Project Database of ICP Forests

PROJECT DESCRIPTION

PROJECT INFORMATION

Project title:	**How can a web app in combination with an IoT system help to record and visualize the health status of forests in a clearer, more transparent and comprehensible way?**
Project ID:	279
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Background and Problem

Climate change and its consequences are affecting the environment and its ecosystems. Of course, trees and forests are included in this and play an important role. The preservation of forests is an important responsibility and also a promising approach to counteract climate change. Trees and other plants concentrate CO2, as is well known, and thus help to neutralise the greenhouse effect at least in part.

It is therefore obvious to keep a close eye on the health of forests, which is deteriorating year by year. However, this is a difficult task, as it involves vast areas, many possible sources of problems and complex environmental parameters. This requires many people, and especially foresters, to collect objective data. However, as this is difficult to ensure and costly, it makes sense to develop an automated solution that facilitates monitoring and evaluation.

Hypothesis and Approach

To monitor large areas and continuously collect data on the health of trees and forests, microcontrollers can be used in conjunction with electronic sensors that provide an overview of the condition of the sites. These can make it possible to create an inventory over a long period of time and to follow the development objectively.

Using a front-end solution (framework or library), the created UI and UX concept should then be implemented and made usable for the users. In order for users to be able to understand the data as easily and clearly as possible, it should not only be presented in the form of figures and tables, but also in the form of visualisations and infographics on the state of the forest.

Existing electronic and digital solutions are largely based on systems that use satellites or drones in cooperation with artificial intelligence to monitor and measure the health of remote forests ex situ using images. There are also a number of partial solutions that measure individual health indicators of trees, soils and other environmental parameters. However, there is no end-to-end system that bundles all these indicators and makes them available to the user in the long term through a web app with clear infographics and visualisations.

Scope/ Out-of-Scope and Methodology

The scope is based on the theoretical elaboration of the whole system, and the implementation of a limited prototype.

The theoretical part will go into detail on how the whole system could be built from start to finish, with overviews of the possible options and including the technical reasoning regarding the choice of technologies.

The practical work will be based on the design and implementation of a working full-stack prototype. This should be based on the existing long-term ICP data sets available on the topic of forests and forest health. The insights gained from the assessments of the different stakeholders (foresters, forest protection organisations and experts in the field of forest science) and the literature research will form the foundation for the user story map of the web app.

The focus of this bachelor thesis will be on the visualisation of data. The goal is to find out how to make the collected data as usable and understandable as possible using UI & UX practices, so that the handling of the web app is intuitive and the objective assessment of the health status of the selected tree or forest is as clear as possible.

The validation will be based on qualitative surveys and user tests. The aim is to find out whether the implementation as a web app, including the extensive visualisations, can actually depict the health status of forests in a clearer, more transparent and more comprehensible way.