**Proposal for Semester Project**

Patterns & Trends in Environmental Data / Computational Movement Analysis Geo 880 FS2021

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**Abstract**

Due to the ongoing optimization of harvesting methods in agriculture, the prevention of wild boar damages has become increasingly popular in recent years. Understanding the selection of resting places like kettles and wallows build the basis for effective management measures. Based on spatiotemporal data of wild boars we try to determine such resting places and allocate them to surrounding crops.

**Research questions**

Using the already known wild boar data from the ZHAW research project "Prevention of Wild Boar Damage in Agriculture" as a basis, we want to answer the following research questions:

How can resting sites be modelled based on spatiotemperal movement data?

Can locations frequently visited by wild boar be determined efficiently and effectively in the research data provided?

Can these regular resting places be clearly defined as kettles or wallows?

R**esults/products**

Rastered heatmap with nesting sites, differentiated by wallows and nests

Can be filtered by seasons and animalID, context of land coverage (Arealstatistik)

**Data**

We will mainly use data that we have already used in class. The basis is the wildboar movement dataset and its metadata. In addition, we will also use the raster and vector data provided on the environment (field surveys, vegetation...). Additional data on land coverage may be required (e.g. area statistics, vegetation height ), which can be obtained from swisstopo.

**Analytical concepts**

To gain more meaningful movement data, we will start with segmentation. The segmentation process will be based on predefined movement properties (e.g. speed, steplength) which need to be readjusted multiple times and reviewed in a critical manner. The resulting trajectories will then be annotated with a status (“resting”, “moving”) and joined with land use type to provide further context. Finally, for each resting trajectory a convex hull will be calculated to visualize the results.

**R concepts, functions, packages**

We will rely on established and widely used packages, namely tidyverse, lubridate, TERRA and tmap. Tidyverse will be used for maintaining our data clean and tidy data wrangling and visualization of simple plots. More sophisticated plots like convex hulls will be done with tmap and TERRA. Lubridate will be mainly used for handling time and date variables, especially its round function.

**Risk analysis**

The biggest challenges will be finding clear criteria to define and identify nests and wallows to differentiate between the two of them. Plan B would be not to differentiate them and just identifying resting sites.

Handling raster data in plots

**Questions**

Welche Methodik ist aus Sicht Tutor sinnvoller für unsere Fragestellung?

What are reasonable criterias for segmemtation in our movement data?