**Data assignment 1 Amsterdam Paralympics**

Amsterdam wants to host an open water swimming event in May 2024, just before the Paralympics in the Seine, Paris will take place. The municipality wants to host a 5 kilometre open water swimming event through the canals of Amsterdam. We are asked to advise on the feasibility of this event looking at the safety of the swimmers. The event can’t have an impact on commercial water transport and it is desirable if the impact on the routes of canal boats is also as small as possible. To give a proper advise, it is needed to know if the water quality of the canals is safe for the athletes to swim in. Data sets recording the surface water quality and/or ground water quality in the canals are thus needed. On top of this, there are data sets needed about which waters and canals commercial water transport uses and about the routes of canal boats.

The municipality of Amsterdam has a data catalogue containing a dataset ‘Meetresultaten kwaliteitsonderzoek oppervlaktewater, 2019’. It is an excel file that is human readable as it is a text file. This dataset contains measurements of the surface water quality at multiple locations in Amsterdam. However, there are only some locations in the centre of Amsterdam and only one that is really in the canals of Amsterdam. The one in the canals is the ‘Brug over Keizersgracht bij Leidsegracht’. The ones in the centre are at the ‘Brug over Kostverlorenvaart bij de Clercqstraat’ and there is one in Vondelpark. All the other locations are further out. (Gemeente Amsterdam, n.d.-a)

Another dataset containing information about the surface water quality is from the ‘Waterkwaliteitsportaal’. This dataset contains information about the chemical and biological state of water quality generated by the Dutch ‘Waterschappen and Rijkswaterstaat’ and through the whole Netherlands. It is again an excel file that is human readable as it is a text file. There are some locations in Amsterdam, but again only a few in the centre. These are at ‘Weesperzijde 122’, ‘Joos Backerplantsoen’ and ‘Oosterdok Marinehaven’. Of these, only the one at Marinehaven is in the canals. Measurements from the years 2016 up until 2022 can be downloaded. (Waterkwaliteitsportaal, 2023)

Escheridia Coliforma (E-coli) is the faecal bacteria that causes infections. It takes 48 hours to obtain the results of the values of E-coli. We can thus only predict what the water quality will be at the Paralympics, based on the quality 48 hours ago. However, weather conditions have an influence on the water quality. After heavy rainfalls, the sewage system overflows into surface waters with deteriorated water quality as a result. (Van den Tillaart, A., 2017) Data sets about the rainfall in Amsterdam, could thus also be useful in order to advice the municipality. There is geospatial data on rainfall in the Netherlands from KNMI. Monthly sums of precipitation can be found shown on a map of the Netherlands. This is shown in surfaces on the map. Maps for each month from the years 2004 to 2023 can be found. (KNMI, n.d.) After an overflow of the sewage system, it takes three to five days for the E-coli values in the canals of Amsterdam to lower to acceptable values again. This is because of dilution, water flow and the degradation of pathogens. (Holthuijsen & Ouboter, n.d.) The Paralympics thus shouldn’t take place when it just heavily rained. From precipitation data from previous years, it can be estimated if in May the chances on such a rainfall are high. Furthermore, the precipitation should be monitored and watched in the coming days to the event.

Waternet monitors the water quality in Amsterdam once or twice a month. They do this at official and unofficial swimming sites. They have found out that the water quality is comparable to the samples of the water quality at official swimming locations. (Holthuijsen & Ouboter, n.d.) More measured locations from ‘Meetresultaten kwaliteitsonderzoek oppervlaktewater, 2019’ or ‘Waterkwaliteitsportaal’, which were previously mentioned, can thus be used to predict the water quality in the canals.

Regarding the commercial water transport, the municipality of Amsterdam has a map showing the ‘Op- en afstaplocaties beroepsvaart’. (Gemeente Amsterdam, n.d.-b) This is geospatial data in which dots show the boarding and disembarking locations of commercial transportation on a map of Amsterdam. Another map shows the berths of canal boats. (Gemeente Amsterdam, n.d.-c) This tells us something about where these boats drive. The websites myShip Tracking and Marine Traffic monitor the movements of boats and vessels. The canal boats and other commercial water transport in Amsterdam can thus be tracked on this website. On the website, geospatial data is displayed on a map. All boats can be seen as points on this map. On top of this, past trajectories can be obtained. (MarineTraffic, n.d.) (MyShip Tracking, n.d.)

Conclusion, 2 days before estimate, meteorology monitoring -> predict for the day

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