



RANJIT MAKKUNI,  
president of the Sacred  
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Can the Gandhian principle of encouraging village crafts and the innate talents of our own country apply to the IT world as well? Can computers be made of lacquer, and keyboards of natural fibres? Can GUIs be redesigned to break away from the shackles of information theory and western literacy models, and become more accessible to the common man? Janani Gopalakrishnan caught up with Ranjit Makkuni, president of the Sacred World Foundation, who thinks that all these are certainly possible.

## “ WHEN CULTURE AND COMPUTING CONVERGE ”

**T**he Sacred World Foundation ([www.sacredworld.com](http://www.sacredworld.com)) is a state-of-the-art research and design think-tank. Their projects explore innovative ways of building bridges between techno and traditional cultures. Ranjit Makkuni started the Foundation after spending nearly twenty years at the Xerox Palo

Alto Research Centre (PARC) where he worked on multimedia computing interfaces and learning applications, starting from the visionary explorations of Object Oriented Programming in the 1980s to body-friendly, touch-friendly and culture-friendly multimedia computing in the 2000s. Now, through the Sacred World Foundation, his work

still in the Stone Age, compared to this vision. Hardware and software need to evolve. It requires a radical design change and thinking beyond black-and-beige designs. Gradually, concrete physical displays will disappear and blend into the traditional and cultural surroundings. Computers will become instruments of cultural expression rather than replacing them.

**Q Can you explain the concepts of culturally rooted computing and culture-conscious product design?**

Culturally rooted design basically explores how technology can become a vehicle for preserving cultural identity, not replacing it. If objects that people interact with for more than eight hours a day (such as cell phones and computers) can provide valuable remembrances - such as in the case of Gandhi, it could remind one of non-violence and the equality of religions—then I believe products can also have a spiritual function.

For example, imagine a computer in the form of a shawl. When you wear the shawl it starts uttering *mantras* or *japas*. Note that I am not hiding the computer in the fabric but making the fabric itself the computer. This is possible. When we did a multimedia exhibition on the city of Banaras, called “The Crossing”, we developed wearable jackets, which acted like say, an iPod. The gold thread of Banarasi fabric is conductive. So, it is possible to weave the computing elements into the fabric itself. The motifs embroidered in the fabric act as ‘hotspots’

Reaching out to every Indian



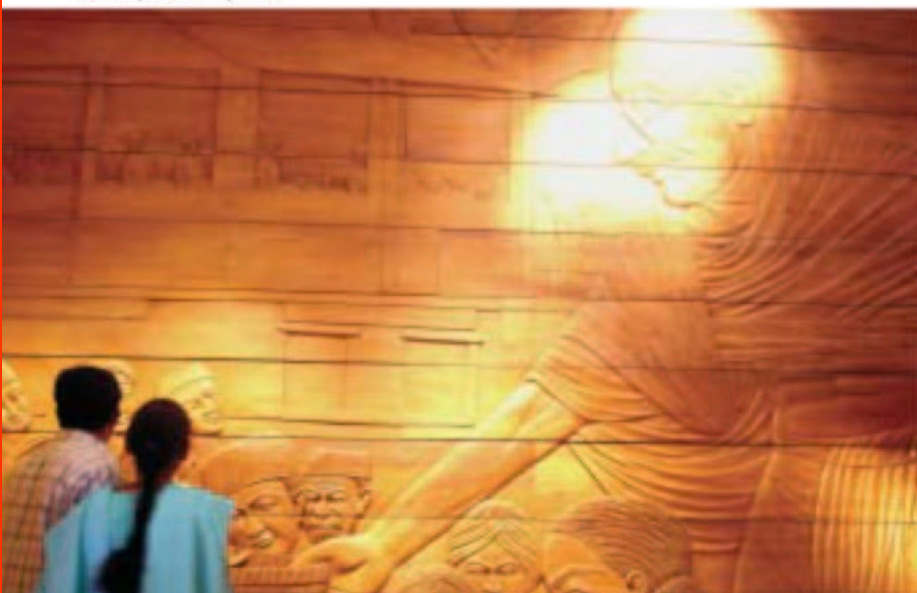
and trigger multimedia presentations when the wearer touches them. All this is therefore possible—it just needs the imagination of more companies prepared to research and develop products that integrate with the rich resources already found in our culture.

**Q One of your earliest projects was the Chinese Temple Editor (1985-86) where you developed one of the first keyboard-less, gesture-based interfaces for designers to use graphical gestures as a means to interact with, index and retrieve records of the design process. What inspired the project?**

The Chinese Temple Editor was conceived when the world of computing displays was ‘green text-based screens’. There was a culture of written text being the centre of the world, and because of my artistic background, I questioned it. Look at it this way—even today it is possible to search easily for text, but not so for images, sound or video. While I can feed in text into a search engine and say, “Show me similar texts,” and can obtain results easily, I can’t feed the image of a Chinese temple’s roof and say, “Show me other temples with similar roofs.”

This is a challenge that has not been met even today, but we took a step towards it in 1985, by developing a parametric way of looking at Chinese temples in terms of architecture, roof and column structures and objects. Instead of looking at a temple’s image as a bitmap file, look at it as vocabulary elements (much like how you create an image in a graphics editor, as different objects on layers)—the pillars, the roof, the windows, each as a separate object. It then becomes easier to edit the image or search for similar objects and so on. While such a concept might be easier to comprehend today, when we did this way back in the 1980s, UIs were still all about green text on a black screen.

As for gesture-based computing, we found that it is easier for people to



explores how the expertise of different people, especially craftsmen whose skills are under threat, can be involved in his multimedia projects.

Ranjit Makkani is also the director of the Eternal Gandhi Multimedia Museum at Gandhi Smriti, New Delhi. One of his recent projects, the Eternal Gandhi Multimedia Museum, is one of the first of its kind in the world. It uses a plethora of futuristic tactile multimedia technologies to bring Gandhian principles to the fore. Computers are housed in water-proofed lacquer and bamboo shells crafted by villagers, engraved pillars serve as user interfaces and come to life when touched by spectators, an urn of salt recreates the Dandi March...visitors to this museum do not just view exhibits, they experience them!

His projects not only show us that it is possible to develop nature—and culture-friendly technologies, but also show us how to create opportunities in rural India. The aim is to experience technology through tactile interfaces, and also create a role for traditional crafts and talents in the IT industry!

**You were part of the Xerox PARC team that developed the world's first GUI. Today you are exploring alternatives to existing GUIs that are not only more accessible to people of traditional cultures but are also inspired by those cultures. What motivated the journey and how has it been so far?**

Computers are just an expression of the world-view in which they exist. They are currently situated in information theory and western literacy-



based models. I want an expression of alternative models for those cultures which work with nature, and which do not just believe in intellectual and rationalistic determinism. Designing computers for the 'rest' of the world then requires rethinking of user interfaces and paradigms, not only in software but also in hardware and product design. If my vision is realised, I hope that the process of engaging traditional cultures will generate income for those craftsmen and artists who are about to get marginalised. In the ideal world, people interact with their objects of meaning, not computers. Computers

can be integrated in objects of meaning.

**Computers becoming integrated in objects of meaning?**

Yes. What do we do today? Drive to work, walk into the office, and then the computer becomes the focus for the next eight hours or more. In workplaces as well as in 21<sup>st</sup> century homes, not only computers, but hardware in general, seems to command a lot of attention. A simple example is how television sets have become the centre of attraction in most living rooms.

Now, imagine a situation where computers become ubiquitous and blend into the environment. The columns and archways in your offices, the windows in your car—all become user interfaces. Screens need not always be physical. How about projections on the wall, or literal desktop computing, where your desktop itself becomes the computer for you? This way, you would 'take the work out of work' because you do not focus on a 'computer' throughout the day. Your natural surrounding itself is the UI.

But a lot of technological advancements need to come about before we can actually implement this. The UI in mobile computing devices today is



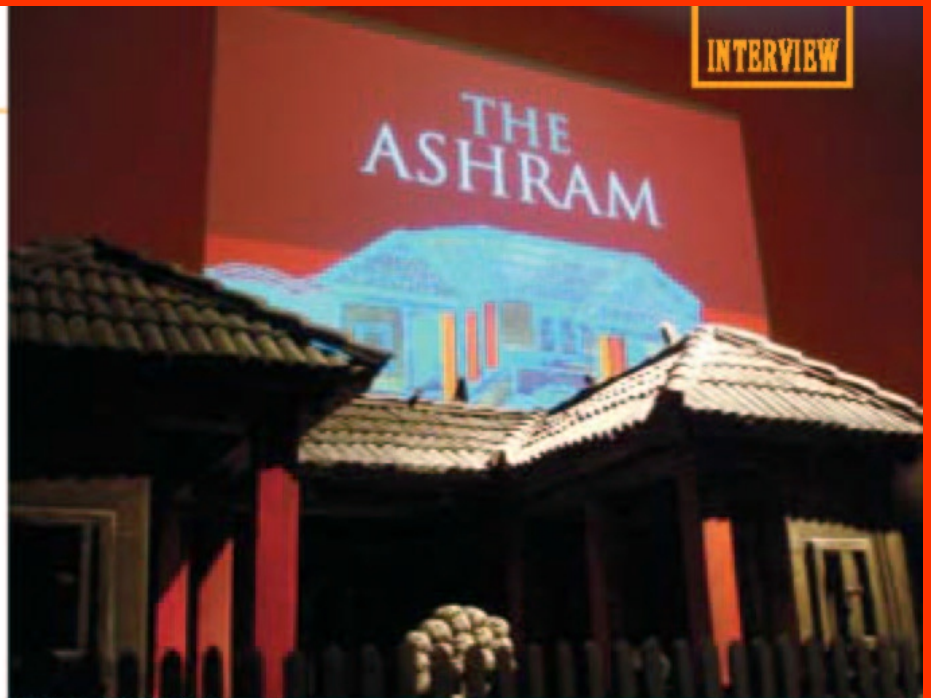
express themselves through gestures than through keystrokes. So, using a combination of camera inputs and the mouse, we allowed the user to interact with the computer through gestures. For example, the user could indicate the shape of the roof with her hand, or she could move her hand up and down to specify the height of the roof, "A tad up, a little down," and so on, which is easier to express through gestures. So, gestures here not only provided the command but also the dimensions of the temples.

Many cultures believe that the mind is in the hand; if the mind is in the hand then the interfaces need to be richer and promote kinaesthetic interaction and internal well being. That is the key to gesture-based computing.

**Q In 1993-94, you came up with Hyper paper, a paper-multimedia cultural learning tool, where pointing and clicking on 'hot spots' printed on the paper pages of a book triggered a playback of short multimedia recordings in a computer. No mouse-clicks, no key-taps, but a direct user-paper-computer interface. Can you tell us more about Hyper paper?**

In the 1990s we were experiencing the digital revolution and the paperless office, and the disappearance of paper was a pretty debated topic. But we realised that paper was a rich medium, not just in the text it represented and conveyed, but in the way paper as a display could be folded, not to mention the whole art of manuscripts, etc that evolved around the paper genre of book design. Also, paper was portable—you could lie in bed and read it. We wanted to combine the benefits of the computing media as well as the tactile dimensions of touch and portability of paper in *Hyper paper*.

As to how *Hyper paper* works—well, there was a pen that the reader could move over the book. The pen was connected to the computer using a wire (remember there were no well-developed wireless technologies at that time). The pen had a camera in it, which could trace the 'glyphs' in the paper, encode them and communicate them to the computer. When the computer detected certain known patterns transmitted by the pen



Time for some contemplation

(when the pen moved over 'hot spots'), the playback of a multimedia presentation was triggered. The video screen for display was inbuilt in the book cover.

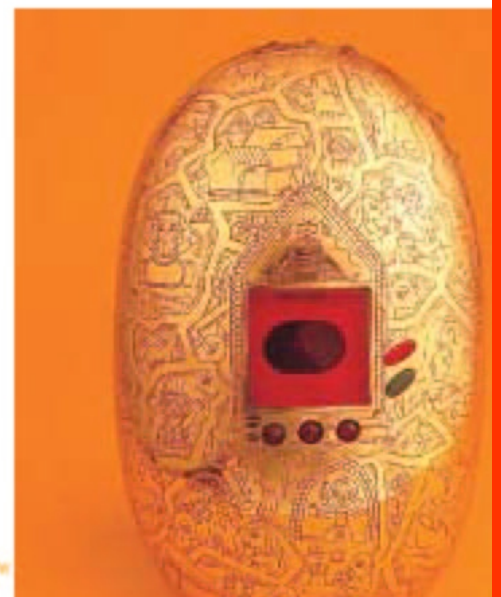
This logic can revolutionise the way we work. Imagine, if a pen could encode the movement of your hand and detect patterns in it. Then you could just write in thin air and have the message sent to somebody by e-mail. No more irksome typing with your thumb on mobile devices. Of course, this is just a possibility. Perhaps one day it will become reality.

The key is in understanding that integrating technology with cultures, traditions and the way we live is all about identifying the patterns and social meanings of how we act. For example, if we could analyse a voice recording, and we identify a considerable pause just before expression, then we could guess that the person was thinking before expressing an idea. Similarly, if we detect shrill notes, we could guess that the person is angry or excited. The idea of a pen acting as an encoder and detecting the patterns in your writing is similar. It is through such abstract notions and a deeper look at cognition that technology will gradually weave itself with social meaning.

**Q The Crossing, a project that you spearheaded in association with Xerox PARC in 2002, took viewers on a virtual journey through Kashi. It had seemingly magical eggs with high-touch user interfaces**

that interactively educated the holders about mythology, a high-tech cycle-rickshaw took the riders on a tour of Kashi depending on the directions they chose, mendicants could be asked for directions on the way, and a variety of novel information access and delivery methods. You made the secrets of Kashi available even to the average Indian who did not know the 'language' of mouse-clicks and key-taps. The project was one of the earliest to implement wearable computing, body-friendly handheld interfaces, 3D presentations, and tactile computing. Can you tell us about the absolute and almost seamless interface between technology and tradition exhibited in the project?

The Crossing was a major milestone in interaction design, not just because of



tactile computing but also at the level of technology becoming an instrument of cultural identity. It serves as a benchmark for the interface experience. A panorama of tactile interface actions, such as tilting, touching, turning and sliding was explored in a variety of information browsers.

The project aimed at showing that computing could be ubiquitous. Computers embedded in *Shiv Lingas* would present content to the spectators. To them, it looked like a *linga*, but it was actually a computer. Images of dancers and musicians would emerge and talk to people. Touching symbols could trigger a multimedia presentation. These are tactile and culture-friendly interfaces which even conservative people steeped in tradition have been comfortable with. At the level of bringing computing to the rural areas, villagers won't want to interact with keyboards, right? This is because the idea of files and folders comes from a western work practice. But they will be comfortable touching traditional symbols such as a *charakha*. These could very well act as the UI. So, tactile interfaces provided the solution to develop culture-friendly interfaces that everybody would be comfortable with.

It was our way of capturing the culture and tradition of Banaras or Kashi, which was once upon a time a renowned centre of education and arts—the oldest living city, a place so transformative that people went there never to come back. It was believed to be a crossing point from the worldly to the spiritual world. We saw how we could juxtapose such a spiritual environment with modern life, which is at odds with traditional society's notions of spiritual connection. And technology helped bridge the two. It also proved that India has an immense resource of aesthetics that can shape modern tools.

As I said earlier, cultural reflectivity addresses the question of personalising the forms of computing, so that people interact with meaning, not computers. People remember Shiva, Ganges and mythology, not abstract bits!

**Q And now we have Eternal Gandhi, a project that our readers can actually go and experience at the Gandhi Smriti Multimedia Museum, New Delhi. Could you tell us more about this project?**

If you look at the technology aspect, the project demonstrates futuristic tangible learning media. It demonstrates that building technologies that allow people to utilise their innate abilities of physical manipulation and sensing, greatly improves the user interface and learning.

With respect to design, the project has carved out a new space of culture-conscious product design and culturally rooted computing, bringing in organic natural material and forms into modern design. It tries to assert the Indian identity, hoping to inspire Indian designers into looking 'within' for indigenous forms of expression, and inspire world designers about eco design, as well as the need for ornamentation in a homogenised environment.

More than anything else, Eternal Gandhi rekindles the Gandhian visions of village creativity, commitment to non-violence and Gandhiji's ideas of a multifaceted understanding of truth. The project not only shows Gandhiji as a historical person, but also inspires a new IT vision and modern product design, inspired by Gandhiji as a symbol.

