



## Virtual Reality Lecturing of Remote sensing concepts

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Virtual reality (VR) provides new possibilities for education. In contrast to traditional lecturing, VR provides allows the students to experience (rather than simply observe) educational content. Preliminary results indicate that VR can lead to higher efficiency and deeper understanding. For example, VR enables students to virtually visit foreign (disaster) places, and understand novel concepts through a combination of 360 footage and interactive simulations. Therefore, VR opens pathways unreachable by traditional lecturing approaches and facilitates student education of concepts outside their normal spectrum, such as satellite earth observation.

Earth observation provides a huge number of possibilities in ecological and environmental studies, and can provide tools for decision support to managers in adverting impacts of natural disasters. While, human society increasingly depends on information derived from Earth Observation using remote sensing (RS) techniques, the full potential of RS has not been fulfilled. This is caused by the increasing complexity of new satellites as well as the difficulty to grasp concepts that increasingly play a role. In order to fulfill this potential, a new batch of multi-disciplinary researchers need to be educated, capable of integrating these novel techniques on current social and economic problems.

Teaching abstract concepts of remote sensing often scares students. Remote sensing is an extremely diverse and multi-disciplinary field, with applications ranging from studying biodiversity loss, to investigating the effects of droughts on agricultural production. Furthermore, the underlying concepts (such as radiative transfer and data assimilation) and novel measurements techniques (including both optical, thermal and microwave sensing) are difficult to grasp for students that traditionally are only educated along a single research-line. Specifically, within the Leiden Universities course on 'Human impacts on biodiversity' students are to understand 1) the added benefit of RS; 2) the workings of RS radiative transfer models in relation to plant traits and 3) the estimation of global biodiversity from this. Past evaluations have discovered that these objectives have been considered extremely complex and hard to grasp. In this regard, a novel approach of educating students need to be explored, in order to increase the effectiveness of the RS lecturing program.

The aim of this research was therefore to create a VR experience to lecture our students to the novel concepts of remote sensing and it's applications. The result of this project is a new educational VR experience which enables students to experience new remote sensing techniques. This VR experienced developed by us, allows students view the world through the 'eyes' of these remote sensing sensors, such as laserscanning, multi-spectral viewing and distant observation. In addition, the experience focusses on showing the potential of remote sensing to gather data on real-life problems, such as deforestation, drought and biodiversity loss. We will focus in this presentation on how we created this novel VR experience, as well as present our own lessons-learnt when creating this, such as how 1) Linking different kinds of visual material can be a challenge, 2) how storytelling specific for VR can help guide the student through the experience.