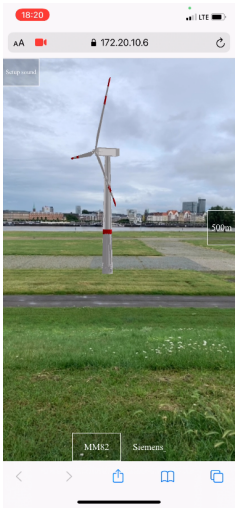
Bachelor / Master Thesis

Mixed Reality for the Visualization of Wind Farms with Depth Perception

Course of study: Mathematics, Computer Science, Computational Engineering
Kind of thesis: Programming and Simulation
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. In general, the acceptance of newly planned wind farms in the direct neighborhood is very low such that the permission to construct is tedious to get and often fails.



Tasks

To increase the acceptance of wind farms and to provide an intuition on the visual and aural appearance of a planned wind farm, we want to provide a visualization on VR and XR glasses which furthermore auralize the noise propagation.

For a given wind farm the following tasks have to be solved:

- Implement the visualization of moving wind turbines
- Consider depth perception in far-field (up to 2000 meter), e.g. by using neural networks, GIS data, or two cameras
- Support different wind turbine styles (e.g. red or blue circles on the tower)
- Support that different pre-defined positions of wind farms can be loaded
- Add information when looking on the ground, e.g. map, or arrow to the nearest wind turbine
- Make the virtual wind turbines clickable to show further details as position or wind turbine type.
- Incorporate further information pages which the user can read
- Incorporate the noise of wind turbines, closer means louder.
- Optional: Place further 3D elements as e.g. hot air balloon, rocket launch in the background, zeppelin, or a virtual traffic sign with further information about the functionality of a wind turbine or about the wind farm.

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:

Dr. rer. nat. **Pascal Richter**
Theory of Hybrid Systems (i2)

Ahornstr. 55
+49 241 80 21244
pascal.richter@rwth-aachen.de