A SUNNY TRIP THROUGH A CAPTIVATING DATA LANDSCAPE

It is among the responsibilities of Itility's software developers Maarten Slenter (back-end) and Vincent Lichtenberg (front-end) to work on dashboards that allow clients to monitor and optimize their infrastructure. All manner of data can be displayed, for instance logs from chip-making processes, railway data or the stats on the Stella Vie. Last October, Maarten and Vincent were able to join the Eindhoven Solar Team for a week and set up a dashboard for this solar-powered family car en route to winning the World Solar Challenge.

By Marianne Faro

Monday

The morning begins with a collective brainstorming session with the Stella Vie students. They want to use the dashboard to keep the press, sponsors and their families updated on their car's journey. We first take stock of the data that is being collected. This amounts to 850,000 records per day, including stats as varied as the measurements on the capacity of the solar panels all the way down to windshield wiper and flasher use. What would be interesting to display on the dashboard is the location data, the battery's state of charge and when this was measured. From this data, it is possible to calculate the Stella Vie's location, the distance it has traveled and how much energy was used in the process. Additionally, we would like to enable visitors to retrieve the data for each day and follow live updates on YouTube and Twitter. Vincent finishes a design outline for the dashboard that afternoon.

Tuesday

Today, we are going through the design. Already during the presentation, Maarten is finding out how to supply the data with which to get the dashboard up and running.

In addition, he suggests including the option of simulating data, as he remembers from his own student project (the electric touring motorcycle Storm, that back in 2016 raced around the world in 80 days) that making this kind of data available is never given the highest priority. It's a good addition, and the project manager is on board, giving us the all clear. That afternoon, Maarten rolls out a NodeJS server with an SQL database from a skeleton. The rest of the day is spent structuring the data model and the API, from which

Vincent will later be able to retrieve the data. Since the meeting, Vincent has been busy rolling out his scaffolding consisting of Angular, Webpack and SASS. Then it's on to new peaks: producing the charts for the data. He tests out a number of libraries in the Itility toolbox, with Chart.js eventually proving the most suitable: it allows for a great variety of settings, comes with a very comprehensive documentation and has an active Stackoverflow community. A mere fifteen minutes later, the chart for the state of charge data is up on the dashboard.

Wednesday

We have got a morning full of coding ahead of us. Vincent and the project manager decide to include the sunrise and sunset times on the dashboard; Maarten adjusts the data model and Git flow accordingly. He then calls the students to ask whether they have any real data available, but unfortunately, due to an issue with Stella Vie's center console, this will have to wait a while longer. Meanwhile, Vincent has plenty to work with, and is ready to test the Google Maps API that same afternoon. Using the GPS coordinates, he calculates the distance traveled each day and literally charts the car's present location.

Thursday

De day starts with a code review and compiling automated tests. Then we get a very important email: "The API has received data from the Stella Vie". Finally, we can check if the dashboard is fully operational. Maarten sifts through the output and identifies a few final issues. The state of charge sometimes amounts to 120%, data is received ten times per second and the solar panels' power output is expressed in milliwatts instead of watts. He finds a way to absorb the deviations in the state of charge. The biggest job is finding a way to tone down the over-eager program the students created and get it to only send data every ten seconds. Vincent solves the milliwatt issue by dividing the values by a thousand. Additionally, the decimal
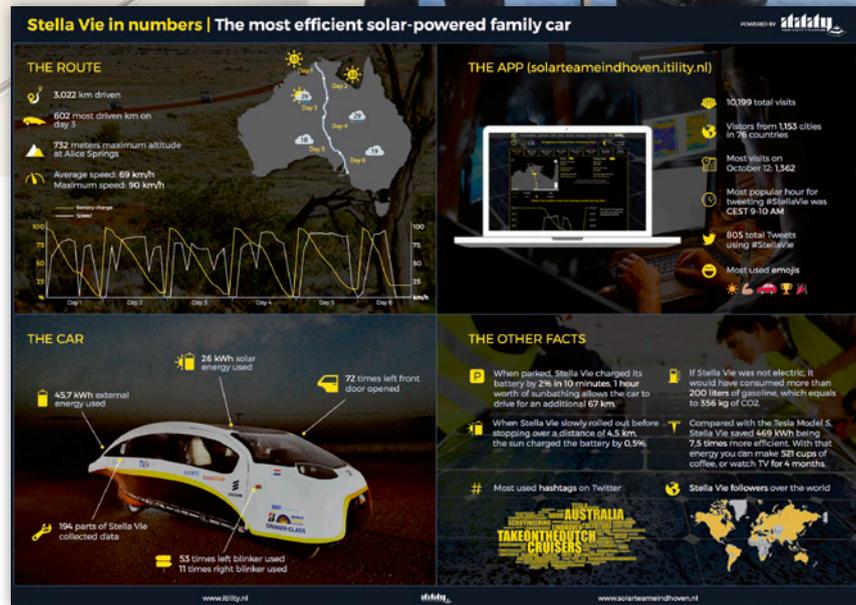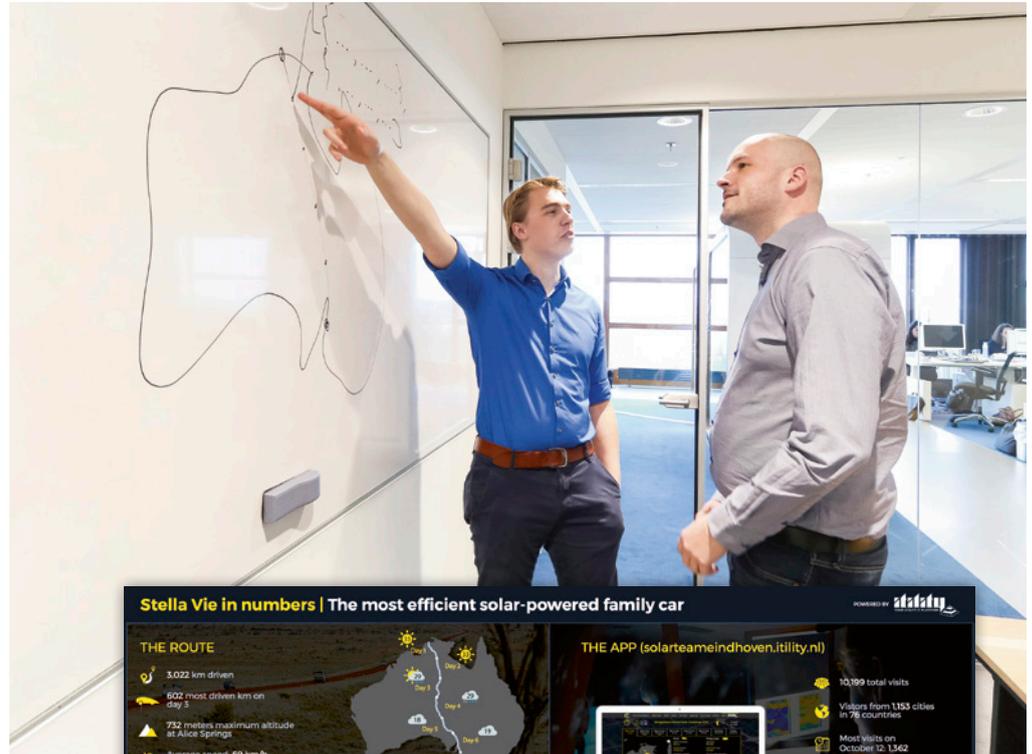
Maarten Slenter (left) and Vincent Lichtenberg have created a dashboard for the Stella Vie, the solar-powered family car that last year won the Bridgestone World Solar Challenge for the third time in a row.

separators need to be replaced with commas. These all aren't very hard to solve, but all in all take up a lot of time. We end up having to phone for pizza.

Friday

After what has been a long evening, we are ready for final device testing. That all goes smoothly, apart from a single issue, which lies with the CEO's iPhone that turns out to be displaying a chart incorrectly as the result of a backward compatibility issue that can be traced back to a line of CSS. It turns out to be easy enough to fix, which concludes our work on the dashboard. Next week the race is on, and we are ready!

Marianne Faro is the managing director of Itility.

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