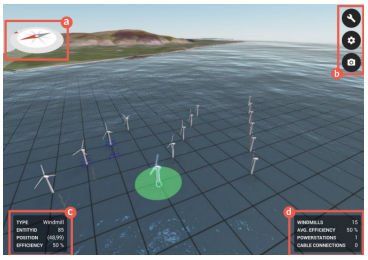
Bachelor / Master Thesis

Augmented Reality for the Planning of Wind Farms

Course of study:	Mathematics, Computer Science, Computational Engineering
Kind of thesis:	Programming, Simulation, and Optimization
Programming language:	Angular, NodeJS, Three.js
Start:	2022

Topic

The transformation of wind power into electrical power is performed by wind turbines, which are usually grouped into wind farms in order to exploit considerations relative to economies of scale, such as lower installation and maintenance costs. But as costs decrease, grouping turbines leads to a reduction in the produced power because of the presence of wake effects within the wind farm. When a turbine extracts power from the wind, it generates a *wake* of turbulence that propagates downwind, such that the wind speed and therefore the power extracted by other turbines (which are placed in the wake) are reduced. In large wind farms wake effects lead to considerable power loss, and thus it is desirable to minimize them in order to maximize the expected power output. The wind farm layout optimization problem consists of finding the turbine positioning (wind farm layout) that maximizes the expected power production.



Tasks

To increase the acceptance of planned wind farms and to provide an intuition on its influence on the nature, we want to visualize a wind farm on a smartphone. Thus, the goal is to design an app which supports augmented reality using the *ARCore* (Android) and the *ARKit* (iOS) interface. As extension, think about a way to bring the app onto augmented reality glasses.

Contact This project is offered by the *Theory of Hybrid Systems* (i2) research group headed by Prof. Dr. Erika Ábrahám and will be co-supervised by Dr. rer. nat. Pascal Richter. For further questions please contact us via email:

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