



# Bergen

## *Climate Travel*



Kristin Eidsheim, Camilla E. B. Hermansen,  
Tommy Kojen, Marie Presthus &  
Live Aadneram Enevoldsen

## Link to the prototype:

<https://www.figma.com/proto/7wMoxHDSX6K1EpZffG1NPn?node-id=448%3A18&viewport=369%2C612%2C0.07327315956354141&scaling=scale-down>

- Test the prototype on a computer (recommended)
  - Use the link above
- Test the prototype using a browser on your phone
  - Use the link above
- Test the prototype using Figma Mirror (app):
  - Open Figma Mirror
  - Use this link:  
<https://www.figma.com/file/7wMoxHDSX6K1EpZffG1NPn/Bergen-Climate-Travel-2?node-id=0%3A1>
  - Double Tap on «Load\_Frame»

## Comments:

- Made for an iPhone 8 format
- Some elements takes time to load properly
- The «save» «share» and «add climate information» buttons in the image feature cannot be clicked

This specification was written as an exam assignment at MIX202 Design for Media Use in the spring of 2020. The course is part of the Bachelor's program Media and Interaction Design at the Department of Information and Media Science at the University of Bergen. The course leader was Professor Lars Nyre. Subject teachers were Professor Andy Opel (Florida State University), senior engineer Zulfikar Fahmy, PhD fellow Fredrik Håland Jensen, PhD fellow Oda Elise Nordberg and master's student Jonathan Lindø Meling. The specification is translated into English by Kristin Eidsheim.

## Table of contents

<b>A time travel through Bergen's climate</b>	<b>3</b>
<b>New and exciting tourist attraction</b>	<b>3</b>
<b>Experience the view from Fløyen like never before</b>	<b>5</b>
Fløyen 2020 - Right now	6
Fløyen 1950 - Back then	7
Fløyen 2100 - Into the future	8
Climate change right in front of you	10
Engaging climate communication	11
Helps tourists get on track	14
Create and share memorable moments	15
<b>Overall design choices</b>	<b>17</b>
<b>Technical limitations</b>	<b>21</b>
<b>Further development</b>	<b>21</b>
<b>References</b>	<b>22</b>

## **A time travel through Bergen's climate**

«Bergen Climate Travel» takes you on a climate journey through the past, present and future. By showing a modified reality of the view from Fløyen, the application gives an insight into what climate challenges Bergen are facing. You do not just read about climate change, you experience it. The prototype was created through a collaboration between media and interaction design students at the University of Bergen and the media company Scary Weather, with Fløibanen AS as the desired customer. «Bergen Climate Travel» creates engagement and curiosity for climate, thus it is an excellent contribution to Scary Weathers portfolio and Fløibanen AS's climate profile.

One challenge with traditional climate information is that it can be difficult to take in, as it often consists of a lot of statistics and science – it can feel distant.

Communicating the information through an experience and visualizing climate change in a real and close setting will give a bigger impression. The application uses augmented reality (AR). That is, one experiences a modified reality with data-generated content through a smartphone camera. By using AR, a time travel that clarifies how the society around us is changed and influenced by climate is visualized, which further motivates to environmentally friendly behavior. «Bergen Climate Travel» provides opportunities for new ways to explore and learn about climate, and is therefore a unique concept that should be a highlight of the visit to Fløyen.

## **New and exciting tourist attraction**

Almost two million people used Fløibanen in 2019 (Fløibanen AS, 2020). According to Tripadvisor (2020), Fløibanen is ranked number one among tourists' favorite attractions in Bergen. Since «Bergen Climate Travel» uses Fløyen as a starting point, tourists become a natural choice of target group. We are under the impression that a large proportion of tourists are older people. Elderly is a user group we are familiar with from a previous project. The project consisted of evaluating a museum installation with climate content, conducting user tests and interviews (Eidsheim, Hermansen, Kojen, Presthus & Enevoldsen, 2020). Although the insight is based on an older user group, we consider the application as applicable to a wider audience.

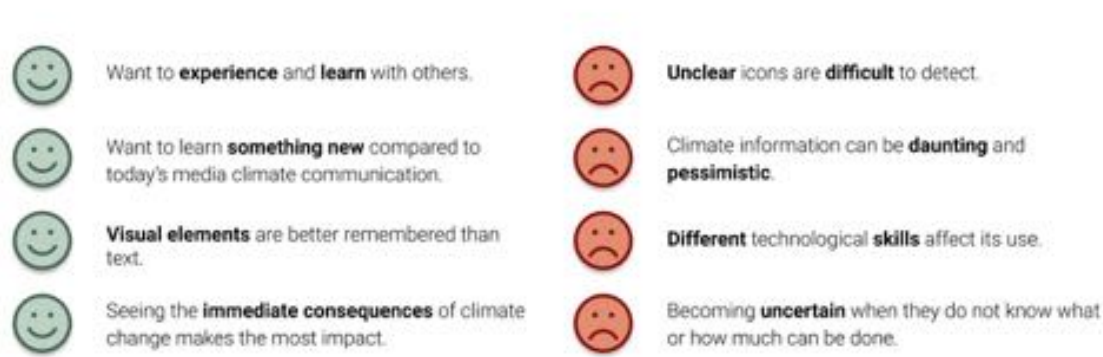


Figure 1: Target group needs, based on insights from a previous project.

In order to support the insights from our previous project, meet the needs of the target group and ensure a good user experience, we have also used:

- Don Norman's Design Principles (Norman, 2013)
- Jakob Nielsen's heuristics (Nielsen, 1994)
- «The Eight Golden Rules of Interface Design» (Shneiderman, Plaisant, Cohen, Jacobs & Elmqvist, 2018)
- Principles of visual climate communication (Corner, Webster & Teriete, 2015)
- Psychological factors in climate dissemination (Stoknes & Nilsen, 2019)

«Bergen Climate Travel» meets the target group's needs (see Figure 1) with user-friendly design solutions. At the same time, the application creates a setting where tourists can explore and learn about the climate in Bergen in a whole new way. The opportunity to share the experience with others, both in reality and via social media, should lead to increased engagement and knowledge of climate.



## Experience the view from Fløyen like never before



Figure 2: Pictures illustrating how the user is introduced to «Bergen Climate Travel».

An elderly man and his grandson are on holiday in Bergen, taking Fløibanen to the top. They discover a poster for «Bergen Climate Travel», and read that the application will show both the past and the future. Old nostalgia and young curiosity catch their attention, the QR code is scanned and the experience starts.

Watch the experience [here](#).

## Fløyen 2020 - Right now



*Figure 3: At present, three current climate challenges are presented (the picture shows only one climate challenge point).*

In the present time, the user is presented with what Bergen looks like today, with various climate challenge points. We chose to use a timeline as the navigation menu, as it reflects the action of time travel. In this way, the menu becomes intuitive to use, regardless of language.



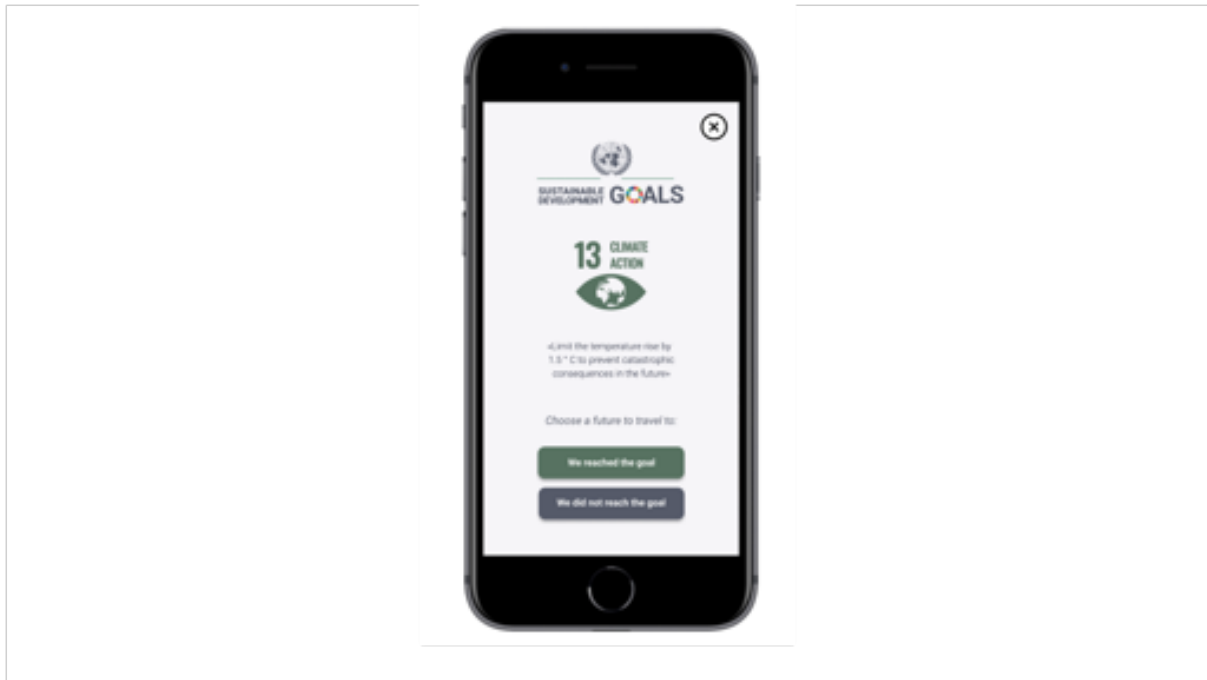
## Fløyen 1950 - Back then



Figure 4: In the past, three climate challenges were presented that were relevant in 1950.

Stoknes & Nilsen (2019) argue that the time aspect of climate communication can be difficult to put into perspective, since humans tend to think in short-terms. By choosing time periods that multiple generations can relate to, more people can feel the proximity to the periods. Based on this, as well as highlighting how big changes have taken place in just 70 years, we chose the year 1950.

## Fløyen 2100 - Into the future



*Figure 5: The future selector tackles one of the UN's sustainability goals: to limit temperature rise by 1.5 ° C.*

The future is inspired by the UN Climate Report (UN, 2019). Our previous studies revealed the desire to see the consequences of climate change, but it was also stated that climate information can be daunting (Eidsheim et al., 2020). In order to convey consequences, and at the same time give hope, we present two different scenarios - a hopeful future and a future that shows what we risk losing. This is in line with the climate communication principle «climate impacts are emotionally powerful». By having balanced content we make it less overwhelming and doomed.

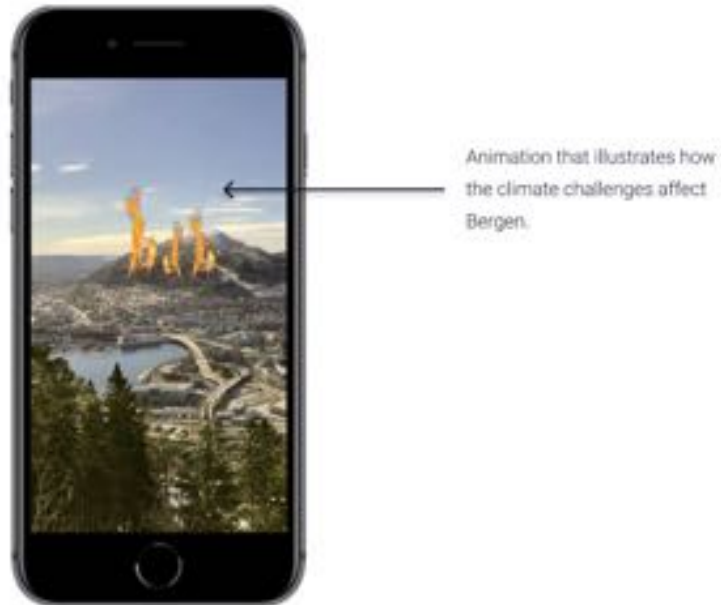


Figure 6: Future scenarios «We reached the goal» (left) and «We did not reach the goal» (right).

The presentation in the future scenarios has a more narrative tone and consists of less facts and graphs. This corresponds to Stoknes & Nilsen's (2019) strategy «story-based» which states that one must use the power of storytelling to create meaning and community.

We implemented the ability to easily switch between the two futures, in the form of a «switch»-button. This makes it easier for the user to compare, while at the same time clarifying the difference between the futures. The button also corresponds to Nielsen's user control and freedom heuristic; facilitating the user to interact freely (Nielsen, 1994).

## Climate change right in front of you



*Figure 7: When you click on the climate challenge icons, an animation first appears.*

Using AR animations is effective as it visualizes the change right in front of you. According to Stoknes & Nilsen (2019), one of the psychological barriers to climate communication is that climate issues feel distant, as it often is far away in time and space. By seeing the consequences right in front of you, the climate issues can feel closer. It also corresponds to the climate communication principle «show local (but serious) climate impact», that relatable content makes a stronger impression (Corner et al., 2015).

## Engaging climate communication

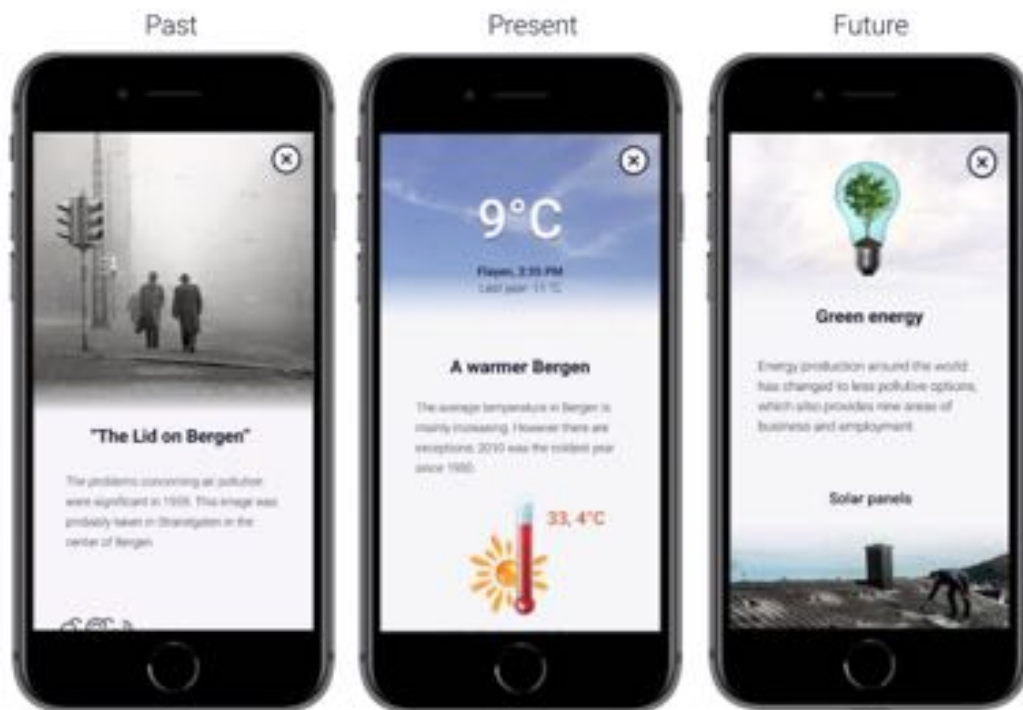


Figure 8: Example of what the fact pages in the different time periods look like.

The fact pages have a simple design with many visual representations, to ensure good readability and make it more playful. We have focused on using visual elements that clearly show the consequences of climate change in Bergen. This is in line with Corner et al (2015) 's two climate communication principles «climate impacts are emotionally powerful» and «show local (but serious) climate impact», as well as Eidsheim et al. (2020)'s previous studies. In addition, playfulness can help make the experience less scary.

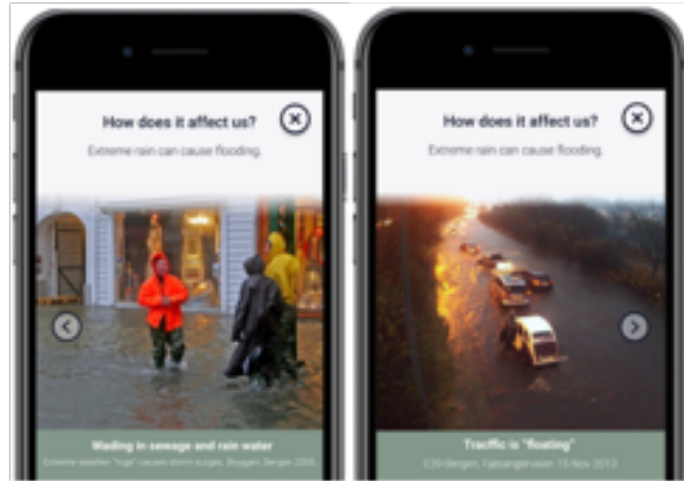


Figure 9: Example of using photos from local news on the «Flood» facts page.



Figure 10: The headers of the facts page in the present.

In the present time, all the fact pages have a header that gives you real-time climate information. In this way, climate events may feel closer and more relevant, which in turn follows Corner et al (2015) 's principle of showing local climate consequences.



*Figure 11: Example of points at the end of the present pages of the present, which should encourage preventative behavior.*

Telling what one can do as an individual contradicts Corner et al (2015) 's climate change principle «show climate causes at scale»; point to «the big picture» rather than an individual level. However, our findings may challenge this principle, as it emerged that the user group missed information about what they could do themselves (Eidsheim et al., 2020).



## Helps tourists get on track

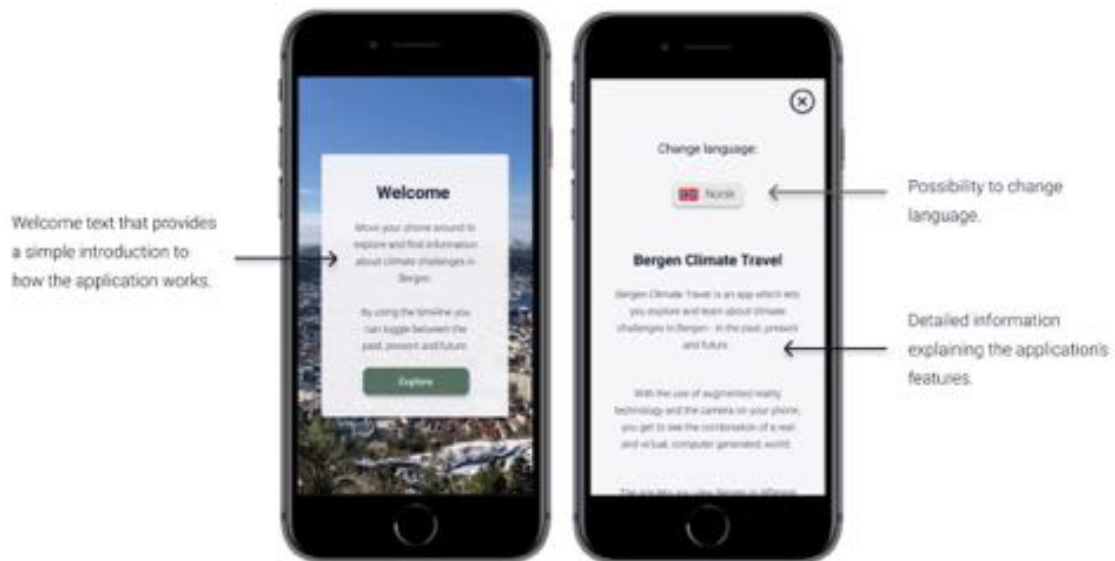


Figure 12: Welcome screen (left and information page (right

In our previous project, several users were uncertain about what to do, as it was unclear (Eidsheim et al., 2020). People tend to have different relationships with technology. The rule of Shneiderman et al. (2018) on «seek universal usability» points out that one must design with regard to human diversity, as there will always be different skill levels. The function is also in line with Nielsen's (1994) heuristic on «help and documentation», which states that a good help system should be available.

## Create and share memorable moments



Figure 13: Example of what the photo filter alert looks like (left) and the «spread the word»(right) image feature.

In our previous project, it emerged that several had trouble understanding what and how much could be explored (Eidsheim et al., 2020). The notifications give the user a hint about the image feature, as well as continuous feedback on how much is left to explore. This follows Nielsen's (1994) heuristic on the «visibility of system status»; give the user feedback on its actions and what is happening. Being able to unlock and collect photo filters serves both as an incentive to explore all the climate challenge points and as a feedback on user progress. The purpose is to make the experience more exciting and playful.



Figure 14: Example of filter use in the image feature (left) and the ability to save or share the image (right).

The photo filters belong to the image feature where you can take pictures with any additional filters. By using a design similar to other camera services, such as Snapchat, we play by following platform conventions. This is in line with Nielsen's (1994) heuristic about consistency and standards, which states that the user should not doubt that similar actions produce the same result. The photo feature makes it possible to share the experience on social media or save the memorable moment. According to Stoknes & Nilsen (2019), social influence plays a role in people's attitudes towards climate. They also mention playing on the power of their social network as a climate strategy. The sharing aspect can also contribute to more people noticing the application and Fløyen.

## Overall design choices

We want to emphasize «user control and freedom» as a fundamental principle for the entire application, as we have continuously provided flexible interaction and space to explore (Nielsen, 1994).



Figure 15: Screenshot showing consistent design of the buttons.

In order to create a unified design, we have followed Norman's principle of «consistency»; Elements that look similar should have the same function (Norman, 2013). That is why we have consistently used icons and buttons with similar designs. To clarify what can be clicked on, we have also used drop shadow on all buttons.

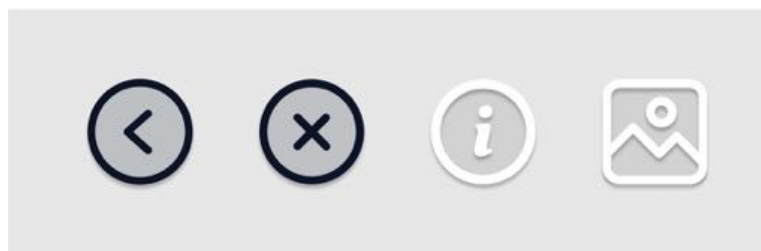


Figure 16: Picture of back and exit button (left), as well as information button and picture function (right).

«Back» and «exit» buttons are used consistently. In this way, the user always has the opportunity to go back. The buttons leading to the information page and the image feature also have good accessibility.



Figure 17: The color palette of the prototype.

We have based the prototype's design around a dark green color. It symbolizes nature and renewability, which fits well with the mood we want to set (Chapman, 2010). The orange tones are selected on the basis that they will contrast and be clearly visible on a dynamic background (see Figure 18).



Figure 18: The orange tones shown on the «view» in the present.

### Increased CO<sub>2</sub> levels

There are natural cycles of CO<sub>2</sub> levels but what is special now is that in a short period of time a huge amount of CO<sub>2</sub> has been dropped into the atmosphere. We currently have the highest level of CO<sub>2</sub>, that we have had in 800 000 years.

## Contrast Checker

[Home](#) > [Resources](#) > Contrast Checker

<b>Foreground Color</b> #0E1428 Lightness	<b>Background Color</b> #F6F5F8 Lightness
---	---

Contrast Ratio  
**16.82:1**

[permalink](#)

### Normal Text

WCAG AA: **Pass**  
WCAG AAA: **Pass**

The five boxing wizards jump quickly.

### Large Text

WCAG AA: **Pass**  
WCAG AAA: **Pass**

**The five boxing wizards jump quickly.**

Figure 19: Screenshot showing our text format (left) and contrast test (right).

We wanted a font that gives the impression of credibility, while being welcoming and easy to read. According to Google Fonts (2020), «Roboto» meets these requirements. Readability is an essential part of the user experience. For that reason, we have customized line spacing, font weight and font size.

Another element that affects readability is color contrast. The combination of black text and white background provides good readability as it has high contrast and people are familiar with it (Hall & Hanna, 2004). We chose a dimmed variant as it will be milder to the eye (Aleman, Wang & Schaeffel, 2018).



*Figure 20: Image of climate challenge icons.*

Our previous research revealed that some people had trouble discovering the points with content. For that reason, we have emphasized visibility. Norman's principle of «visibility» states that the more visible something is, the better it guides the user to possible actions (Norman, 2013). Consequently, we have chosen to have the points for climate challenges quite large and with prominent colors. We have used icons that clearly indicate the climate challenge the user can expect to learn about. This is in line with Norman's principle of «affordance»; it should be a relationship between an object and the possible action (Norman, 2013).



## Technical limitations

The prototype has been developed in Figma's editing tool and has the following limitations:

- Uses panoramic images and does not have a 360-degree perspective.
- Not real AR.
- Not responsive to devices other than iPhone 8, or landscape format.
- Not responsive to the physical movements of the phone.
- Does not retrieve real-time data.
- Lacks system that guides the user to the starting point on Fløyen if the application is opened elsewhere.
- Lacks unlocked photo filter notification and photo filter for the remaining climate challenge points.

## Further development

- Feature that allows the user to choose between light and dark appearance to ensure visibility on a vibrant background. For example, white icons if it is dark outside, and black if it is light outside.
- Add language selections for multiple nationalities.
- Add more climate challenge points.
- Develop the application so that it extends beyond Fløyen - a «climate trail» that travels around various places in Bergen.
- Add more AR elements. For example, to display graphs in «reality» or to include virtual persons from 1950 and 2100.
- Add more time periods. Let the past extend further back and the future further.

## References

Aleman, A. C., Wang, M. & Schaeffel, F. (2018). Reading and Myopia: Contrast Polarity Matters. *Scientific Reports*, 8(1), 1-8.

Corner, A., Webster, R. & Teriete, C. (2015). *Climate Visuals: Seven principles for visual climate change communication (based on international social research)*. Oxford: Climate Outreach.

Chapman, C. (2010). *Color Theory for Designers, Part 1: The Meaning of Color*. Retrieved 22.05.20 from <https://www.smashingmagazine.com/2010/01/color-theory-for-designers-part-1-the-meaning-of-color/>

Eidsheim, K., Hermansen, C. E. B., Kojen, T., Presthus, M. & Enevoldsen, L. A (2020). Poor usability prevents enthusiastic grandparents from learning more about the climate: Scary Weathers interactive globe installation – An evaluation of functionality and ability to communicate climate journalism to grandparents. Exam report published at Vismedia.org July 2020.

Fløibanen AS. (2020). *Årsrapport 2019*. Retrieved 20.05.20 from <https://www.floyen.no/arsrapport2019/>

UN. (2019). *Report of the secretary-general on the 2019 climate action summit and the way forward in 2020*. Retrieved 27.04.20 from [https://www.un.org/en/climatechange/assets/pdf/cas\\_report\\_11\\_dec.pdf](https://www.un.org/en/climatechange/assets/pdf/cas_report_11_dec.pdf)

Google Fonts. (2020). *Roboto*. Retrieved 04.05.20 from <https://fonts.google.com/specimen/Roboto?query=roboto>

Hall, R. & Hanna, P. (2004). The impact of web page text-background colour

combinations on readability, retention, aesthetics and behavioural intention.  
*Behaviour & Information Technology*, 23(3), 183-195.

Nielsen, J. (1994). Enhancing the explanatory power of usability heuristics.  
*Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 152-158.

Norman, D. A. (2013) *The design of everyday things*. United States of America:  
Basic Books.

Shneiderman, B., Plaisant, C., Cohen, M., Jacobs, S., & Elmqvist, N. (2018). *Designing the user interface : Strategies for effective human-computer interaction* (Sixth edition, global ed.). Hoboken, New Jersey: Pearson.

Stoknes, P. & Nilsen, J. (2019). *Det vi tenker på når vi prøver å ikke tenke på global oppvarming* (2nd edition.). Oslo: Tiden.

Tripadvisor. (2020). *Utforsk Bergen*. Retrieved 20.05.20 from  
[https://no.tripadvisor.com/Tourism-g190502-Bergen\\_Hordaland\\_Western\\_Norway-Vacations.html](https://no.tripadvisor.com/Tourism-g190502-Bergen_Hordaland_Western_Norway-Vacations.html)