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The Future of Geographical Information Systems

Interview to *Ed Parsons*

The most outstanding change in the last couple of years in the field of Geographic Information Systems (GIS) has been the large numbers of the general public that have started using it on a day to day basis, especially through the use of tools such as Google Maps. More and more people will be interacting with geographic information to create their own information. The ordinary user will replace governments and other agencies as the main information providers. Another important factor is the move that GIS has made from computers to mobile phones. Companies like Nokia or Google itself are becoming increasingly interested in offering users the information they need, where they need it: local restaurants, weather or traffic reports...

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Q: What exactly are Geographic Information Systems (GIS)?

A: GIS technology began to be developed 30 years ago. It links the graphical representations of maps with the databases containing the information that sits behind those maps. For example, behind any motorway map there is information such as its name or the number of cars that use it every day. At a very simple level GIS could be viewed as just making maps appear on a computer screen, but there is much more information underlying those maps.

Q: What are the applications of this technology?

A: Initially GIS was used mainly in the public sector, such as governments (as part of the process for siting schools and hospitals in the right place or executing major infrastructure projects such as roads and airports) and utility companies supplying electricity, gas, telecommunications, etc. Nowadays they are used to a large extent for commercial purposes; for example, to plan the location of shops or to decide where to carry out marketing campaigns for a particular product... There is an increasing amount of information available about people and their activities in relation to specific locations, information which is used to pinpoint target publics.

Q: What changes has GIS undergone in recent years?

A: The most outstanding change in the last couple of years has been the large numbers of the general public that have started using it on a day to day basis, especially through the use of tools such as Google Maps. More and more people will be interacting geographic information to create their own information; for example, by providing information for maps about a particular excursion, or a good place to take photos from... The ordinary user will replace governments and other agencies as the main information providers. Another important factor is the move that GIS has made from computers to mobile phones. In Europe and the United States, for example, there is a legal recommendation to equip

mobile phones with GPS to help locate people in case of emergency. Companies like Nokia or Google itself are becoming increasingly interested in offering users the information they need, where they need it: local restaurants, weather or traffic reports…

Q: How can we make GIS reach more users?

A: The key is to give people the information they need when they need it; at exactly the right place and time. Geographic data would form part of that information, and it should be provided automatically. Thus, the first step is to obtain more information that may be of interest to users. Now we are probably only using the most superficial data, since there is a lot more hidden on servers, either because it hasn't been published or because its owners have restricted its accessibility.

Q: How can entrepreneurs capitalize on GIS?

A: Five or six years ago, entrepreneurs who simply wanted to insert a location map in their Web page, for example, had to create their own server, collect data, and build their own applications. However, since a couple of years ago, they can access an easy to use infrastructure thanks to Google Maps and other similar tools. Entrepreneurs can concentrate on their own specific business and use geographic information as an extra component to add to their own information. I think that GIS has smoothed the way for entrepreneurs, which would explain the proliferation of start-ups like Dopplr and others, mainly based in Europe, who are benefiting from the infrastructure of geographic

information created by others to build their business on top of it.

Q: What is the role of the user as a supplier of information?

A: Material provided by users has a great future; it something which is becoming increasingly common. Wikipedia is the classic example. It's true that it has aroused a degree of controversy, but its content is correct 99% of the time; it is very well maintained by the community. The question is how to transfer this model to the field of GIS. There are already organizations of this type in Europe, such as the open street map at <http://www.openstreetmap.org>, made with the help of users who know their own area and provide information about it. It's like the local knowledge reflected in those wikimaps created by users themselves. When you stay at a hotel and you want to eat out at a good restaurant nearby, you ask the receptionist; that is local knowledge, which is what you find in wikimaps.

Q: To what extent is this kind of information reliable?

A: Geographic information is like the rest of the Internet; we all end up deciding which sources we believe to be reliable, based on their reputation or our own experience. You can't set up any kind of validation mechanism; you just have to trust the community to do that job.

Q: Is there a downside to the massive use of GIS?

A: We need to be aware of the power of these tools: people's mental maps, the way they see the world, may end up changing. In a way it's very similar to the link between people losing the ability to do mental arithmetic and calculators; whenever a new technology comes along we need to strike a balance between the benefits and the drawbacks. Users may end up wondering, say, whether to give up using paper maps for ever. In my case, if I go out hiking I always carry a map with me, because I know I can look at it whenever I want without having to worry about the batteries of my GPS running out. It is all very well having these three-dimensional tools but it's always a good idea to have a backup as well, just in case.

Q: Do GIS also use open source software?

A: There are two sides to open source: on the one hand there is data which is accessible to users, like in projects such as Openstreetmap, and other data that users collect and offer to the community as a whole; and on the other hand there are open source tools which are gaining ground in Europe, particularly in Germany and Spain, where GIS applications of this type have been developed. The advantages are the same as for any other open source software: the possibility of simply and quickly improving it thanks to contributions from users. In the case of GIS, it is also especially important to be able to know how the programs are actually built.

Q: How can GIS help tourism, one of Spain's main sources of income?

A: Nowadays a lot of people book their holidays online rather than going to their local travel agent, but you lose the chance to ask the travel agent what his or her personal opinion about this or that place is. With the tools available today like Google Earth, which allows videos, photos, etc. to be included in the landscape, you can get an idea of what a particular place is like by visiting it virtually, seeing where the hotel is in relation to such and such museum or to the beach, seeing what the architecture is like, etc. We can get a fairly good idea of where we are going before we get there, although there are people who criticize us because they say that soon this will stop people from ever going anywhere. If this were to actually happen we'd be doing a brilliant job! But anyway, GIS can give us an idea of what the place we want to visit is like.

Q: Google is one of the main providers of geographic information. Does it deserve this reputation?

A: You'd need to ask the users [laughter]. But I think that most people who choose Google do it because they can get the information they need very efficiently and quickly. But one of the peculiarities of the sector in which I work is that very easy for people to change provider; they only have to type in a new Internet address, or use another search engine. We are only one click away from our competition, as the saying goes. So it is very important for us to centre in on our users' needs, and on how we can meet them. We do not take our leadership for granted; innovation is a constant feature of our work.

Q: What do you do in Google?

A: I work on the evangelization side. In other words, my job is to contact companies and explain our goals to them and convince them to make their own information accessible. Organizations often see their information as a by-product of their main business. Nevertheless, a public transport company, for example, has to run buses, trams, etc., but part of that process should be to provide easy to use timetables. It would be very useful to be able to access that information over the Internet, as a service provided by a third party such as Google or other companies.

Q: Google has a reputation of being a great place to work. To what extent is that true?

A: It's totally true! [laughter]. Our work is oriented towards achieving goals. The atmosphere is relaxed, although we work very hard and with a great deal of motivation. It's a lot like a university where people also concentrate on the aims of their research; in our case that research will lead to producing a new product or information system. There is a great sense of enthusiasm to get things done, and there is hardly any bureaucracy; workers have a lot of flexibility and the freedom to find the best solution for their project.

Q: Are there areas in the world that have not yet appeared in Google Maps?

A: No, the whole world is covered by Google Maps,

although the level of detail varies. In Europe, North America or the Far East we have plenty of information, high resolution photographs, complete street maps, etc. In other parts of the world, however, we haven't reached that stage yet, so we are looking into how to get the same level of detail for the entire planet.

Q: What is Google's relationship with the university sector?

A: We have a work experience programme for university students and teachers. One result of this type of collaboration was Google Sky, a tool for observing the night sky invented by some academics during their work experience period at Google. We also have another external collaboration programme, the Summer of Code, in which anyone with a good software idea can present it to us and, if it gets the go ahead, we may back it with money or with our own team of engineers.

Q: Does Google accept its social responsibility to bring to light any human rights or other abuses it may come across while mapping the world?

A: Google has a moral role to bring to light any abuses it may become aware of, although we cannot go beyond that, nor can we get involved. In the case of the genocide in Darfur, for example, we decided to highlight what was going on, since in the United States it was a subject that hardly anyone was talking about. By making people aware we can raise the issue to a political level, but ultimately it's up to the politicians to do something about it.

Q: What challenges await Google in the future?

A: Every day there is more information, so the challenge of making that information accessible is growing day by day. Also, users are becoming more choosy about the type of information that they want; they want what they are looking for to appear on the first page of results, and we need to take that into account too.

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