How Far Can You See?: Simulations of Sightlines in Swedish Landscapes

Lindell, Moltas (School: Curt Nicolin Gymnasiet)
Tornkvist, Andreas (School: Curt Nicolin Gymnasiet)

Determining what you see in the distance as you look out over a landscape can be challenging. In this research project, we have created a program to calculate the view from any vantage point in Sweden and display it on an interactive map. Using trigonometry and a formula for an ellipse, we have developed a method to quickly estimate the curvature of the Earth in any direction from a vantage point. To accurately describe the height of the terrain; and objects such as trees and buildings, data provided by the Copernicus Programme and the Swedish Forest Agency is used. The data is interpreted, adjusted, and added to our model of the Earth's curvature, allowing us to evaluate the data points and identify visible areas. Using this method, we created a web-based program that lets the user choose a vantage point in Sweden and calculate visible areas. Depending on the resolution of the calculation and the shape of the landscape, the calculation time varies. However, a reasonably accurate calculation can be made in a few seconds. The program allows the user to easily identify landmarks in the landscape. The program has also been used to find the furthest line of sight from a point in Sweden. By comparing calculations from 12 616 mountain peaks, we found that it runs between a peak in Härjångsfjällen, a mountain massif in Åre municipality, and the Norwegian mountain Vinjeronden, a distance of 188 kilometres.

Awards Won:
Fourth Award of $500