing changes and other small details for future work in the final implementation.



2. REQUIREMENTS

Mobile devices have been around in one form or another for many years, but only recently have they gained mainstream acceptance in enterprise environments. As the mobile consumer market continues to grow so will the expectations of individuals, making mobile support an essential part of the CERN Web.

Looking into the current Search Portal (<https://search.cern.ch>) in Fig. 1 we can observe even though it can be used in mobiles, in practice its just a smaller version of the desktop page, making it difficult to use. it does not support mobile.

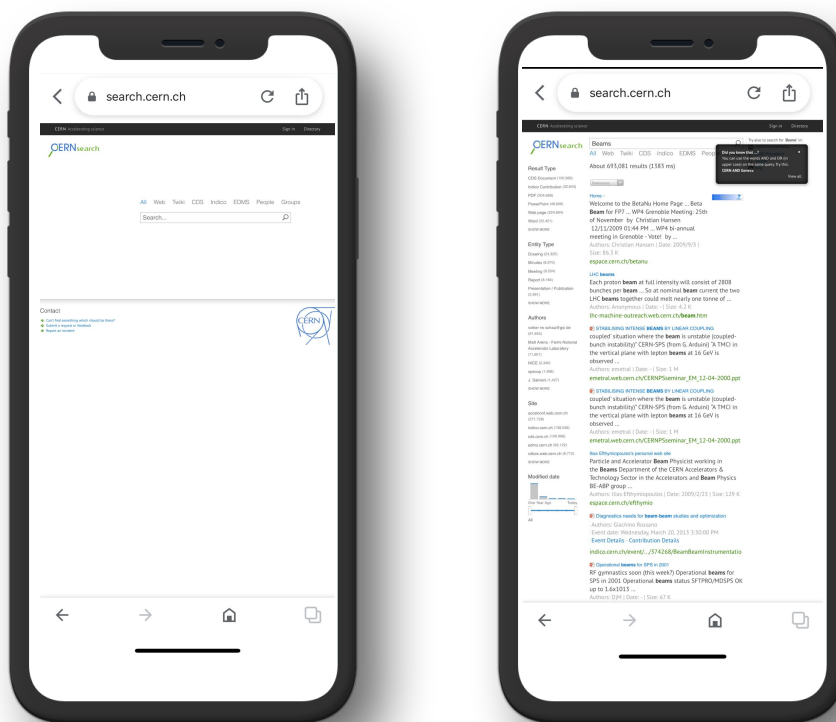


Fig.1. The current CERN search portal in mobile devices

Therefore it's a main requirement that in this new search we implement a solution that is not only supported in small screen devices, such as mobile phones and tablets, but that is fully adapted to the particularities of small screens and that is easy to use, efficient and user friendly.

Following the CERN Design Guidelines [1] it's also mandatory, to comply with the Organisation image.

Finally the proposed changes, should follow a pattern easy to maintain and replicate/adapt to new component in the long term.



4. DESIGN PROCESS

a. INVESTIGATE USAGE

There were around 3.5 billion smartphone users in the world by 2020. That equates to 45 percent of the world population. People used over 9000 different devices to access the internet in 2019, with the percentage of mobile users increasing every day [2].

Responsive design is the proposed solution: it makes the interface easier to interact with and more readable, this approach eases also management in the final products [3].

The following are the most commonly used Mobile, Desktop, and Tablet resolutions [4]:

- 1920×1080 (8.89%)
- 1366×768 (8.44%)
- 360×640 (7.28%)
- 414×896 (4.58%)
- 1536×864 (3.88%)
- 375×667 (3.75%)

b. IDENTIFY CURRENT ISSUES

After analysing the current CERN Search Portal and the one in development (Figure 2), the following issues were identified (Figure 3):

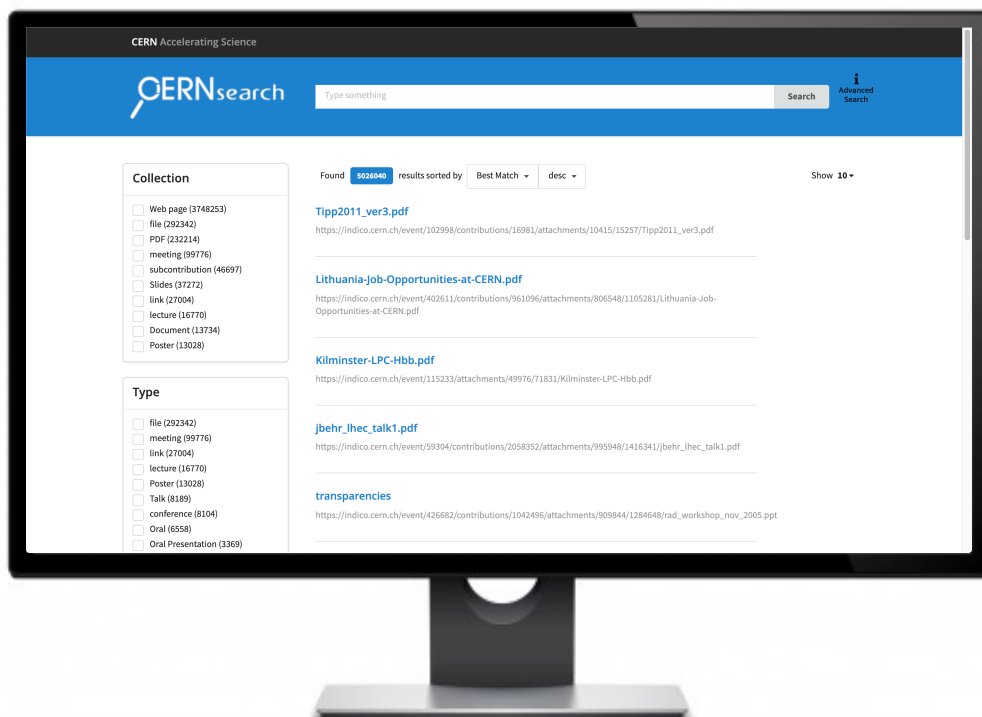


Figure 2. Screenshot from the current CERN Search Portal in development - Results page

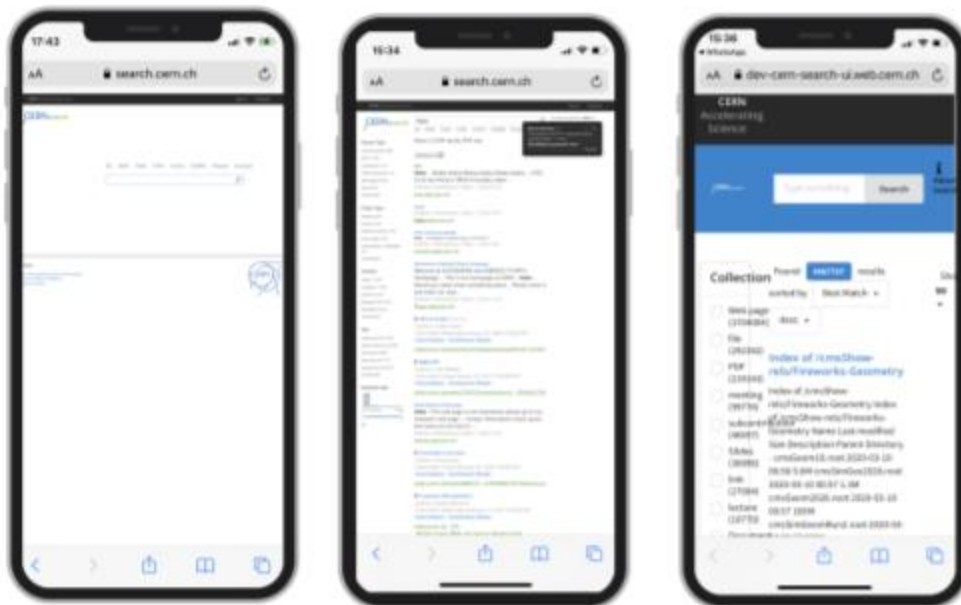


Figure 3. Screenshot from the CERN Search Portal and current one in development, on mobile view

- 1) The texts list flows out of the collection container
- 2) The number of search results can be better defined as a responsiveness approach.
- 3) On the results cards, the second `<div>` is not responsive and does not respond properly to the screen size's changes.
- 4) On the Side Bar filter input, when an option is selected on the list, the text flows out of the list container.
- 5) On the mobile version, this would be more user-friendly if the search CERN logo should move above the search input on the header of the website.
- 6) Redesign and sort the collection and other containers on the left beside the header to redefine it as a list (burger menu or inspector).

It was also identified the need for a new Lading page and Help page, missing in the current development.



c. DESIGN TECHNIQUES

i. CSS Breakpoints and Media Queries

CSS breakpoints are points where the website content responds according to the device width, allowing you to show the best possible layout to the user. CSS breakpoints are also called media query breakpoints, as they are used with media query. Because of the enormous variety of devices on the market, there will be always challenges for designers and developers to find and fix those breakpoints.

The challenges vary from the point of view of who's looking: for developers implementing successful media queries is a challenge in itself, for designers on the other hand how it should look on different websites/screens is the main challenge

ii. Design Tools

To design and develop the user interfaces several tools were used:

- Whimsical, a visual workspace for thinking and collaboration online;
- Balsamiq App, an app for creating low-fidelity wire framing tool;
- and the Figma app, which is a web-based user interface design app that allows online collaboration.

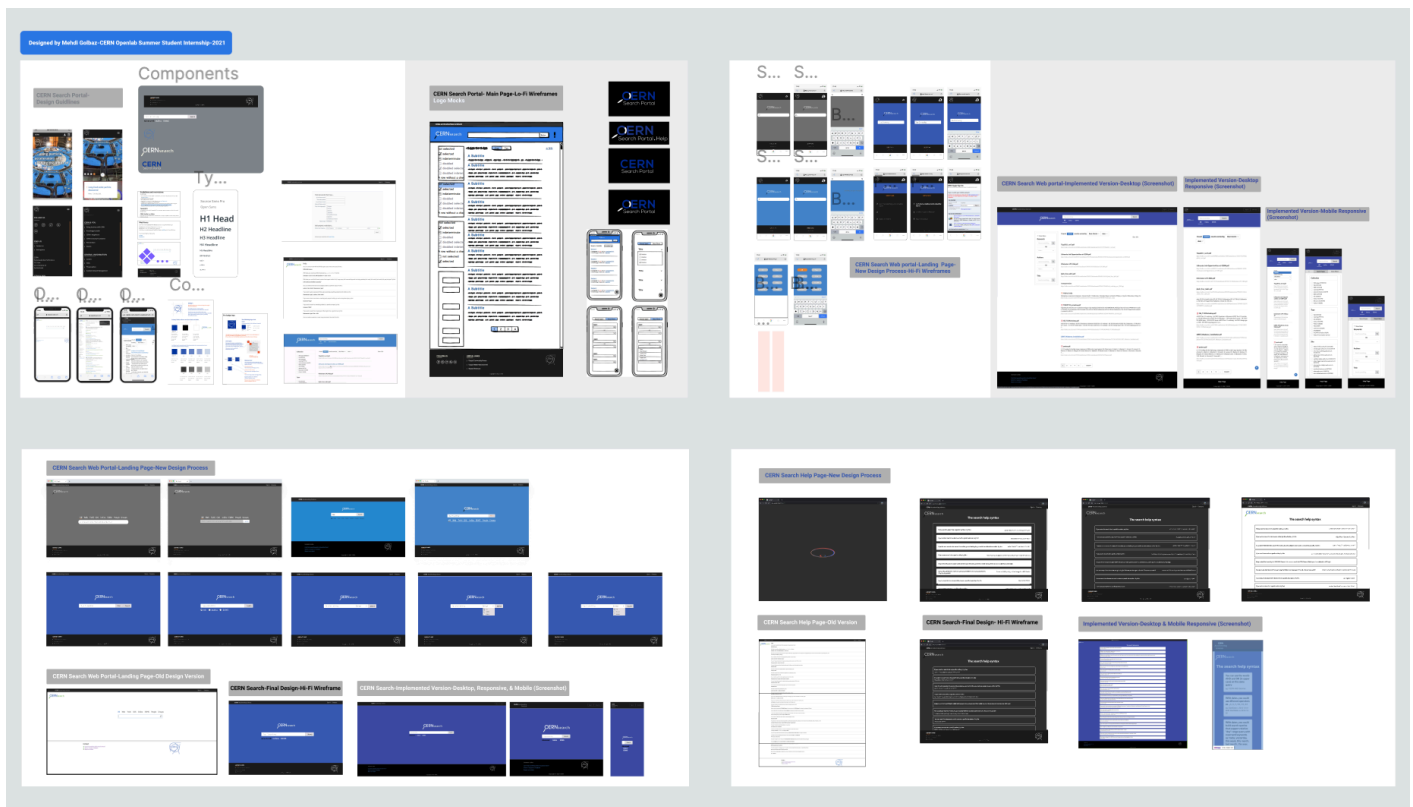


Figure 4. Screenshot from the Figma App, showing several design options



5. IMPLEMENTATION

a. DESIGN

Based on previous investigation the main landing page, the help page, and finally the result page (the mobile version) was redesigned. The final breakpoint selected was 1024px, above that being the desktop version and under the mobile layout - both responsive for all in between sizes.

i. WIREFRAMES

The project's first step was to create and redesign the principal user requirements for the User Interface (UI) of the CERN Search Portal. Furthermore, several wireframes and Mocks were generated and discussed with the team's supervisor, as part of this process, enabling the team to start the interface implementation, at the next level.

As a highly significant part of this project was defining those user interfaces for mobile users, the Mobile Responsive method was applied to most of the user interfaces.

In Figure 5 some of the wireframes created can be seen.



Figure 5: CERN Search Portal-Result Page-Low Fidelity Wireframes

The main problem identified previously was the filters component which would not work well in small screen, if showed together with the results. The proposed solution moves the filters to a new component while in mobile, which is showed in a different page from the results. This component is accessible through a new circular button with is fixed in the mobile version, leaving the results page less cluttered.

ii. HIGH-FIDELITY MOCKS

The next and final step of the design process was to produce high-fidelity mocks that could be replicated in the prototype implementation.

There were specially important for the new components and pages, and thus skipped for the result page changes.



As can be seen in the next figures, they provide the final look and feel. In figure 6 it can be observed the proposed landing page in desktop version and in figure 7 in the mobile version. In figure 8 we can see the proposed help page.

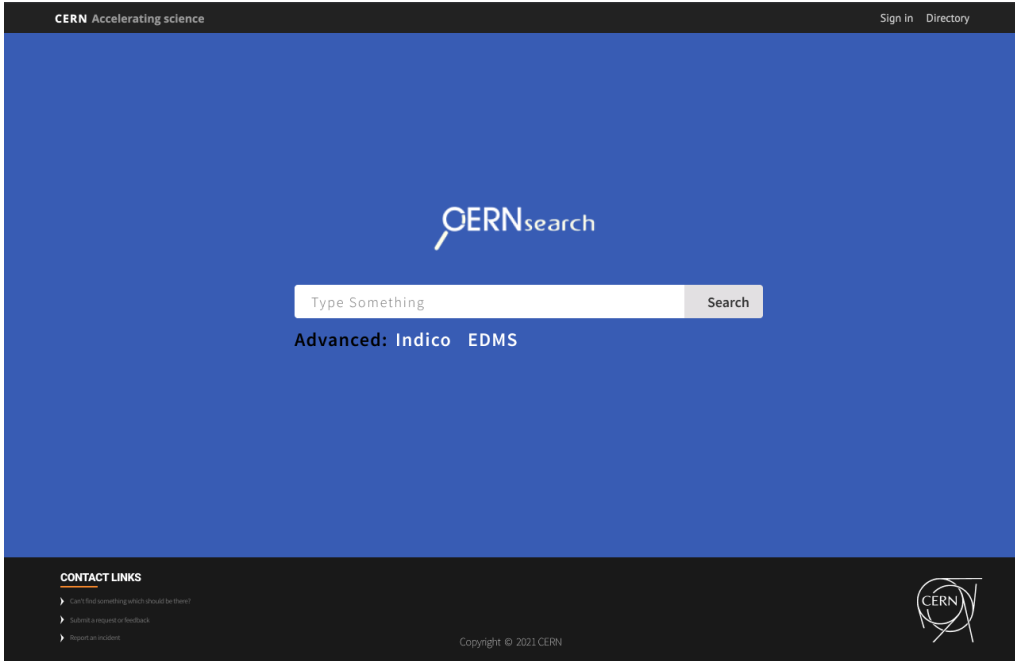


Figure 6. CERN Search Portal - Landing Page High-Fidelity Mock

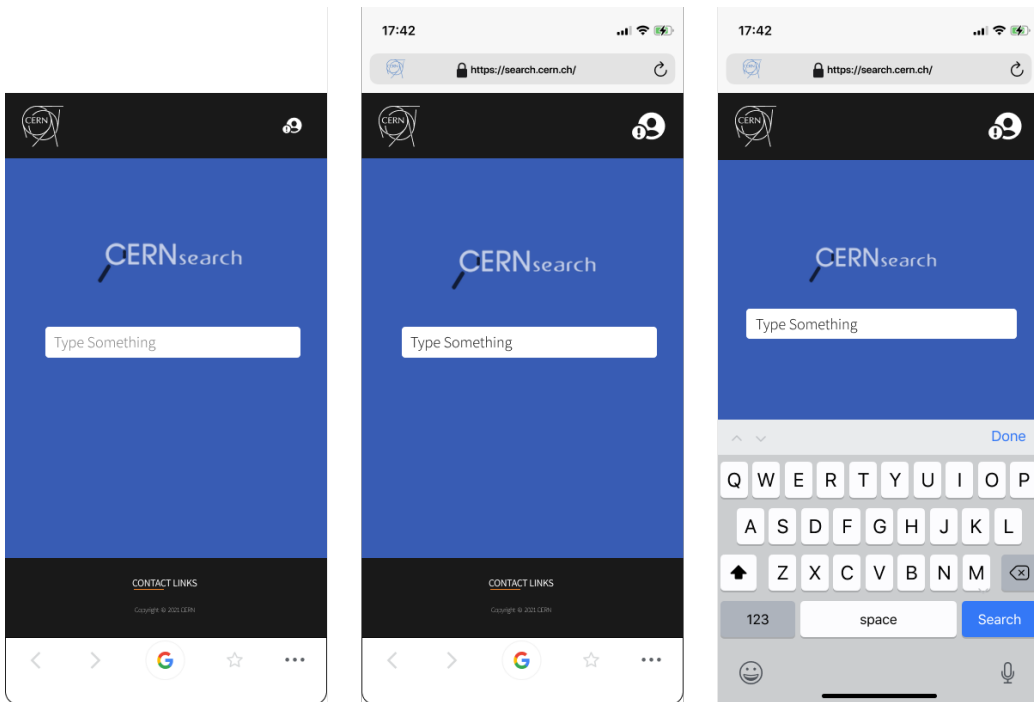


Figure 7. CERN Search Portal - Landing page (mobile version) High-Fidelity Mock

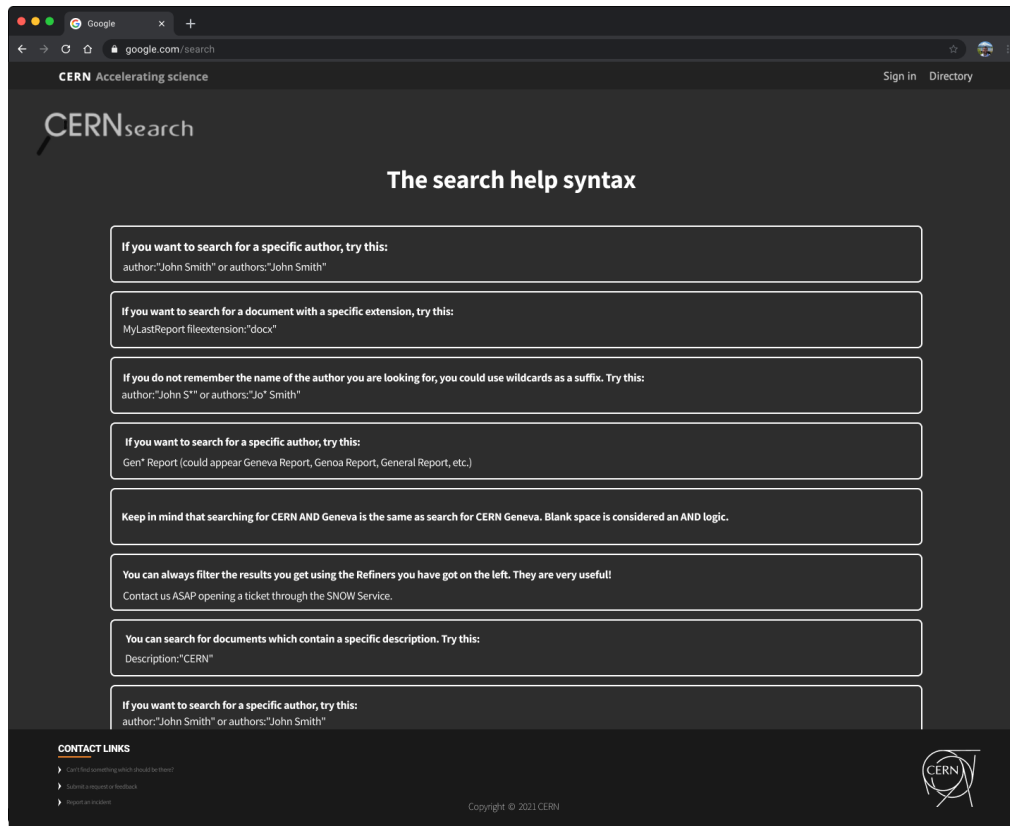


Figure 8. CERN Search Portal - Help page High-Fidelity Mock

b. SOFTWARE

After taking the feedback on the low-fidelity and high-fidelity mocks, the accepted User Interfaces were developed. The interfaces were implemented following the mobile responsiveness methodology and using the existing stack, namely the React.JS library, HTLM/Sass and Semantic UI.

For remote collaboration the adopted technologies at CERN were of major importance, namely the Zoom application for daily stand-ups and Mattermost to be in contact with peers at all times. Visual Studio and Gitlab were used for day-to-day development.

In figure 9 and 10 an example of the produced code can be seen, in this case the React component for the Landing page and its CSS.

From figures 11 to 14 the implemented prototype can be seen, very similar to the high fidelity mocks.



```

src > components > JS LandingPage.js > LandingPage
38 import logo from "../assets/logo-white.png"
37 import { AutocompleteSearchBar } from "react-searchkit";
36 import ListFilters from "../ListFilters";
35
34 const LandingPage = () => {
33
32   const [isMobile, setisMobile] = useState(window.matchMedia("(max-width: 812px)").matches);
31
30   useEffect(() => {
29     window.addEventListener("resize", () => {
28       setisMobile(window.matchMedia("(max-width: 812px)").matches)
27     });
26   }, [isMobile]);
25
24
23   return (
22     !isMobile ?
21     (
20       <Grid celled className="no-border-radius no-margin landing-page">
19         <GridRow>
18           <Container>
17             <div className="landing-page-contents">
16               <Grid.Column className="search-logo">
15                 <a href="https://home.cern/">
14                   <Image floated="right" src={logo} size="medium" />
13                 </a>
12               </Grid.Column>
11               <Grid.Column width={16} textAlign="center" className="auto">
10                 <Grid style={{ padding: "2rem 0" }}>
9                   <Grid.Column>
8                     <Grid.Row>
7                       <AutocompleteSearchBar />
6                     </Grid.Row>
5                   </Grid.Column>
4                 </Grid>
3               </Grid.Column>
2             </div>
1             <ListFilters />
0           </GridRow>
-1         </Container>
-2       </GridRow>
-3     </Grid>
-4   )
-5 )
41

```

```

40 /*****
41   Landing page styles
42 *****/
43
44 .landing-page {
45   background: #6B84c5;
46   height: 65vh;
47 }
48
49 .services-list{...}
50
51 .landing-page-contents{...}
52
53 .search-logo{...}
54
55 .services-list-outer-container{
56   display: flex;
57   align-items: center;
58   justify-content: center;
59   margin-top: 15px;
60 }
61
62 @media (min-width: desktop) {
63   .landing-page {
64     height: 65vh;
65   }
66 }
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82

```

Figure 10: Landing Page CSS slice

Figure 9. Landing Page React Code

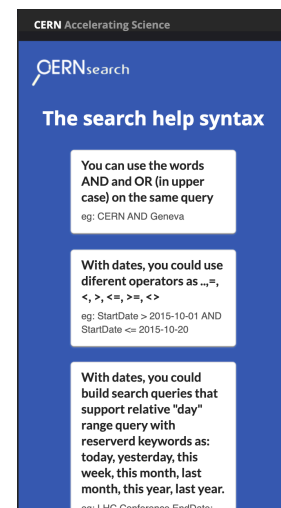
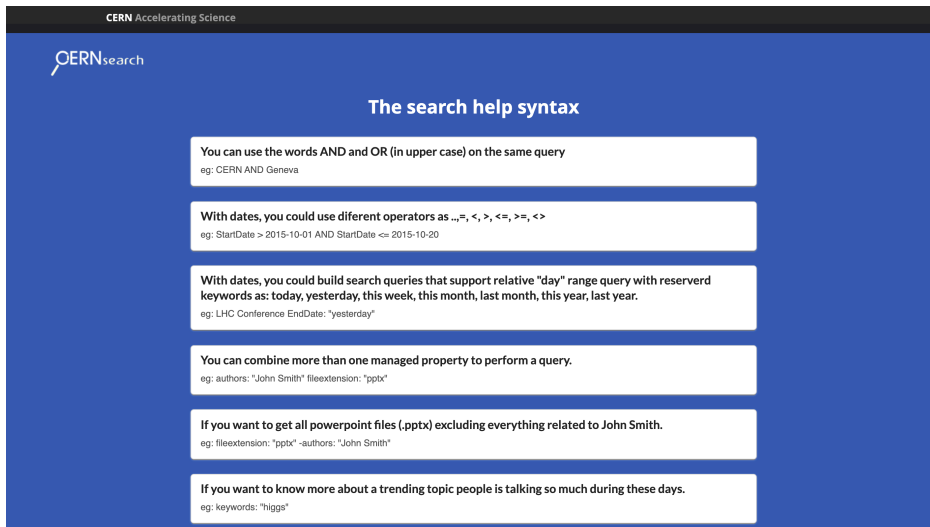


Figure 11. Help page desktop and mobile

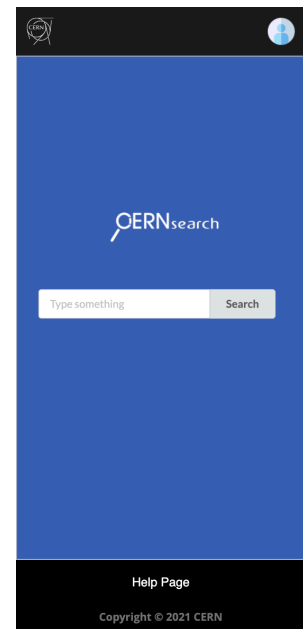
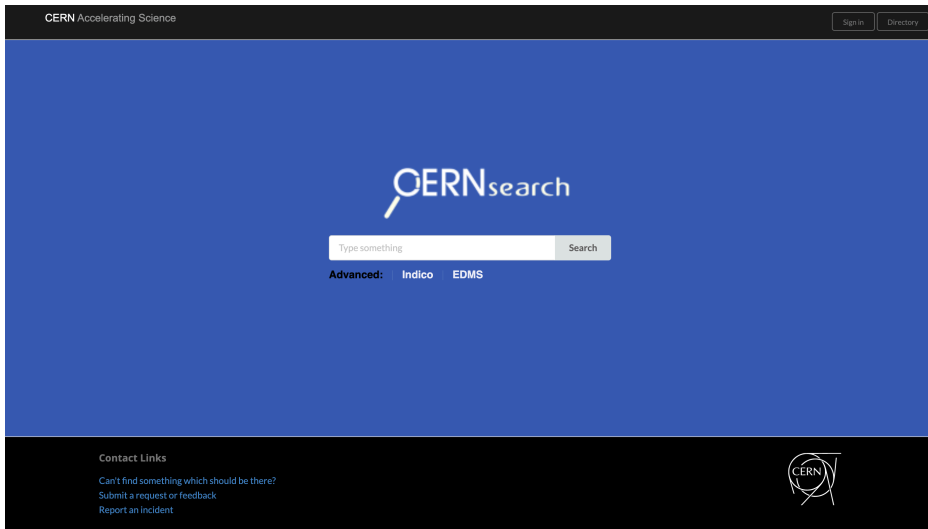


Figure 12. Landing page desktop and mobile

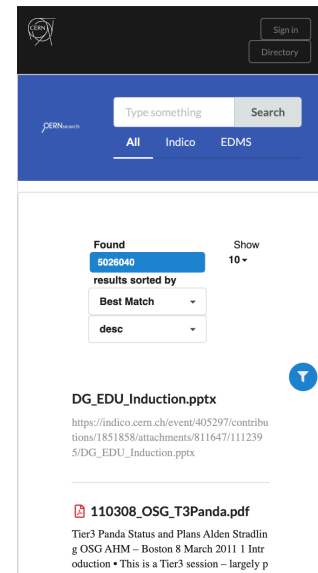
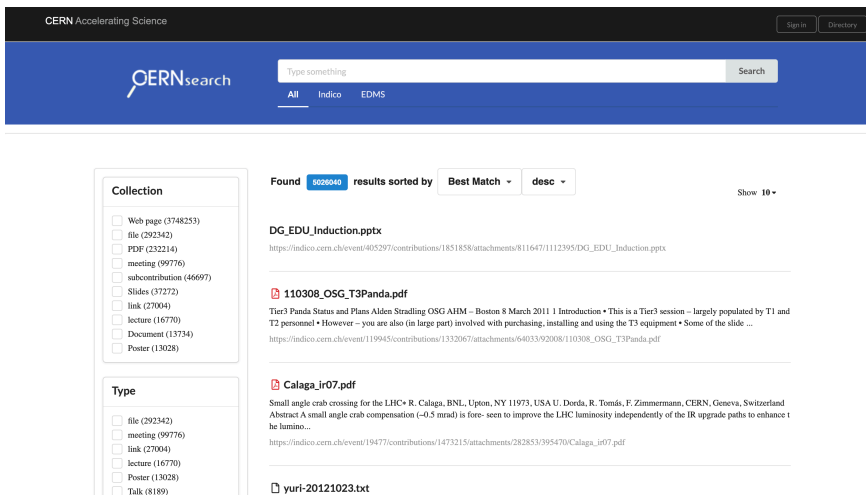


Figure 13. Results page desktop and mobile - some improvements for future work visible, eg. Sorting component



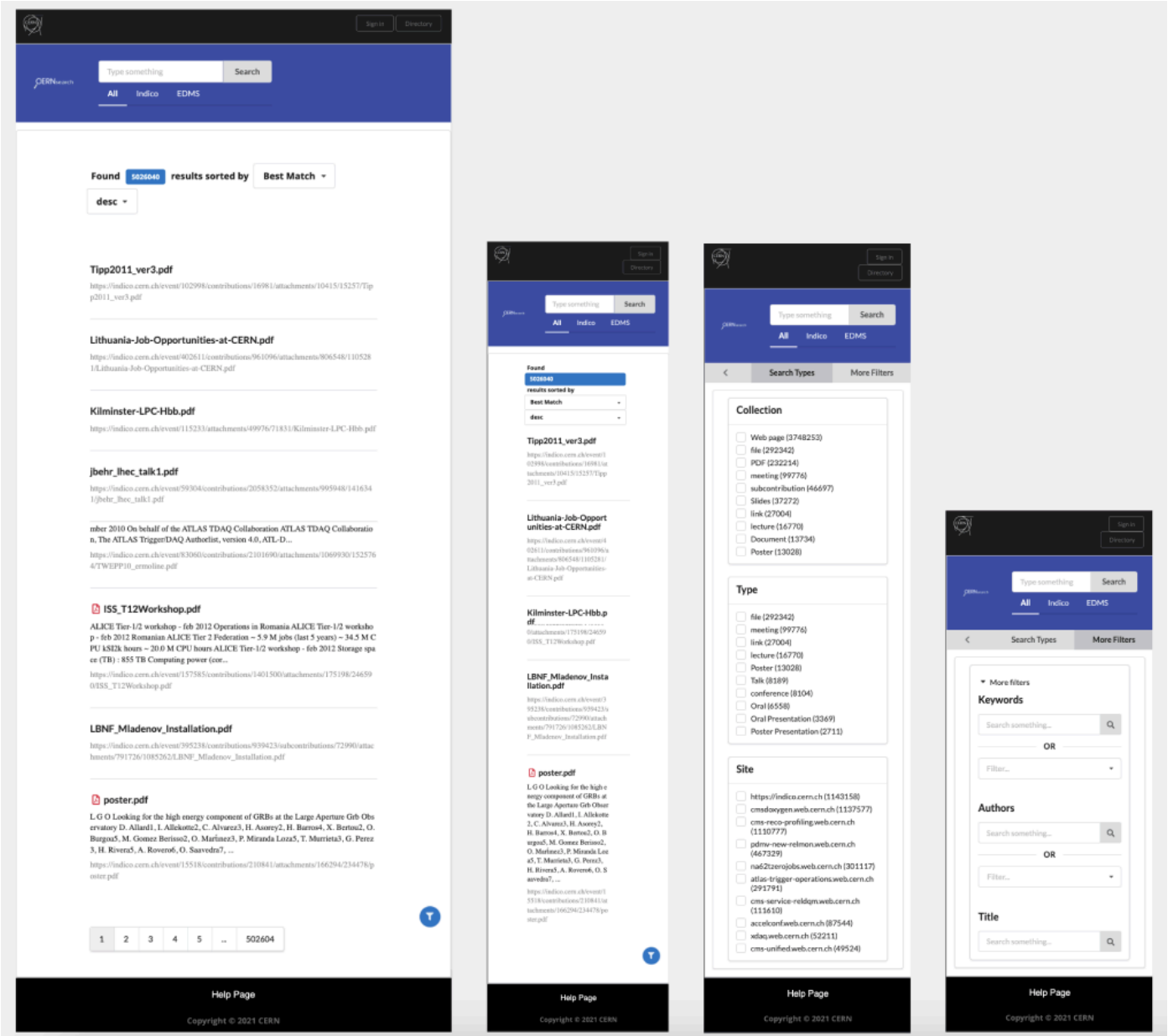


Figure 14. Result Page - Mobile Responsive





6. CONCLUSION

During my summer internship at the CERN Summer Openlab, I learned about many aspects of Mobile Responsive Websites and the importance and reasons behind that, such as the differences between the Mobile-First Design and Mobile-Friendliness. Although my main task was working as a Front-End Developer with specialised focus on UX/UI, the aforementioned resulted in redefining and working on both aspects of User-Friendliness and Mobile-Responsiveness of the new CERN Search Portal.

The implemented User Interface follows the basic rules of user-friendliness and mobile responsiveness. This newly developed CERN Search Portal, which is accessible as an open-source project on GitLab, lets future developers collaborate and improve the quality of interactivity of those Interfaces.

6. REFERENCES

- 1) <https://design-guidelines.web.cern.ch/guidelines/guidelines-cern-websites>
- 2) <https://www.ironpaper.com/webintel/articles/importance-mobile-responsive-website>
- 3) <https://www.tributemedia.com/blog/why-mobile-responsive-web-design-is-important>
- 4) <https://www.inovex.de/de/blog/usability-guideline-mobile-web-views/>
- 5) Easter egg :) Webfest 2021 Project in which I participated during my involvement with CERN is the winner: <https://home.cern/news/news/cern/hacking-humanity-cerns-global-webfest>

