Recommendations and improvements for the generation of photographic 360°-panorama tours

Digital knowledge-transfer and self-representation of FuturoVerde and PuroVerde Paraíso Forestal S.A. in Costa Rica in cooperation with the "Flipped Classroom"-project at the University for sustainable development in Eberswalde, Germany

A guideline to improved field work and data processing by Torben Föhrder (t.foehrder@hnee.de) and Lina Wernicke (l.wernicke@hnee.de).

Previous project development and guidelines

The concept of this project was generated within the "Flipped Classroom"-project of the University for sustainable development in Eberswalde, Germany. For further information it is recommended to contact the dean of the faculty of "Wald und Umwelt", Prof. Dr. Peter Spathelf (peter.spathelf@hnee.de).

For the basic generation of panoramic scenes and the furthermore implementation of these into a connected tour, including subsequent information or other web-content, the software of PTGui and Panotour were used under a professional license. The open-source versions of these programs are not sufficient enough for the generation of a high-quality tour and should not be used. For a guideline of how to use the software and generate the tour under easy conditions, please find the created manual under: http://twistedminds.com.de/HNEE/FlippedClassroom/FlippedClassroom_Sept2018.pdf

During the period of the project, the participants were already able to notice some recommendations for the further handling of equipment and possibilities to ease up the workflow.

In advance it should be noted, although often taken for granted, to prepare the excursion to the desired photo-spots as comprehensive as possible. In terms of personal provision, one should not underestimate the weather conditions of Costa Rica and prepare always as good as possible the following items:

- Pack sufficient amounts of food and water, sunscreen and insect repellent
- Clothing appropriate to the conditions at hand, raingear should always be included
- A suitable and durable way of packing the equipment, which usually is heavier than expected and especially items like the tripod or the panorama-head are heavy, have an unfavorable shape and are quite sensitive to bumps and crammed conditions
- A minimalistic set of tools for the most used items is recommendable as well, which should in most cases only include a maximum of 2-3 Allen keys and / or screwdrivers – the equipment which is to be used should be checked beforehand and the user should be accustom enough to localize failing clamping and other signs of wear and tear
- It has been proven to be of high advantage to keep a working GPS unit in possession, therefore not to rely on mobile phone reception or provision of high-value equipment from the employer, since these often have to be shared and are unlikely to be handed out for more than a day

Generated content, current approach

The software to generate the scenes (PTGui) and tours (Panotour) are very sophisticated and well maintained. Since the competing developments did not seem appropriate for the purpose of these tours, the authors assume that these programs are used for further projects or at least a different software with similar functions is able to fulfill the aimed quality expectations.

In general, it can be stated that any panorama or scene will look a lot better for marketing purposes, if there is a lot of sunshine and the feeling of a tropical setting can be captured. But for scientific purposes, the participant may want a more neutral lighting, allowing more details to be seen due to the reduced contrast of light and shadows. This will also help to avoid the appearance of the photographer's shadow in the generated scene. A basic orientation and awareness of different approaches should be given in advance.

What is of major importance to the generation of the scenes is an undisturbed setup of the camera and understanding of its functions. If the light conditions at hand are unfavorable, there might be a setting in which the camera can be able to compensate these conditions. Understanding of these functions should be trained before, so not to lose time in the field.

Overall, time management is a major subject for the successful field work. Since the time frame for result-orientated approaches is at any time a rather small one (favorable light conditions are mostly between 10-14 o'clock), the participants should plan carefully ahead and never underestimate the amount of time necessary to arrive at the desired spot, as well as include enough time to get safely back to the housing situation. It is quite advisable, to rather plan each activity to need twice as much time as one would expect!

The time necessary for the follow-up digital work and generation of panoramic scenes as described in the Flipped Classroom manual has also proven to take longer than within circumstances of German forests. As the Costa Rican weather changes more frequently or tends to extreme conditions light-wise, the participants recognized the need for quick action when taking the shots, therefore to capture the whole scene in as similar conditions as possible. In detail, the movement of clouds may cause difficult conditions for digitalizing the content. The reverse situation, a total lack of clouds, may cause as well heavy disturbances in the automatic stitching process of PTGui. Even when taking shots without sky segments, the extreme change of lighting and color appearance causes the shots to be unusable for digitalization. Only with deeper knowledge of photography and the sophisticated functions of up-to-date digital reflex cameras may be able to compensate for the less bad conditions. As described in the Flipped Classroom manual, a well-structured mixture of different patterns works best for the stitching process of PTGui.

When taking the shots, the tropical circumstances require special attention to the following aspects:

- Equipment maintenance needs to be intensified and especially right before taking the shots it should be checked for a safe stand of the tripod, clean lenses and enough reception to determine the GPS-location
- Checking the scene for unwanted objects, chances are rare to be able to come back in exactly same conditions and re-do the shots – keep checking for insects sitting on the lenses which might cause blind spots
- Sunny conditions are of course always preferable, too much sunlight although causes some cameras to malfunction and the shot turns out overexposed

Improvements, recommendations

In general, any improvement in terms of lighter or better transportable equipment is a huge benefit when working in the field. The panorama-head used in the project (Manfrotto) and the tripod were probably the most heavy and uneasy to handle items. The panorama head used is not available for purchase to current date (Feb 2019) but research for alternatives has been initiated within the IT department of Futuro Verde. The most important attributes would be: Lightweight, compatibility with different camera devices and stability. A detailed division into degrees is not of as high importance, as one would expect. It is, however, of high importance to be able to determine the primary direction of the first shot to be able to align the digital panorama later correctly to the cardinal directions. Therefore, future participants have to assure when using a classic compass, that the device is not deflected by the metal components of tripod, panorama-head or any other equipment!

If future participants want to explore the software of PTGui or Panotour, they may find within the field work data some unused shots at Tierras Buenas (#14, #18: "Mandala-Beet") and La Virgen ("Bestand-Fluss"). The approach at stitching them let to unsatisfactory results but if a broader timeframe is given, a sophisticated participant may be able to complete this process and integrate the missing shots into the existing tours. At least, these might be serving as a training purpose until the first shots have been taken. For future needs, the participants may find all the GPS-locations, some altered with manual corrections, in the Excel-file. As basic recommendation, the used software of Panotour and PTGui were intuitively understandable, easy to use and seemed to have been continuously maintained by the developers. There have been recognizable differences to available opensource solutions, which could not compete to the software at hand. A more sophisticated research although, might result in even better solutions. For questions regarding the process or details of the generated tours, the authors can be contacted.

Future development, options for project continuation

There is a lack of information about the 2018/2019 started agroforestry project at Tierras Buenas. The missing details of the composition of plants, the desired result, intermediate steps which may be undertaken by future participants should be noted within the concluding project description. This information can be integrated and displayed. The change of the agroforestry area during the upcoming seasons and how the integration of yield into the farm life develops would be a most interesting display of project progress at Tierras Buenas.

Additionally, there might be a chance for a decent shot of the Mandala-Beet, in case the project can be re-lived and continued. It is recommendable to dig up the center post and position the camera up top the hole. As the authors were trying to do the shot, the camera was positioned around the post and several tries did not achieve the desired outcome.

As the wish for further representation of the work in Costa Rica by the foundation of Futuro Verde has been expressed, any additional finca which can be included into this form of knowledge transfer would be certainly an enrichment. Therefore, a lot of possible photo spots and concluding tours may be generated at the further involvement of Futuro Verde at any of the foundation's locations. An associated idea for a subject to investigate would be the perception of viewers of the tour, in detail the investors and participants of the Futuro Verde economical approach and how the general reaction to a graspable display of the concept results in a change of behavior or involvement or neither.