

Success Stories

SUGAR – Monitoring of New Forms of Electronic Cooperation via Graphical Tools for Operational Analysis

The SUGAR project, headed by Benoît Otjacques and which ended in December 2007, has spent the past two years studying and designing a revolutionary new visual method of analysing computer data. The two main aims of the CRP Gabriel Lippmann team were to first imagine a completely new method of graphics, which could be simply interpreted but could potentially hold vast amounts of data for analysis; and then to develop a software prototype to implement them.

Collecting and analysing data is paramount to the successful running of any organisation and while collecting the data is simple enough, analysing it in a meaningful way is time-consuming, laborious work; primarily because the information is presented in a complex, two-dimensional way. We have all been faced at some point with a vast spreadsheet of data, containing row upon row of figures, which has taken hours of intricate analysis to interpret. Information Visualisation looks at how information (for instance a company budget or annual schedule) can be presented in an easy, understandable manner; working with layers of shapes and colours, which are more easily processed by the cognitive part of the human brain. As Otjacques says, "It is well known that a picture is worth a thousand words but most reports are still presented as text-based documents."

Working on this premise the SUGAR team have developed a new technique called ellimap, which aims to visualise weighted hierarchies, using layers of different sized and coloured ellipses, each one representing a piece of data. Ellipses are among the most easily understandable shapes for the human brain and what is interesting with the ellimap technique is that you can immediately get an overview of the data you are looking at.

Say for instance you wanted to analyse the stock in a supermarket, your ellimap would show a large outer ellipsis (A) which represented the supermarket itself and inside there would be a number of slightly smaller ellipses (B) to represent the different departments (e.g. meat, fruit, dairy etc.). The size and shape of these ellipses would represent the percentage of takings that department generated (e.g. meat 20% would be round, fruit 10% would be thin). Inside the B ellipses are smaller ellipses (C) that represent the type of food (e.g. pork, beef, chicken etc.), again with differing shapes and sizes according to their contribution. The ellipses (D) inside the C ellipses represent the products (e.g. chicken legs, whole chicken, free-range etc.), again with different shapes and sizes but also coloured in a sliding scale from red to green depending on their popularity. If you hover over an ellipsis with your mouse you can see the information relating to that particular ellipsis (e.g. product name, price, amount sold). If you click into an ellipsis you will go into the next layer that you can study in more detail.

Data is still imputed in the traditional spreadsheet manner but the software behind the ellimap converts the data into readable graphics. You also have the possibility of mining out information you don't need or changing the look of the ellimap depending on how closely you wish to study it.

It is a simple idea (and once you have mastered the technique of it you will be able to search through data quickly and efficiently) but as with any new technique it took months of intensive work to achieve; particularly when developing the software. The team started with three possible ideas of how the graphics could look but after a few months decided to focus on the ellimap, which was unfortunately the most complex software to develop. During the initial stages of the development they worked in cooperation with SICOV (a FNR funded project developing virtual platforms for organisations) and were able to use the data from some of the platforms as a basis from which to develop the visualisation technique, giving them more time to focus on the visualisation issues. They also dedicated a large part of the research project to evaluating how people respond to ellimap by setting up a specific testing environment called "Festiv", from which they could carry out controlled experiments. The results from these tests were extremely positive not just about the overall look of the visuals but also the ease at which data can be processed and analysed.

Although the FNR project is now completed, the team is using this technique to work on a new project with the city of Esch-sur-Alzette for visualising administrative data, which will give them the chance to refine the programme. They are also working on a proposal with the Luxembourg School of Finance to develop similar techniques for visualising financial data and will submit the proposal to the next call of the FNR CORE programme.

Otjacques is clear about the contribution from the FNR, "because of the unusual nature of our research, which is not really known, it is extremely difficult to obtain funding from outside sources. How can you go to a company and say you want to develop innovative graphics that you can't even sketch! The FNR have played a major role in the development of this technique by funding during the more fundamental part of the research process."

