

Case Description Draft & Data Management Plan

Group 1 (bBOX) | GRS60312

Case Description Draft

1. Biodiversity focus

Biodiversity indicators are essential for evaluating and tracking the variety of species and health of ecosystems. There are multiple indicator species present in the study area, each with their own unique habitats. In the biodiversity strategy document of the municipality of Oost Gelre, which Groenlo falls under, special attention has been paid to the grey partridge (*Perdix perdix*), little owl (*Athene noctua*), common kingfisher (*Alcedo atthis*), yellowhammer (*emberiza citrinella*) and the European tree frog (*Hyla arborea*), which are indicator species in the outlying areas. For the residential areas, the Black Redstart (*Phoenicurus ochruros*) and house sparrow (*Passer domesticus*) have been spotted. The variety of these species covers the broad land use range of the study area, making them interesting focus points for a visualization prototype related to the theme of biodiversity.

2. People (users)



Personas: Group of best friends from a local elementary school - Jelle, Niels and Marieke.

Age: 8-12 years old

Gender: Mixed

Language: Dutch

Background: Jelle, Niels and Marieke have been friends for as long as they can remember. They spent their entire childhood playing together and now attend the same elementary school - St Willibrordus in Groenlo. Sadly, as the friend group grew older, their interests diverged and they cannot find common ground when it comes to leisure activities anymore. Jelle discovered video games and doesn't show interest in doing anything else in his free time. Niels is very curious and eager to learn new things - biology is in fact his favourite subject and he spends most of his time reading books. Marieke enjoys playing outside the most. She loves nature and going on adventures whenever she can. The purpose of our visualisation prototype is to increase the interest of personas in biodiversity by educating them through exciting spatial technology. We want to fulfil their individual needs and

interests through a gamified outdoor app that teaches about the indicator species in the area and highlights the importance of biodiversity conservation. The app offers something interesting for each character - gaming, learning and being outside.

3. Purpose

Keeping children in contact with nature is a very important part of their education and sadly one that is steadily declining. Being outside has lost its appeal to many people and therefore new, modern methods should be developed to motivate people, especially the younger generation, to go outside again. We want to adapt the model of making hiking trails more attractive, which is mostly done with signs and other decorations, and modernise this with mobile spatial technology. The Zeven Dwergenpad in Overloon already adopted this model where the walking trail is gamified to attract the attention of kids and provide an entertaining experience. By incorporating wildlife and landscape features into this story the trail provides an educational value to the area. Therefore the indicator species will play a prominent role in the narrative as the main characters instead of mythical figures.

We estimate that teachers and parents will be major stakeholders particularly in providing guidance when children are going for hiking tours as well as providing access to hardware devices such as smartphones and tablets on which apps will be hosted.

The implementation of this app will be similar to Pokemon Go, where users can capture the indicator species as they pop up in areas where they reside (black redstart birds and house sparrows in the residential areas, common chiffchaff around the water bodies and in the fields, different birds in the forested and agricultural areas), and they can be collected. On top of that, habitats or other landscape features can be collected too. When these items are spotted, information will be given about them to educate the children about their function in the ecosystem and their importance.



By using GIS to capture data on points of interest along a walking trial, we want to create a narrative driven walking experience for children with a fantasy feel to it. This experience is meant as an appealing way to teach children about biodiversity and the unique features of their surroundings including wildlife.

The data will be captured using various different techniques to highlight areas of interest. These are the following:

- **Audiomoth** (*acoustic data*) - The audiomoth sound capturing device is used to capture the presence of animals around the trail to add the bird species to the app as part of the experience for the children to look out for.
- **Lidar** - Collect point clouds scans with TLS to generate point clouds animations of points of interests
- **Camera** (*pictures*) - An RGB camera will be used to take pictures as part of the app.
- **GNSS device** (*capture hiking trails*) - A GNSS device will be used to set out routes for the walking trail, if there are no existing trial datasets or if their route is not of sufficient quality.

4. Personal motivation

We find education very important and we realise that education about nature starts from a young age to build up sufficient understanding of biodiversity and attachment to nature. Providing walking trails through conventional formats has proven to be no longer entertaining especially for the children and the new crop of generation. Consequently, we want to offer an exciting and educative immersive experience to really push nature. We realise the untapped potential GIS methods and tools have on providing a solution to this matter, especially with regards to gamification which is why we want to focus on this product. Additionally, the majority of our team has a passion for video games so we understand the immersive and engaging experiences that games offer. By developing our own app, we can explore different aspects of game development, such as level design, gameplay mechanics, user interfaces, and more. This hands-on experience will enhance our knowledge and will definitely be an interesting experience.



Organizational context

Name	bBox_Group1
Date	17-05-2023
Chair group	Geo-Information Science and Remote Sensing (GRS)
Commissioner/ GRS-supervisor	Dr. Ir. Lammert Kooistra
Start date of IDV project	22-05-2023
File name of this DMP	DMP_RSGIC_BBOXGroup1.docx

Short description of your project

Title	Developing a biodiversity driven, gamified outdoor application for children by merging forest LiDAR data and Audiomoth sensors
Abstract	Biodiversity indicators are essential for evaluating and tracking the variety and health of ecosystems. The variety of the indicator species' habitats covers the broad land use range of the study area, making them an interesting focus point for a visualization prototype related to the theme of biodiversity. The goal of the project is to collect data about these species and their habitats using various technologies and sensing methods. The generated information will be used to create a gamified outdoor app for children around the age of 8-12, where indicator species, their habitats and other landscape features will be introduced and elaborated on. The objective is to educate children about the local indicator species and their habitats, establish a strong connection with nature and raise awareness about the importance of biodiversity.

Data management roles

Roles	
Who is collecting the data?	Paula Golunska, Emmanuel Sabla, Stijn Peeters, Liam Adam, Lucas Rivero Iribarne Fieldwork assistant(s)
Who is analyzing the data?	Paula Golunska, Emmanuel Sabla, Stijn Peeters, Liam Adam, Lucas Rivero Iribarne
What is the role of your supervisor ?	Supervision of IDV project, no data collection/analysis/storage, some suggestions on processing techniques where necessary

Overview of expected type of project data, software choices, data size & growth

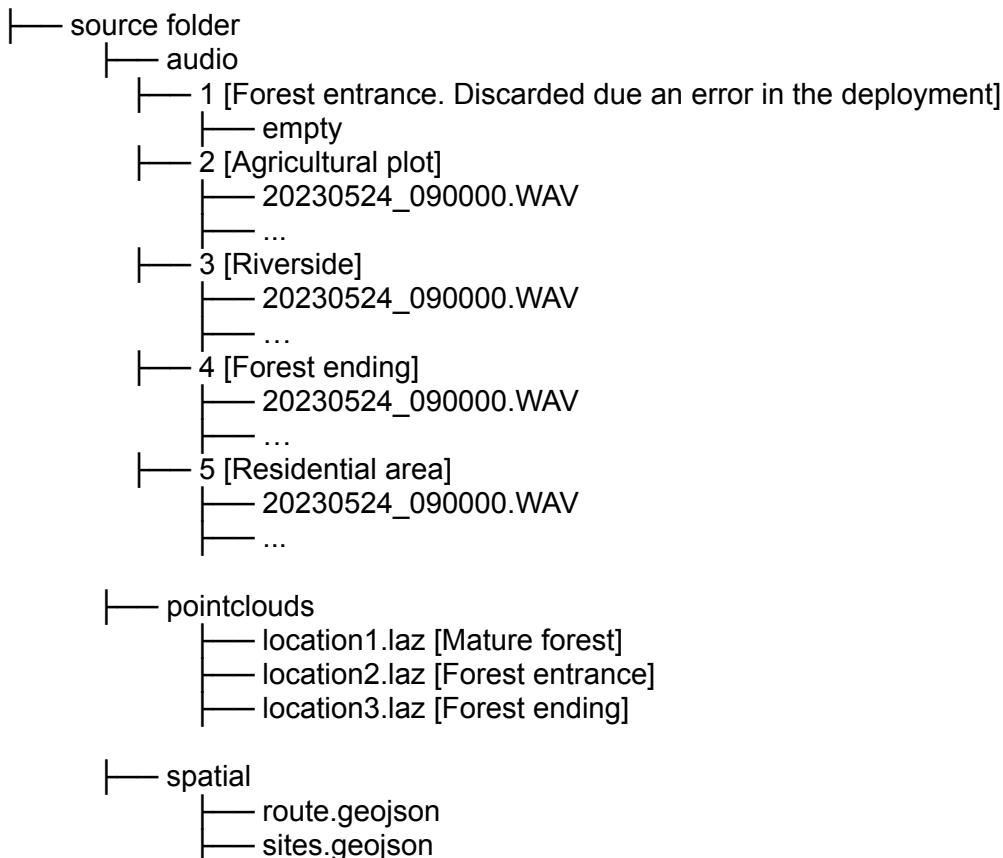
Data stage	Specification of type of project data	Software choice	Data size/growth
Source data	Acoustic data (frequencies of different indication species)	R/Python/GIS software	4 GB
	GPS Coordinates of walking trails of the Roerink, Groenlo area	R/Python/GIS software	5 MB
	Roerink forest Airborne Lidar Scanning point cloud data	R/Python/Cloud compare	5 GB
Result data	Gamified portable device application	Portable device (tablet or smartphone)	100 MB

Short term storage solutions

Data stage	Storage location	Backup procedures (storage medium and location/ how often?)
Source data	External hard disk and cloud storage	Backup in external hard disk/when needed and stored in cloud provider
Result data	Hard drive/online	Backup in external hard disk. Also in cloud storage
Models/code	Online repository	Upload daily to repository

Data Structure and Information

Below is a representation of the system for the directory- and file names we intend to use:



Does your workflow provide for version control? If not, describe how you intend to keep versions apart.

Yes, by using dates in file names and a Github repository.

Documentation and Metadata

In the Github repository there will be a main ‘readme’ file in the root folder. This file will describe the project, the folder structure of the repository, and how to run the code. In each subdirectory there will be an additional readme file that describes each file in that directory. These file descriptions include the metadata stating the source and the processing steps needed to obtain/derive that specific file. Lastly, all scripts will have docstrings and comments to document the code in each file.

Sharing and Ownership

Sharing and ownership	(With) who(m), what and how?
Data sharing	Yes, we want to share the data with others from the GIS department through the GRS repository in ESRI's ArcGIS Online portal.
Data ownership	Data is intended to be open and free for all users. We are concerned about sharing improvements and will use a GNU General Public License.
Privacy	No privacy or security concerns exist.

8. Long term storage

Yes or no?	Argumentation
Yes	All data sets will be stored in a repository accessible for next year students.

Annex II: Agreement between project group and WU-supervisor.

We, the undersigned, agree upon the following points:

- 1) The group bBOX provides a Data Management Plan (DMP) as part of the Project Proposal. If no Project Proposal has to be written (anymore), the project group provides a DMP by 17-05-2023 (*date*), as agreed with the WU-supervisor.
- 2) The project group provides core data sets to the daily supervisor (or commissioner) at the end of the project or earlier as agreed upon with the WU-supervisor (or commissioner).
- 3) All data, scripts, products and results are owned by Wageningen University and custodianship is with Wageningen University. The project group has the right to use them.

As agreed upon,

Names project group: Date: 17-05-2023

1. Paula Golunski
2. Emmanuel Sabla
3. Stijn Peeters
4. Liam Adam
5. Lucas Rivero Iribarne

Signatures:

Name(s) WU-supervisor/Commissioner: Date:

17-05-2023

Signature(s):