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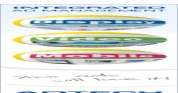
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Photo recognition software gives location

10:00 10 April 2004
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James Randerson

For a small fee, photo recognition software on a remote server works out precisely where you are, and sends back directions that will get you to your destination.

You are lost in a foreign city, you don't speak the language and you are late for your meeting. What do you do? Take out your cellphone, photograph the nearest building and press send.

For a small fee, photo recognition software on a remote server works out precisely where you are, and sends back directions that will get you to your destination. That, at least, is what two researchers at the University of Cambridge in the UK hope their software will one day be used for.

Roberto Cipolla and Duncan Robertson have developed a program that can match a photograph of a building to a database of images. The database contains a three-dimensional representation of the real-life street, so the software can work out where the user is standing to within one metre.

Line of sight

This is far better than existing systems can manage. GPS satellite positioning is accurate to 10 metres at best, and can be useless in cities where tall buildings shield the user from direct line of sight with the satellites. And positioning using cellphone base stations has a precision of between 50 and 100 metres.

"Telling people 'You are in the vicinity of X' is no good to man nor beast," says John Craig of Cambridge Positioning Systems, a company that develops software for locating mobile phones.

Unlike the GPS or cellphone base station approaches, Cipolla and Robertson's software can tell which direction you are facing. So the service can launch straight into a set of directions such as "turn to your left and start walking", or give information on the building in the photograph.

When their system receives an image it begins by identifying vertical and horizontal lines. Next, it warps the image so that the horizontals are all parallel with each other, and the same for verticals. This transforms the picture into one that was taken square on, rather than at an angle.

Windows and doors

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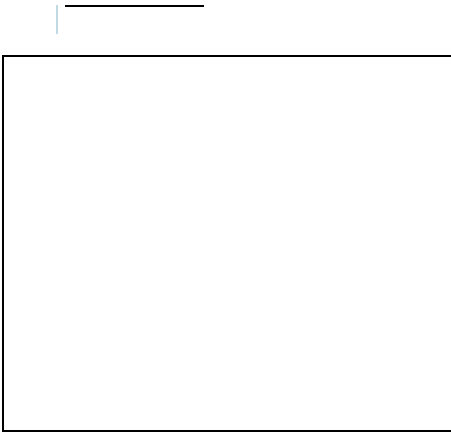
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■ The software then looks for useful features, such as the corners of windows and doors, and extracts the colours and intensities of the pixels around them. Next, it searches the image database for matching data, using the base station the cellphone's signal came from as a guide. Finally, it uses the differences between the two images to calculate the photographer's position.

The software can match two images even when they are taken at a different times of day, from different angles and with clutter such as pedestrians and vehicles in the way. "That's an easy problem for a human, but it's very difficult for a computer," says Robertson.

However, the system's commercial future is uncertain. "The question is: how much are people prepared to pay for it, and how often will they use it?" says Rob Morland, of technology consultants Scientific Generics near Cambridge. "That's a tough one."

For now, Cipolla and Robertson are optimistic. In March they received funding to start working on a prototype to cover all the buildings in Cambridge city centre.



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