The Montreal e-mission

An electronic mission against emission

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Assignment 5: Disruptive Networks

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design/interaction/art inspirations

Planet earth is a continuous changing world. An infinite amount of events happen and change every moment of time. Over time these changes have some sort of impact on the world. Most of these events have a positive impact on life. But every coin has a flipside, and life can not be purely about the manifestation of good things in entities. Negative and bad events happen in every moment of time. These events can be uncontrolled, unnoticed and even invisible. The downside of these negative invisible events is that people forget or even not know about those. This notion of (un)knowledge is concerning. This project is going to actively start changing the world, it is going to raise awareness of some invisible events that have a negative impact on earth's environment. The invisible event this project lays the focus on is the emission of carbon dioxides into the atmosphere.

Our project is based on the actual environmental fact of emission, but it won't use these to convince people to take their bikes. We're trying to create a community/movement and represent this to the world. A community that actively chooses to commute by bike instead of cars, a community of which its participants together paint/cover a building in a green color, a community that creates a cleaner city.

Participants who choose to actively work on the environment by taking a bike will use an mobile application and website. This application will track personal cycling distances in real time. After every commute the app will calculate how much emission is saved. The personal cycling data is visualized on an individual profile. With the profile users have access to their own environmental friendly behavior. Additionally all the individual users will contribute data to a database. The database keeps track of all emission that the city of Montreal has saved. The data will later be used to determine whether the actual environment(e.g. the city of Montreal) needs to be altered drastically. One can think of changes in gasoline prices, speed limit, car free hours/days, and parking prices. For additional information, see section: 'technology to be used'.

The application/website will also provide general information to its users, the community has access to progress of targets, next targets and what the effect of getting to a target is. As mentioned earlier, the data gathered will be used to change the environment. Therefore one can argue that there is another interaction going on in this project, a rather physical one, namely between human beings and actual targets. The user's actions have a direct effect on the environment.

The design needs to be rather simple and most of all very intuitive. This is due to the main goal of the project, creating awareness about people their actions. One should not be struggling with any technical aspect of it, this also enlarges the target group to younger and older people. Few personalization options will be available such as, personal profiles and - targets. These will primarily function to create an engagement between the project and its users.

5 research articles (summarized)

It is not possible to randomly assume that the project will be beneficial for the environment. It is necessary to have the facts and numbers to properly support the claim on the relationship between transportation and emission. For now, the assumption for the relationship between those two is that it would certainly make a difference when people grab their bikes more often. This is simply because the carbon footprint of cycling is, unlike cars, zero. The articles below elaborate on this claim and the other aspects of cycling versus motorized transportation

Sharing road space (Granville et al. 2001)

Cycling is a mode of transport which is environmentally friendly, it is silent and produces no emission. In contrast to motorized vehicles which produce emission and noise, these emissions contribute towards the greenhouse gasses and thus to global warming. Cycling can also reduce congestions and journey times (think of Montreal downtown around 5pm). These congestions can also negatively influence local business due to transport problems.

This research came up with a rather interesting result, it appears that people choose to cycle in order to avoid stress and congestion instead of merely physical

Figure 2. (Source: Sightline Institute)

exercise. This suggests that our project will positively contribute towards the general stress level Montrealers. Another results of the TRL studies done by Granville et al. shows that there is a general attitude towards cycling 'Cycling was thought of as healthy, a way to relieve stress, and a good family activity.'
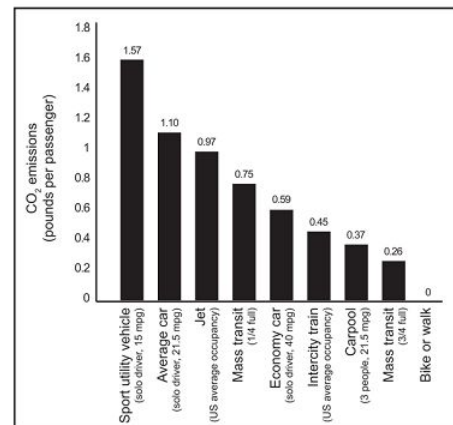
Climate Protection (Ray Mc Grath, 2001)

In previous article it is mentioned that cycling is indeed more environmental friendly, but they fail to provide actual data to support that claim. According to Mc Grath an individual car driver releases about 1.1 pounds of carbon dioxide per mile. Whilst a cyclist or pedestrian releases none per mile. Although a cyclist does have a carbon footprint because the manufacturing process of the bike does contribute to the emission problem. But compared to the total carbon footprint of a bike's life the carbon footprint of a car still is significantly bigger. This finding suggest that cycling as type of transport will help regarding the greenhouse effect.

One of the most important findings in a study done by Peter Jacobsen(2003) shows that the amount of collisions reduce when the number of cyclists grows. He states: 'motorists adjust their behaviour in the presence of people walking and bicycling'. Recent data from Portland reinforces Jacobsen's statement, they found a drop of 70% in crash risk per rider since 1990. This finding strongly supports this project as it will probably reduce even more.

Cavill & Davis, 2008b This research conducted by Cavill and Davis revealed a number of points regarding improved air quality, danger, and increased play and activity opportunities for children, these points will shortly be explained in the latter.

Air quality is often worse in more poor areas, this results in higher effects and exacerbating the symptoms of people with asthma for example. It is often argued that cyclists are more exposed to polluting air because they are not physically protected by a car. However, this research suggests that slow moving traffic (typical in cities like Montreal during peak hours) also exposes car occupants to higher pollutant levels. This is supported by the following claim: "Cars offer little or no protection against the pollutants generated by vehicle traffic. Road users can be exposed to significantly elevated levels of pollutants as they are, in effect, travelling in a 'tunnel' of pollution."
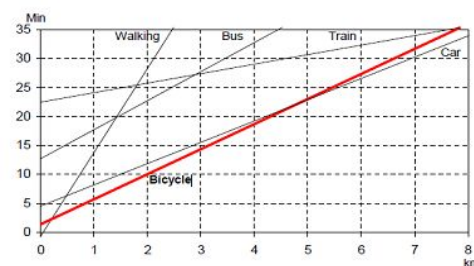
This can result in two to three times greater exposure to pollution than pedestrians in slow moving traffic. Another finding shows that the greater the volume of cars leads to lower levels of street activity, this is due to the increased perceived risk. This also negatively influences the amount of playing children, this can result in health risks. Additionally a review done in the United Kingdom showed a 29% drop in crashes when they limited the speed limit to 20mph in contrast to 30 or higher mph.

This research shows the need for a project such as this, young, old, and physically ill people will gain from more cyclists. Additionally, there are opportunities for children to ensure that they will do their daily physical activities.

Road to Health: improving Walking and cycling in toronto (Toronto Public Health 2012)

A reason to take motorized transportation instead of the bike is often that people want to get somewhere as soon as possible. This is especially true for greater distances which are too much of a hassle to do by bike. But when getting somewhere in the city is really is not necessary to take, for example, the car instead of the bike. According to the road to health paper (Toronto Public Health 2012) the time to get somewhere by bike is about equal to taking the car.

Figure 4: Comparing the speed of different travel modes for different trip distances*

Source: Dekoster and Schollaert (1999)

*The modes depicted in the figure do not all start at 0 minutes because of the time required at the "start-up" of some of the modes. For example, train trips require ~22 minutes to arrive at the station, purchase a ticket and board the train. Alternatively, there is no "start-up time" for walking, which starts at 0.

Another big downside of most people taking the car is that it heavily contributes to traffic congestions. Congestions alone in Toronto do cost 3.3 billion a year.

Impact of changes in mode of travel to work on changes in body mass index: evidence from the british household panel survey (2015)

Everybody knows that exercise is good for your body and body mass index. It is often claimed that people who start commuting by bike will lose around 6 kg in the first year. This study has confirmed this claim. It is also known that people who walk and cycle short trips have much lower rates of disease and premature death. Both these findings again demonstrate that people should cycle more and participate in this project.

Interaction sketch

Essentially the application gathers data about the all users their biking behavior. Users have a personal interface where their own data is presented. In the Montreal window people can see how they have been doing as a collective. They can see whether some levels are (not) made. When clicking on a level people can see what the effect is of getting to that level. For example when clicking on level 5 people will see that the level will cause for a car free monday. The levels are described in the next section.
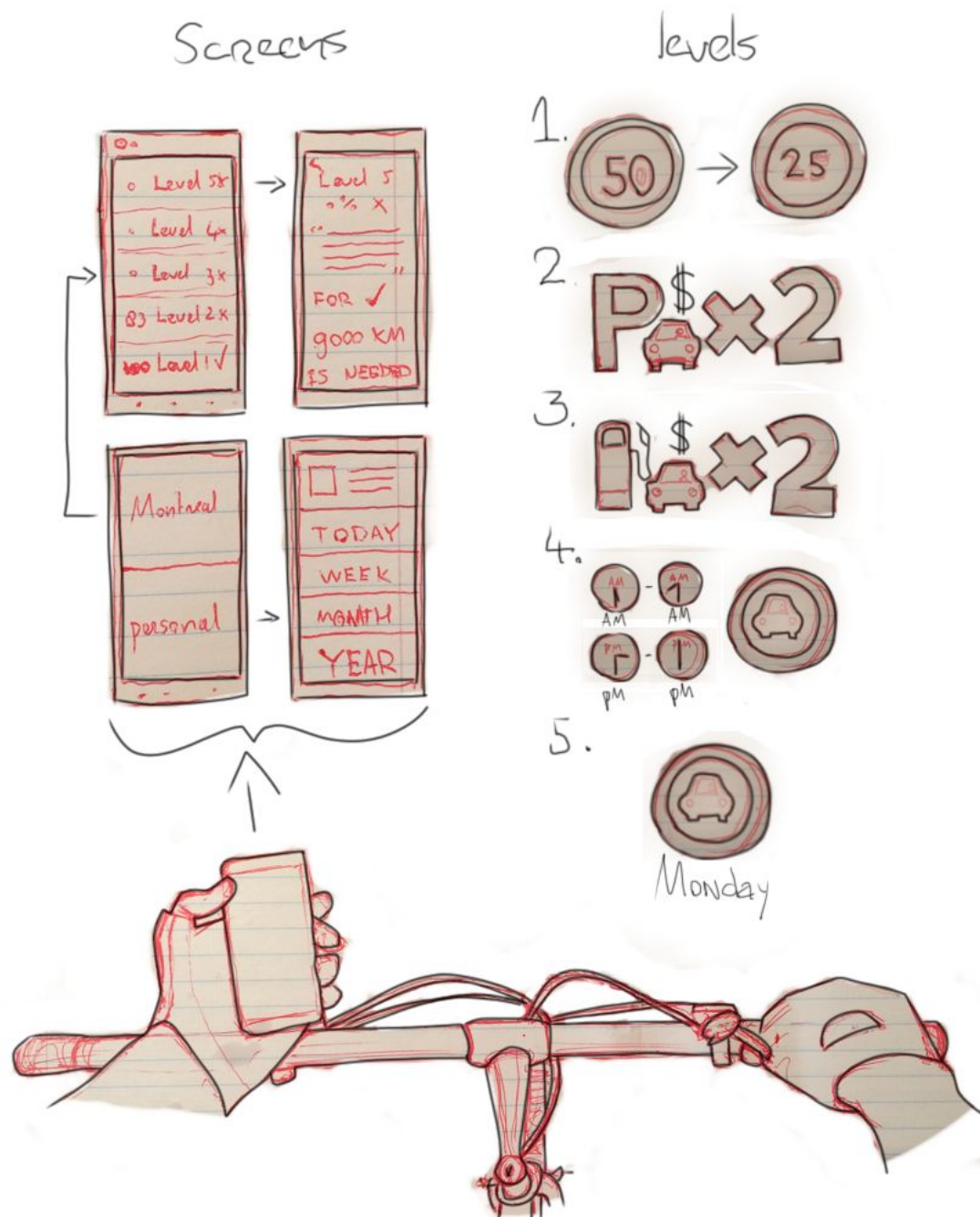
technology to be used

For now the application relies on a multi-platform web interface in which users have to keep track of their own cycling behavior. The application computes how much emission has been saved which directly influences certain factors which contribute to people their direct environment. In the current application these effects are graphically visualized. Ideally, in the final application chosen behavior needs to have a direct influence on the environment. The next paragraphs will be dedicated to the future final application.

Other than the manual input as described in the previous paragraph the final application will make use of user's smartphone. The application constantly tracks people their movements on bikes. Whenever one arrived on the desired destination the phone calculates how much emission has been saved and sends the data to the user- and main database. As mentioned earlier the phone application needs to be easy to use for virtually all people who are able to cycle. Ideally the application will automatically know whether people start cycling with the use of the gyroscope. This technology of detecting people biking is already used in the fitbit and thus realizable for this application.

The information about the user his commute is immediately available after the data got uploaded to the main - and personal database. By doing this the user has direct access to his/her data. The data is accessible through the app or the website. Users can see their own - and the community set goals.

The amount of biking done by the all the users of the application has an effect on certain existing car related rules and factors. The application works with certain goals which all have effects on these rules. For example when goal X is reached, rule Y is changed in favour of cyclists. When goal X is <u>not</u> reached, rule Y will be changed back to its original state. All goals which are reached on a monthly base get reset for the before the beginning of the next month. For now the following levels contribute to a more cyclist friendly environment.

- Level 1 - Speed limit is divided by two
- Level 2 - Parking lot prices double
- Level 3 - Gas prices double
- Level 4 - Cars banned in rush hour
- Level 5 - Car free monday

These levels will give the cyclists power to really change the way of transportation. Hopefully this notion of power will motivate people to grab the bike instead of the car.

Resources
http://www.sharetheroad.ca/what-are-the-environmental-traffic-congestion-benefits-of-cycling--s16223
http://road.cc/content/news/150710-new-study-confirms-weight-loss-effect-commuting-bike