

Idea of the project

Schloss Neuschwanstein is a 19th century castle which is famous for its amazing views and its cameo in the Disney movies. The castle is a popular destination for tourists, but many people do not realize that there are many beautiful hiking routes near to the castle and that it is situated in such a picturesque area. The project aimed to make members of the public and tourists aware of these opportunities by creating a map that showed many different hiking routes around Schloss Neuschwanstein. The current map given to tourists upon their arrival was very basic and limited in the hiking routes it shows around the castle, and does not depict the number of calories that could be burnt, therefore it seemed a perfect place to base this project.

The overall aim of the project was to create a map where users can obtain a vivid perspective of how many calories are burnt by taking a particular hiking trail as well as showing users some of the best hiking routes in the area.

Workflow of the project

Firstly, nine hiking routes were chosen with different difficulties and lengths. They were downloaded from 'Wikiloc' (<http://www.wikiloc.com/wikiloc/home.do>), a website which allows crowd sourced hiking, cycling and other activities routes to be uploaded with ratings and photos added to each route. After downloading, the routes were converted into shapefile data format, and then the geographic coordinates of each hiking point were extracted.

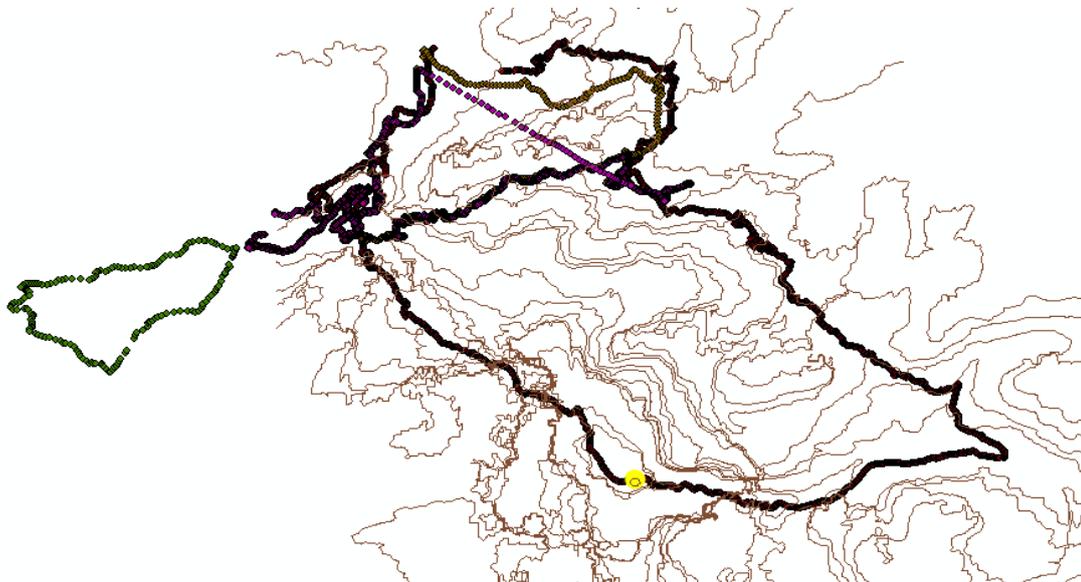


Figure 1: 5 hiking routes as point shapefile in ArcMap

Tobler's hiking function (a method to calculate the hiking speed whilst taking into account the variation over different slopes) was used to calculate hiking speed over the mountainous terrain. After this, the geographic coordinates were calculated through

Tobler's hiking index and an average velocity between every two continuous points was output. Then velocity, body weight (averages for German men and women) and the sum of the distances between two points were used to calculate calories burnt between these points, which were added up in the end to give the calories burnt throughout the whole hiking route.

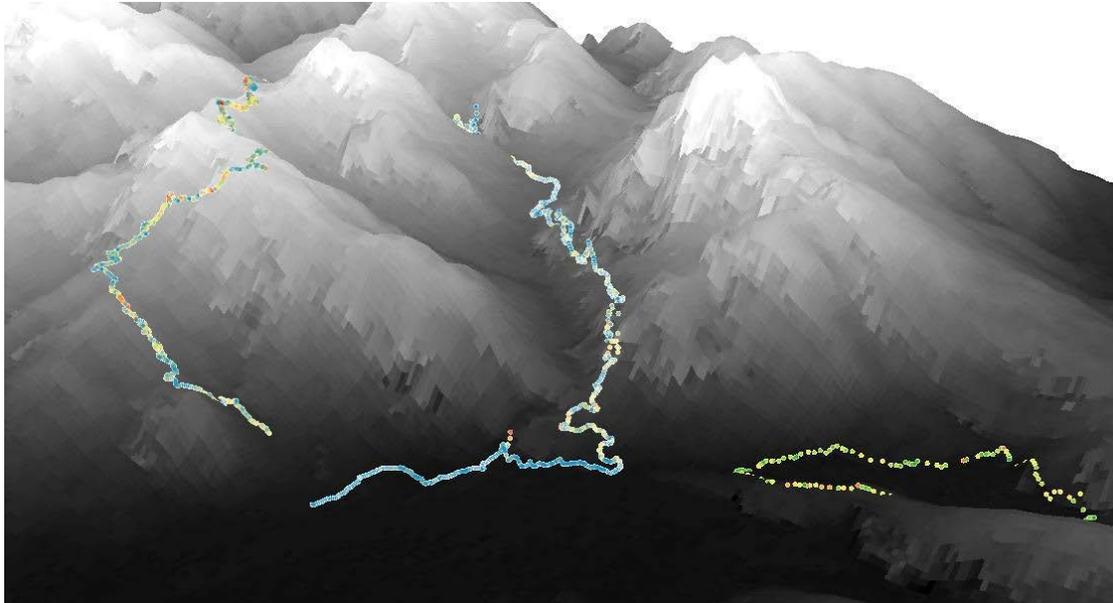


Figure 2: 2 routes with color showing how much calories burnt between two closest points displayed in ArcScene (the warmer the color is, the more calories burnt along one route anti-clockwise)

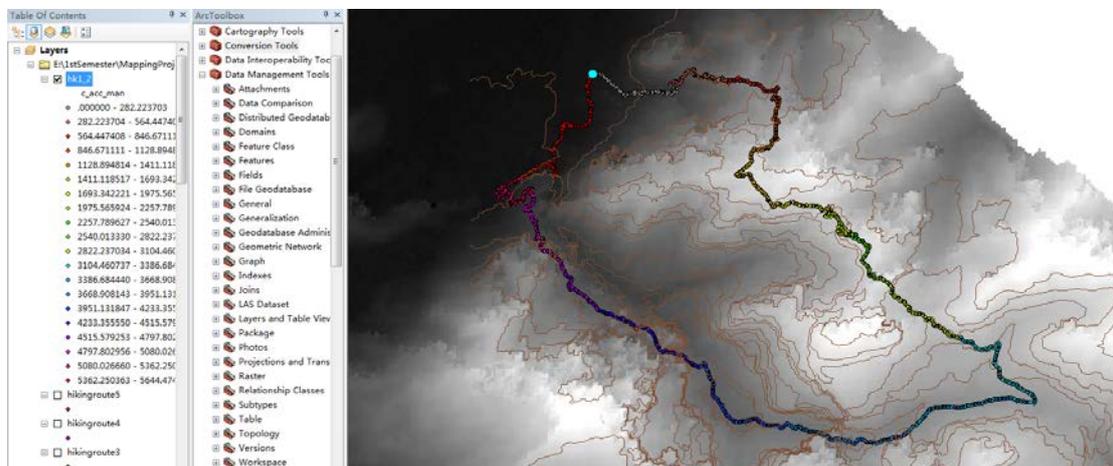


Figure 3: First hiking route with color showing how much calories burnt from the start point (highlighted) anti-clockwise

As for map design and display, ArcGIS Online was applied as it gives a clear view to users of both the calories burnt on each route and geographic information. ArcScene was also applied to demonstrate how the calories differ from each other with the changes of height difference as well as visualizing the differences between hiking routes.

Results

The finished product displays a multitude of hiking routes with the calories for each clearly displayed visually through symbols as well as within pop ups along each point within the hiking route. This map is the first to present hiking routes with a calorific content.

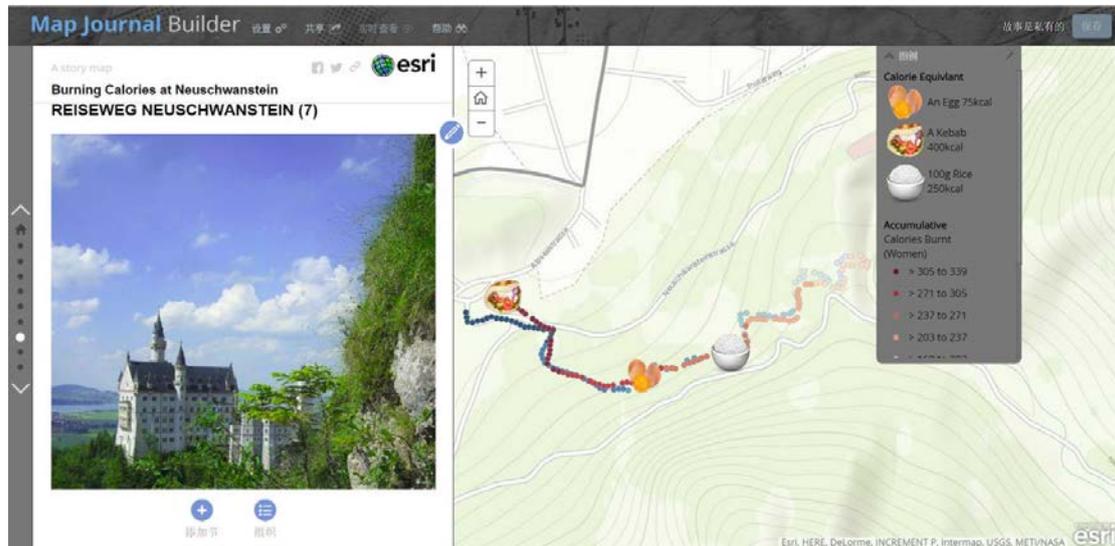


Figure 4: Example of a mapping route in ArcGIS online

The outlook for future work currently would be to focus on repeating the same process for different areas and as more people become interested then an interactive map or app for mobile devices could be created, allowing the user to input their data.

<http://arcg.is/1oJIZu0>

Authors

Kaidong Ao

Kate Doyle

Keni Han

Students of International Master Programme in Cartography

Technische Universität München