Techover Bid

Sacred World Foundation uses technology to integrate spiritual aspects with products of daily use with great panache. **Ishani Duttagupta** takes a look

RANJIT Makkuni quit top jobs at the prestigious Xerox Palo Alto Research Center and Xerox PARC's Crossing Media Lab in Delhi to set up the Sacred World Foundation, a think tank based in San Francisco and Delhi. The not-for-profit multimedia and educational research centre is now developing digital learning tools for people to access the world's rich resource of sacred knowledge. The foundation, which has set up the Sacred World Research Laboratory in Delhi, has a team of researchers, scholars, designers, robotics experts and embedded systems professionals who are building bridges between traditional and modern technology to integrate the sacred and spiritual aspects into design of products of daily use. "It was also a challenge to prove that India can innovate and export in the design arena, too. And our villages should also be a part of this innovation process," says Makkuni.

One of the SWRL's recent projects, sponsored by Hewlett-Packard has been on Vridavan. "The idea was to explore a sacred geography

ART-E-FACTS

and the mythology surrounding it. We involved children in a physical and virtual school set-up and designed a multimedia curriculum for them in Vrindavan," says Makkuni. The children used a new creative medium to compose maps and representations of the sacred city by using composite media, comprising both physical tactile and digital multimedia elements. The new media provided an alternative to typewriter-keyboard and mouse based interaction, typical of contemporary computing systems. Combining both display and interface, this media provided children with a tactile interface to interact with computing representations. The new media enabled children from the culturally rich city to generate a map of their city and create links to its spaces and interpretations.

"While Indian companies often tend to neglect the cultural heritage of the country while designing software products, we have links with top design houses in Milan, San Francisco and Bali for interdisciplinary research," says Makkuni. The foundation which is a non-profit venture ploughs back all the funds that it generates into research. "And while we our training people at our lab, we also hope to become the hub in the region to attract global design talent," he adds.

Some of Sacred World Foundation's current projects include creating new paradigms for modern computing which will attempt to reverse the design divide i.e. look at issues like how aesthetics developed in developing nations can shape the design tools in developed worlds. Other projects are building bridges between tools and the body where next generation technologies will seek to address body-friendly interfaces and research new tools of communication integrating the hand, sense of touch, texture, gesture and craft in the design of modern technological interfaces.

Preservation of cultural resources is also one of the goals of the foundation to allow modern technological society to access the world's sacred traditions or content dealing with healing, transformation and self-learning. Other projects include interactive learning exhibitions and a digital museum of world spirituality and culture.

A SWRL team has recently put together a project on the personalization of transport technology in Asia or how communities of users personalize their vehicles to different degrees of ornamentation. The resulting array of graphics, textures, patterns, motifs, paintings, embossing, composite material, talismans, quotes and decorative accessories present an amazing variety of anonymous artists and their indigenous art.

Earlier Makkuni's project on the city of Banaras called The Crossing which was a multimedia exhibition showcasing state-of-the-future documents applied to India's city of knowledge, won prestigious global awards like gold at ID Magazine Interactive Review, NY in 2002 and Prix Ars Electronica in Linz, Austria also in 2002. This project has now been presented in a book titled *The Crossing Project: Living, Dying and Transformation in Banaras* by Makkuni and Madhu Khanna, an associate professor with the Indira Gandhi National Centre for the Arts in Delhi.

E-LECTRIFYING PRESENCE: (Top) Makkuni's E-Death Egg and E-Rickshaw

Wisdom should be accessible

**LIVING, DYING &
TRANSFORMATION IN
BANARAS**
By Ranjit Makkuni and
Madhu Khanna
Published by Sacred
World Foundation.
Pages 174

By P. SREEVALSAN MENON

R anjit Makkuni is the director
of Sacred World Research
Laboratory, former director of
the famed Palo Alto Research Centre
at Xerox Corporation and visiting
faculty in various universities around
the world in the area of multimedia.
He has written a book, *Living, dying
and transformation in Banares—The
Crossing.*

Excerpts from an interview:
What is the agenda of Sacred World?

The Sacred World Research
Laboratory explores innovation
created by building bridges between
techno and traditional cultures. In an
era of accelerating change, the
laboratory works with the world's
spiritual cultures to develop new forms
of media and documentation so that
perennial wisdom can be made
accessible to all.

The digital divide is a chasm
created by several factors including
economic and cultural. While
economic factors make products
unaffordable, cultural factors can result
in products designed with a western or
literate world-view or products being
neither usable nor useful to people living
in traditional cultures.
**Can you explain the theme of The Cross-
ing?**

The Crossing presents a vision of
Indian creativity and interactive
design, combining traditional and
modern technology. As computing
technology proliferates in the world,
retaining identity becomes an
important value in the new
millennium.
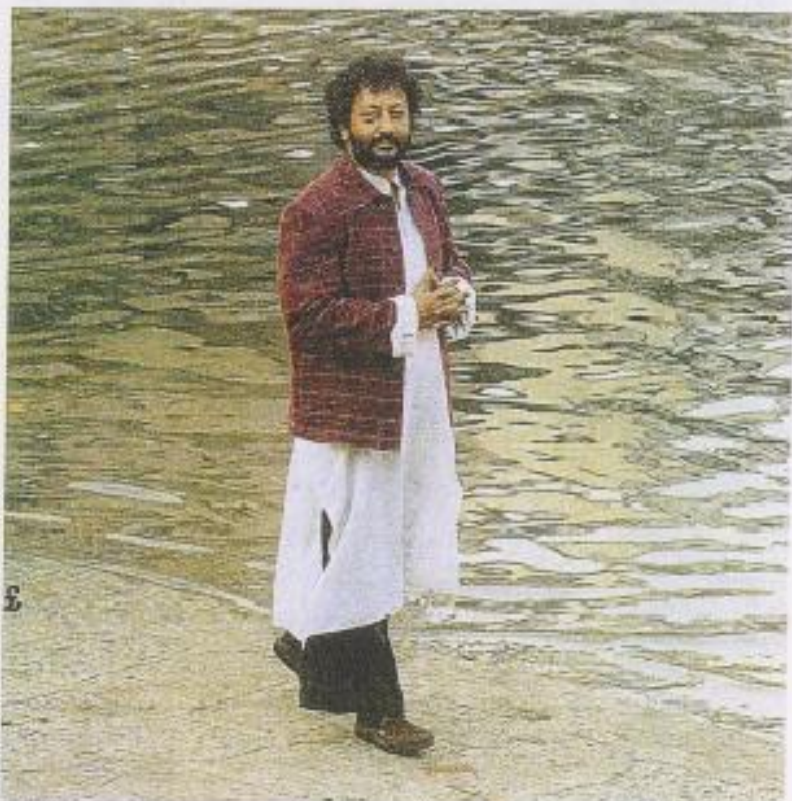
PRASHANT NADKAR

Through physically tactile
computing interfaces, the Crossing
project allows people to access, for
example, the sacred spaces of Banaras.

Banaras simply looks like a city by
the river. But it is more than just that...
it is a pilgrimage station, a crossing
point, a site of mythology, a site of
ritual, a site of healing and a site of
sacred geography. It is amazing that we
could take a physical place and
transform it into a setting for healing
and transformation. It is amazing that
we come naked to the river when all
other hopes of healing have failed.
Divinity exists in Banaras not just as
architecture but also as the element of
fire and water.
**Can you explain your new project,
Saraswati?**

It traces the origin of the goddess
of arts and creativity, Saraswati, her
stringed lute, the veena, and the

veena's transformation across Asia
into various forms of lutes, including
India, Burma, Indonesia and Korea.
Through electronic music, music
synthesis and digital recordings of
performances by Asian masters, the
project allows people to enter the
world of Asian sound, musical
imagery, cultural and spiritual
aesthetics.

The project also looks at the power
of computing to create larger than man
instruments. What if a bamboo could
become a sound production device like
a gigantic lip? What kind of sounds could
this new instrument produce? What if
the Golden Gate bridge were a gigantic
harp? What kind of music will that
produce? The project also looks at the
notions of creativity, left and right
brain thinking, music and healing,
creativity as the dropping of the ego to
experience states of flow.... ◆

BOTTOMLINE: 'THE CROSSING' WILL TAKE YOU ON A VIRTUAL TOUR OF BENARAS

Land of Light, the tech way

Prachi Raturi

SACRED City, Land of Light—whatever you may choose to call it, Varanasi or Benaras is best known for its holy ghats, pundits and throngs of worshippers who believe that no Hindu pilgrimage is complete without a trip here. Now here's a research scholar who says he will take you through the sacred land of Benares. The journey, he promises, will be as vivid as reality, only, the medium is virtual. And the means is an ordinary looking jacket, which nevertheless holds magic within.

Ranjit Makkuni, a scholar at the Palo Alto Research Institute (PARC), Xerox Corporation, USA, has put together, "The Crossing', a multimedia cultural experience in the ancient city of Benaras. The exhibit, as Mr Makkuni puts it, represents the

Ranjit Makkuni against a multimedia screen

complex learning spaces of Benaras through living multimedia documents and interfaces.

The most interesting part of 'The Crossing', which will be showcased in Mumbai, Paris and New York, is the devices it uses. Though the exhibit is a high tech multimedia

exhibit, you see no keyboard or mouse anywhere. Instead, it uses a range of high touch interface tools, such as computer based clothing and interactive craft objects through which the visitor can access the experiences of scholars, philosophers, craftspersons, painters, musicians and dancers.

The high-touch interfaces take the form of physical icons, pop-up boxes, body adornments such as jewellery and computing augmented books.

Land of Light, the tech way

Each of these physical interfaces uses embedded computing technology. The user's actions with the physical interfaces are recognised and transmitted through IR technology to a hidden computer nearby. The computer passes the user's commands and translates them into actions such as play a multimedia file, or browse through a hypermedia.

Explains Mr Makkuni, "The basic idea is to bring the user so close to the medium that he actually feels its presence. And unlike in a computer, where the user is situated outside of the display screen. In this exhibit, the user will be inside the knowledge space with a painting or structure right in front of him. It is all his to be explored."

So you might actually be facing a mural painting and rolling a board over it. And as and when the board touches a 'hot point'—a point that has a story behind it—its story will unfold before you. You could get a glimpse of death, be able to permit telling you about a particular glhow. Or, faced with a puppet of Lord Vishnu, the god of death, be able to ward it away with the harp of a string. Or simply be transported to streets selling bangles with just a flick of your coat. The journey, says Mr Makkuni, brings the ancient city of Benares alive in all its unique flavours. In terms of layout, The Crossing consists of a collection of physical virtual spaces, each space interpreting learning themes related to the 2000 year old city, which is still acclaimed as an ancient centre of learning.

"In each learning space, large screens of multimedia imagery surround the visitor. The screens are aimed at creating a sense of envelope that defines physical space as well as providing surfaces for the projection of content.

"Another important aspect of the exhibit, says Dr Madhu Khanna, associate professor at the Indira Gandhi National Centre for Arts and a project scholar with

Crossing cultural walls

YOU ARE in New York, you want to float some *diyas* in the Ganga at Varanasi... all you have to do is go to the "Crossing" exhibit at the Asia Society, stand in front of a large scroll painting of the Ghats of Varanasi, move the little box in a moving red to Manikarnika Ghat in the picture and the box will bring the Ghat live for you. You may not only float the *diyas* being in NY but may also witness a puja and learn all about Varanasi just standing there... by just moving the box on the rod or holding an egg in your hand which will show you pictures as you tilt it.

Sounds incredible? It may soon become a reality and may be on display in an exhibition in your city. Behind all this high-tech wizardry is a pleasant young man, Ranjit Makkuni, a multi-media researcher, designer and musician associated with the prestigious Xerox Palo Research Centre, a world renowned think-tank, responsible for a great many innovations relating to personal computing. Ranjit Makkuni was in Chennai recently to show the new developments to cultural connoisseurs.

After B.Tech from IIT, Kharagpur, and a Masters in Design Theory and Computer Aided Design from the University of California, Ranjit joined Xerox and became part of the visionary group which developed the smalltalk — an Object oriented programming language and the world's first graphic user interface. From that base, Ranjit pioneered explorations in active learning. The 'active learning' projects conduct basic research in new paradigms for interface and presentation and develops cutting edge cultural learning applications.

Ranjit is also the president of the Sacred World Foundation, San Francisco, which is committed to bridging the digital and spiritual divide.

"Why is the project called the Crossing?" Ranjit explains: "In India a pilgrimage site is called *Tirtha* meaning a ford across a stream. And by extension, a cosmic crossing point and sacred place for transformation. Each

centre, whether Varanasi in India or Jerusalem in the west are crossing points that provide people with potent, living symbols of the relationship of man to the larger Cosmos – life and death, matter and energy."

"We are applying decades of multi-media expertise we have in cultural learning to build a museum exhibit that will let people connect to the living culture of Varanasi. Through the design of physical and virtual multi-media learning spaces, and through live multi-media connection to the ghats, as well as interpretation by scholars, mystics and ritual specialists, the exhibit will immerse learners in the transformative setting of Varanasi. Multi-media presentations typically present pre-recorded imagery and commentaries. But the Crossing project exhibit will explore how a learner can connect directly to the priest in the Shiva temple, the pilgrims on the ghats, the boatman in the river and the musicians and dancers in schools, says Ranjit.

> Through "Project Crossing", Ranjit Makkuni wants to develop a unique museum exhibit that will connect you to the culture of Varanasi even if you happen to be in New York.

Ranjit Makkuni's earlier project, 'The Gita Govinda' was shown at the Indira Gandhi National Centre for the Arts in New Delhi, Europe and the U.S.

How is this useful? "One assumes that better presentations mean effective learning. Digital works that are easier to access and understand, encourage people to explore and learn."

So Ranjit Makkuni has developed technology that has gestures or drawing replacing a mouse of a computer and also releasing computer from a rectangular screen with the person sitting in front of it becoming a part of the scene.

He has also built a completely gesture-based, keyboard less computing system. He is also the co-inventor of Hyperpaper, a paper-based media system that explores the synergies between traditional paper and modern multimedia.

So we wait with bated breath! To experience Varanasi in Chennai! ■

V. R. DEVIKA

■ *JA Wijayasinha*
Special to The Nation

FINALLY, COMPUTERS get religion. And with collaborators across Southeast Asia, an Indian technical wizard is mounting "Magic Strings", a multimedia show in which the Hindu goddess of music, Sarawasti, will convey a message of universal cultural and spiritual understanding.

Meet Ranjit Makkuni, 46. He's a sitar player and president of the Sacred World Foundation.

He's also the man who, while studying at the University of California, Los Angeles, teamed with fellow microchippers from Xerox to bring computer-aided design to the personal computer.

"Since people spend so much time interacting with the dull computer, we're trying to create a richer experience so that modern society still has culture in its life," he says.

"By putting culture back onto your desktop, you get to interact with beautiful objects, and that helps you remember your inner God."

Ranjit has produced enthralling digital shows on the Tibetan Thangka Buddhist paintings and Gandhi's teachings. "The Crossings" is an intensive multimedia history of the Ganges River and the ancient city of Banaras.

All have been displayed at leading

HI-TECH AMBITIONS: *Computer designer Ranjit Makkuni hopes to bring more compassion and kindness to society through his art. He's seen here with Thai artist Ittiphon Phatarachon.*

museums and won top international awards for promoting culture, peace and environmental protection.

For "Magic Strings" – forecast for completion in 2008 – Thai artist Ittiphon Phatarachon is helping out with a portrayal of Sarawasti as she wings from India to Burma, Thailand, Cambodia and Bali in Indonesia.

"In Thailand we're looking at the notion of the *kianaree*, the goddess bird who dances in heaven and connects to humans through music via the *chakras* of the body," Ranjit says.

"Because strings symbolise the vibration of the whole universe, and not just

music, you see the world as a vibration and understands how people can connect in harmony."

"The Electronic Sketchbook" of Tibetan Thangka paintings displays the original Buddhist works using multimedia. It explains in a series of mouse clicks the images of the meditating Buddha.

"The Buddha is an important cultural and spiritual learning tool because he teaches us the use of balance in controlling the mind, which is important for peace and harmony in life," says Ranjit.

"The Crossing" is currently on view at the Ars Electronica Festival in Linz, Austria, and is coming to Thailand's National Gallery from December 4 to 30. Showings are also slated for Chiang Mai, Cambodia, Laos, Singapore and Indonesia.

The project connects viewers to the living culture and beliefs that culminate in huge gatherings on the Ganges in Banaras.

"The Crossing' explains how the celestial water, the Ganges, is the source of purification and is the medium of 'crossing' over between life and death, which is not feared," says Ranjit.

"It's important to keep people close to their culture as well as keeping nature alive, because without these spiritual supports, we in the material world are further away from God and our inner selves.

"After all, the world is finite – there *is* an ending," he says, "so let's create another planet by conserving our resources and maintaining important values that will encourage future generations to cultivate good qualities like forgiveness, compassion and tenderness with wisdom."

For more information on Ranjit Makkuni's work, visit SacredWorld. com and CrossingProject.net.

Attn, Kashi has just moved to New York!

Pragya Singh
New Delhi

MULTIMEDIA SHOW TAKES TEMPLE DARSHAN TO NEW TECH HIGH

IMAGINE INTERACTING with your computer through a button on your dress. Or, consider making a long distance offering to the Ganga in Varanasi from a computer that replicates the Kashi Ghats. Depicting the holiest of holy cities through the eyes of a Benarasi, the Crossing Project, a multimedia exhibit for museums in Delhi, Mumbai, London, Paris and New York will change the way we look at interactive technology.

Every single exhibit at Crossing will have a host of traditional craftsmen from India behind it. And the scope of what museum visitors will be able to see is unlimited. For example, visitors in Mumbai will use a model of a temple in Varanasi to point at any part of the real temple. A hidden camera near the temple will transmit relevant sections before users. A museum visitor in New York will be able to float flowers in the Ganga and receive the results of her offerings, live, in America.

The package has been designed by PARC labs, the development hub of Xerox. The Media Lab in India is headed by musician cum multimedia designer cum IIT graduate Ranjit Makkuni from PARC and some 300 Indian scholars, designers, printers, video filmmakers, graphic artists and computer technicians.

The gallery, scheduled to open in mid-April will combine digital technology with art, music, religion and Hindu spiritualism. Though the exhibits are digitally created or enabled, none involve the use of keyboards, mice or other familiar paraphernalia.

Instead, interaction with the digital content will be through a variety of smart, high-touch interfaces such as physical icons, pop-up boxes, body-adornable accessories like jewellery, rings, wearable computers and computing augmented books. Click on the embroidered star on a jacket and a starlit scene in Varanasi will pop up before you... Use a scanner-like device to highlight a Kerala-style temple painting. A screen then shows up with pre-recorded content in the form of scholars comments, or dancers re-enactment of ancient postures etc.

The Crossing re-examines the relationship between the human body and physical space through the combined use of multimedia technology and traditional Indian art forms.

The entire research, development and conceptualisation of the project has been done in India and cost Xerox's invention engine, PARC, $ 300,000 over an year and a half. "This is another first for our project", says

Attn, Kashi has just moved to New York!

Makkuni. "Traditionally, technology has moved from the West to India, and carried with it interfaces that are unique to the West. But we have used designs that are not only sensitive to the human body, but are also India-centric and made right here."

It must be time for a change. "Back when Xerox invented the personal computer", says Makkuni, "we used traditional mediums like the television and typewriter to base the PC on. The human body was gradually isolated from the medium and the object of communication." In other words, though multimedia has enhanced and enriched the output we see and hear on our computer screens and speakers, the input methods remain the same. We still use text-based keyboards to feed in and search for data and mice to click and point. This reduces humans to mere button pushers, constantly clicking and pointing.

Insted, why not use a gesture, or a sound or a movement of the hands to access data? "After all, our hands have produced crafts and expressed emotions since time immemorial."

This is exactly what Crossing will let us do. Ergonomic new interfaces that are graspable and touchable and invite the users to join the exhibition through media beyond computer screens have been developed. Crossing people call these devices High Touch interfaces. So users can draw a figure with a flute, and their computer will show them pictures of Lord Krishna.

Each tool is modelled in shapes that fit the context of a search. One can look at the lingam, signifying Shiva, through the hidden eyes of a lingam-shaped pointing device and camera. The tools therefore, serve not only as means of interaction but also as memory aids. Visitors to the Crossing gallery can even take the objects home and be re-

minded of their powerful learning experience.

But why did Crossing choose Varanasi as the setting? The project scholar, Dr Madhu Khanna explains, "Varanasi, the holy town of 2,000 temples, with its throngs of pilgrims flocking to the Ganga, has ghats that symbolise the interplay of life and death. Understanding life through the ghats can be a transformative and healing process.

The chief human quest is to place the individual within a 'whole'. All pilgrim sites, including Varanasi, are 'power-places' which help modern man resolve this crisis of understanding."

Crossing sees the Internet as representing modern computer society's yearning for the collective. It also provides the tools to understand the relationship between individuals and their universe — something we always thought technology would prevent us from doing.

Marrying tradition to technology

For all that you wanted to know about Banaras but did not know whom to ask just get across to Ranjit Makkuni whose multimedia presentation promises to bring the whiff of Banaras to your doorstep without so much as the click of a mouse!
ZIYA US SALAM *reports...*

IMAGINE A computer that blends with the woodwork. Or think of possessing one without a keyboard or a mouse. Or let your imagination run a little wild and try to stitch a computer into the jacket you wear to picnic or even to meet your sweetheart!

First things first, these things are no longer just a part of the world of make-believe. In fact, for an intrepid man answering the name of Ranjit Makkuni they stem from belief. And gaining from his belief are you and me, for Makkuni brings to us all the magic of Banaras sitting in any corner of India.

And that too without the click of a mouse. So speak to the sadhus on the ghats of the holy city, visit the lanes of Ustad Bismillah Khan, get an insight into the temple architecture or the mythical origin of the city with 'The Crossing', a unique experiment in multimedia presentation which takes communication beyond desktop-mouse and static documents. It aims to open up the next wave of digital document experience by creating a 'living document'.

Makkuni is a research scholar at Xerox Palo Alto Research Center, USA, popularly known as Xerox PARC. Based on PARC's decades of multimedia expertise in developing tools for cultural learning, Makkuni and his team of designers are engaged in putting together thoroughly interactive exhibits that will allow the learners access into Banaras' world of transformation.

Hence the project is titled 'The Crossing'. It is actually a blend of tradition and technology. You may not agree with everything that the sadhus reel out to you or the narrative support for the visuals, but they are still worth spending a few minutes on.

Makkuni's innovation shifts the documentation presentation paradigm from screen-based presentations to digital presentation in 3D, a richer and more dynamic form of surround sight and sound. The interface gadgets (including a specially made coat) which when held in hand and touched unfold the desired environment of Banaras - the ghats, the temples, Shiv lingas, flowing river, the priests, the cremation points and what have you

Ranjit Makkuni... new endeavour.

- that you want to see, to learn more about the mythical, philosophical aspects that are associated with them.

In fact, the guys have designed a mouse in the shape of a Shiv linga whereby one gets to see only a few black switches atop a finely decorated contraption. Similarly, one can create music with the wheel of a

cycle or keep in touch with the world through a few wires smartly interwoven into a fabric jacket, each of which answers to personal touch.

Makkuni has specially set up a media lab of Xerox PARC in New Delhi to develop this project. PARC researcher together with Robotics/ Embedded systems experts from the Indian Institute of Technology, designers from National Institute of Information Technology, the National School of Design along with a network of museums including IGNCA, New Delhi; NGMA, Mumbai; Asia Society, New York are working on the exhibits which will showcase new paradigms showing the relationship of the human body to technology and the sacred dimensions of Banaras. He calls it "cultural learning technology".

Why Banaras? "As the birth place of some of the major religions of the world and rich cultural heritage of classical and folk artforms, India serves as the best experimental lab to bring hi-tech digital documentation

A new 'mouse'.

and traditional art together for building the future technology of learning," says Ranjit. And Banaras, according to him, epitomises that tradition. Here is to more such marriages in future!

Xerox' embedded technology: From fiction to science

Leading Parc researchers are working in India at a specially set up lab with experts in robotic/embedded systems from the Indian Institute of Technology, designers from National School of Design, Ahmedabad, and National Institute of Information Technology. The network of museums including Indira Gandhi National Centre for Art, New Delhi, NGMA, Mumbai, and Asia Society, New York, are also part of the project.

The project was initiated eight months ago and an amount fo $300,000 has been invested in the project till now. Elaborating on the project,

Mr Makkuni explains, "The innovation shifts the documentation presentation paradigm from screen-based presentations to digital presentation in 3D — a richer and more dynamic form of surround sight and sound. The interface gadgets which when held in hand and touched, unfold the environment of Banaras — the Ghats, the temples, the Shivlings, the flowing river, the priests, the cremation points."

For Mr Makkuni, if "it was a unique example of how art, culture and technology converge on one platform", for me, it was simply 'communication beyond the desk top and mouse'. Here is how. On completion of the project, one can manipulate remote cameras and robotic arms in Banaras. For example, manipulating a handheld box painted with a particular architechtural motif causes the Web-based camera in Banaras to focus on a temple constructed in similar architectural style.

Still other commands allow the user to virtually be in Banaras — take part in ceremonies and make offerings of flowers in the Ganges through telerobotics. Incidentally, the embedded system technology allows the use of Internet for communication.

The technology uses high-touch portals like the knowledge-egg, multimedia paper, wearable computing as also portals with embodied user interfaces like tilt-based browsing, gestural interfaces and multi-level physical and virtual documents. There were architectonic space, backdrops, lighting systems, aroma, wind effects, expanding way beyond the boundaries of the screen.

The vision driving the project is the new information paradigm which would make computers a part of the social architecture, a part of everyday objects. The presentation will now travel to different cities in India as also to New York and Los Angeles next year. On completion of the project In September, CD-ROMS and palm documents would be launched as part of the project 'The Crossing, will then finally move the technology from the labs to the people.   ●

BRIDGING A DIFFERENT DIVIDE

PRAGYA SINGH

The problem with paradigm shifts is that you can never make them obvious enough, and they're always hard to explain. Even if the project director of The Crossing, Ranjit Makkuni, puts up a sign saying "Ignore at your own risk" atop the exhibition hall, some of us still might miss the point behind a multimedia exhibition that delves into art, mythology, science and learning. That's probably because India is still used to searching for more utility from technology than ideological shifts.

Ranjit Makkuni, musician, IIT graduate, PARC researcher, multimedia expert and Indophile has finally come up with a near-complete version of The Crossing, which will travel to New York next year and Mumbai by September.

The Crossing is part of Xerox's (The document company) Living Documents project. It re-examines the relationship of the human body to technology. "Traditionally, the computing technology we use has placed human hands a step away from the real action which takes place at the monitor, and placed the human body outside the physical space of a computer. Living Documents and The Crossing change that." He argues that since humans have relied on hands to create works of art that we consider a treasure, modern technology need not invariably mark a shift from that. The exhibition was on display at Xerox's year-old media laboratory near Nehru Place on the 30th. It included interactive paintings, motion-sensitive displays, wearable computers, always-on mobile devices and several other gadgets and gizmos developed under a single theme to represent the holy town of Benaras through the eyes of a Benarasi.

The Crossing has three basic levels — that of technology, that of the content and that of human interactions with both these. Through these three, Benaras is seen as a place of enjoyment and sensual pleasure, as a place of worship and faith through it's ghats, temples and associated myths, as a place of learning, by spanning the various scholars and saints who learnt or taught there from the Buddha to Mahatma Gandhi and as place of death and purification associated with dying there.

The Crossing has also evolved a new way of displaying these digital documents. Instead of disembodied onlookers who are encouraged by today's technology to only push buttons, it immerses the onlooker into a complete experience, through sight, hearing, touch as well as gestures. The interactive devices and new interfaces like touch screens can be manipulated with "smart touch" wireless hand held devices. These devices, when held and touched unfold the desired environment of Benaras—the 40 ghats, the temples, the river Ganga and so on.

The Crossing has been developed as a multimedia cultural learning project. It focuses on Benaras since the city is one of the world's most celebrated pilgrimage sites and has been a centre of learning for over 2000 years. Visitors to the exhibition in November in New Delhi's IGNCA will be able to hear the project scholar Dr Madhu Khanna and several hundred other religious persons, dancers, musicians, scholars and eminent personalities explain the exhibition and comment on it's different facets. More than 300 people have been interviewed and placed on video and audio for the exhibition. Musical forms like thumri (The musical inputs are credited to Ustad Ali Akbar Khan and Mithilesh Jha) and dances from Kuchipuri to Manipuri, Kathak and Bharatnatyam, different scholastic and scientific positions (including Prof Anand Krishna and Ram Shankar Tripathi from Benaras) and the expertise of graphic designers, video film makers, robotics experts and many, many others have been put into the effort of representing the ghats of Benaras.

Another interesting part of the display is that each one of them has been developed in India, right from the conceptual stages to the building of the prototypes. The contributors included Xerox India Software, IIT Delhi, Archaeological Survey of India, National Institute of Fashion Technology and IGNCA.

Ranjit Makkuni

form of pictures of the Ganges taken at different points at different times of the day. "Some of these are completely new in the public domain. The family that owns the private museum Bharat Kala Bhavan has shared some of their private collection with us," beams Khanna.

The second part of the project is Makkuni's questioning of the entire computing paradigm in true Parc tradition. His objective was to remove the current static screen syndrome. The user's experience should be multimedia and spatial. Even in his first multi-media project, a screen depicting how a Tibetan Thangka painting was drawn, the screen was embedded in a chinese wall. In these exhibits too, attempts are made to re-create the spatial experience of the 80 *ghats* of Benaras and the various myths associated with them.

Interaction is achieved very simply — through natural gestures. "Tilt the table top and the display of *mauj* and *masti* in the Benaras street immediately pans," points out Makkuni. Or when you turn, it could trigger off another movement. Take the flat computer screen mounted on a tall swivel metal base on which is engraved a Mithila painting. As you circle around the rotating screen, you get a 360° view of the Benaras *ghats*.

"We are questioning several ideas. The current mouse and screen set up does not have hand-eye co-ordination. You are looking somewhere and you are working elsewhere. Also this interface does not engage the whole body. We want to create interfaces where all this is intuitive," says Makkuni, even as you fiddle with a cycle-rickshaw wheel (the mode of transport in Benaras is the cycle-rickshaw) which is mounted on a tall metal stand.

Each spoke of the wheel contains a clip of *tabla* or *sitar* music. Poke a spoke and a corresponding little blue light comes on and the music plays. Play several of them together and it could be-

come a composition. "We can get a person to create and experience what would otherwise need 20 years of practice. If the notes are rightly placed, you could copy from one spoke and place it on another just by running your hand along. We could transform learning. It could become fun and get you to question more," he says.

Just like paper can be carried around, why not create 'living documents' that can be carried around in objects like rings, or a beautiful art depiction of a Benaras *ghat*, or even clothing? These then take you to the third part of the project: creating technologies like content delivery, robotics, wireless and wearable computing. "We are creating standards here," says Mustafa Siddiqui, an electronics engineer, who till now was working on a GSM project.

Here he has worked on projects such as a box-like device handcrafted in wood and on which is a painted depiction of the *Asi ghat* in Benaras. Press on the image of the moon and it will wirelessly

communicate with a computer and play a video of, say, *Karthik Purnima* being celebrated in Benaras. And, mind you, the wireless follows its own standards that according to Makkuni could be the standard of the future.

The project also experiments with smart materials. The video, for instance, can give the viewer feedback. If you are watching a video of Shiva and are using the box, at some point Shiva could open doors in the object.

This is implemented with a memory shape alloy which gets feedback from the computer wireless and then opens the door.

How would these be useful? "We are only demonstrating and volumes and standards need to be in place. But in future you could have several objects available in the market that allow you different experiences. These objects could communicate to a distant server, a Web camera or practically anything that imagination conjures up and offer an 'experience' right here" is the answer.

You could soon even be wearing technology. The *zari* jacket designed by NIFT student Shivanee Dutt, and Makkuni, is embedded with programmed chips in hotspots. Touch different points and a visual depiction of a Yogi meditating alongside the Ganges appears. This technology does seem to have a lot of potential.

Listen to Makkuni who himself plays the sitar at concerts around the world. "How about a *Raag Yaman* jacket which will play different music based on your *chalan* (movement)? Move your right hand and it will play *antara* (higher octave), move your left hand and it will play *asthayi* (middle octave), shake hands three times and it will play a *tihayi* (a rhythmic cadence)." Or maybe even a jacket which has a bio-feedback. If it can sense your heartbeat, it could play relaxing music from a remote server, if you are getting really worked up.

All it needs are some standardisations and perhaps turning walls into giant display screens. But that is up to the commercial world to worry. Makkuni and his team are just demonstrating what is possible. ■

Xerox' embedded technology: From fiction to science

Saumya Bhattacharya in New Delhi

IT certainly was a presentation with a difference. By the end of it, my preconceived notion of a multi-media presentation being confined to a rectangular display screen lay shattered. For the first time too, I felt the awesome wonder of witnessing the birth of new technology. Spellbound I watched vignettes straight from *Star Wars*: bicycle wheels which produce produce the sounds of sitar and tabla when plucked; an ordinary laminated table which responds to human touch; an interactive jacket which allows the wearer to touch hot spots and see the multi-media imagery play all over the jacket.

None of it was science fiction, however—just applied science from the Palo Alto Research Centre (PARC), Xerox Corporation, USA.

The magic spreading before me was the embedded system technology and smart high-touch wireless information

(From left to right) Project director Ranjit Makkuni — and his magic touch tools

devices developed at the US-based labs— aesthetically beautiful and a much richer alternative to the button pushing, disembodied interfaces being used presently. (Five years from now, I'm willing to bet, none of us will use the 'mouse' in its present format.)

Today's occasion was the unveiling of a 'Living Document' on Banaras, developed by Xerox Parc's Mr Ranjit Makkuni. The project director and researcher used The Document to show the futuristic digital document technology. and brought alive the geography of

Banaras along with its intellectual and artistic traditions.

This cultural learning experience in the form of a museum exhibit — called The Crossing: Learning and Transformation in Banaras — has been developed at Xerox Media Labs in New Delhi.

VIDYA VISWANATHAN

B-15 Chirag Enclave, New Delhi doesn't quite look like a place where a radical technology-interacting-with-culture experiment is taking place. It is a nice, whitewashed, red-roof house with a neat, well-watered lawn. It looks like a pleasant place to live in.

Last week if you had stepped through its front doors though, you would have revised your opinion rapidly. For you would have walked straight into an unusual experiment where technology and culture meshed together to create *objet d'arts* that interact with you.

To describe it as "a multimedia cultural learning experience", as some of the project designers did, would be to severely understate the case. Actually, a motley crew of scientists, researchers, engineers, programmers, designers — product, graphic, accessory and textile — had got together to create a sort of cultural three-dimensional history of Benaras that you can virtually 'experience' instead of seeing it in a flat two-dimensional form.

Walking in, you would have been greeted by a large, colourful and beautiful mythological panel painted by an artist from Kerala. So what's unusual about that? Simply this — you actually saw it by manipulating a browser, a large eye-shaped object which moved on two axes. As it reached hotspots on the panel, a video would switch on in the browser depicting the stories behind the myths with Madhu Khanna, a scholar on Indian religious practices, offering detailed metaphysical explanations.

If you walked further inside you could see a tastefully shot video of women worshipping a tree playing on a large screen with some soulful *shehnai* music accompanying it. You could opt to view the video with your own headphones on a smaller television screen that was mounted on a swank metal top of an understated, terracotta, *dhol*-shaped display created by a Delhi master potter, Giriraj.

In another room, scattered on a table were intricately painted wooden objects — a cosmic egg, *bilva* leaves and *trishuls*. Yet another room was dominated by a mannequin wearing a beautiful *zari* embroidered jacket. In the atrium stood a 'tilty' table on whose top was a moving vision of the streets of Benaras as depicted by a Mithila painter in Madhubani style.

None of these were your average *objet d'arts*. Each one could be 'experienced' because of the technology integrated with it. The software designer, the product designer, the textile designer, each had contributed his unique skills in creating a truly innovative object.

The exhibition was really a sneak preview of a project funded by the legendary Xerox Palo Alto Research Centre (Parc), which has given birth to so many of computing's innovations. And the current project is easily one of the most challenging, given the sheer number of disciplines that need to come together to make it a success.

"The project is truly multi-disciplinary and just like the courses at National Institute of Design (NID). It involves pottery, textiles, graphics and is also interactive," says Kalpana Subramanium, an NID-trained videographer who has spent a couple of months shooting in Benaras.

The entire media lab is the dream project of Ranjit Makkuni, a Parc researcher who has spent over 15 years researching interactive and immersive user interfaces. He spent a year at Parc visualising the project and brought back many technology ideas from there. He calls the whole effort the Crossing project (www.crossingproject.net).
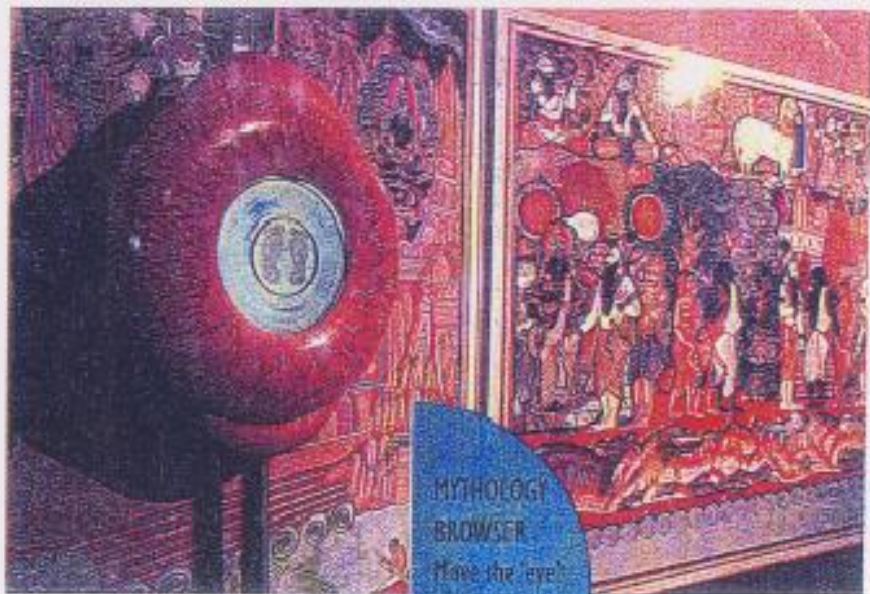
The name of the project has a deep significance. Explains Makkuni: "In traditional societies, a pilgrimage provides the setting for reflection, learning and

ZARI JACKET
Wearable computing is going to be *haute couture* soon

PUSHING

PAINTED BOX Depicting a *ghat*, this can wirelessly trigger a virtual experience

inner transformation. A pilgrimage site is called *tirtha* in Sanskrit which means a ford across a stream or a cosmic crossing point or a sacred place for transformation. Each centre, whether Benaras in India, Jerusalem in the West, or Mecca are crossing points, that provide people with potent living symbols of the relationship of man to the larger cosmos, life and death, matter and energy."

Makkuni's aim was to create a virtual method to 'experience' these crossing points from, say, a distant museum or even from home. Makkuni himself has had multi-disciplinary training. He is an architect from IIT Kharagpur and got a masters from UCLA where he developed software for architecture.

But since 1985 he has been demonstrating new technology to bring alive ancient cultures. The need to get people to 'experience' culture seems to spur him to create technology.

The crossing project too is no excep-

MYTHOLOGY BROWSER Move the 'eye' to make the storycome alive.

A unique project sees technology, art and design meshing together to create an interactive experience

THE LIMITS

TILTY TABLE Shift the table top and pan across the Benaras street scene

tion. It has three aspects to it. On the one hand, it documents Benaras in a way that has never been done before. Says Khanna: "We are going to show the city from many viewpoints. From the boatman's, scholar's, sage's, philosopher's and that of the ordinary person." This documentation will also address multiple levels of understanding. At one level, it is fun and play and, at another level, it interprets the notion of body and awareness. At a third level, it attempts to unravel myths. Like the myths and stories of Ganga.

Not only does it have so many perspectives, it spans a timeline from 7th century BC till modern times. "From Buddha to Gandhi there were several sages, philosophers, travellers, architects, scholars, poets who came to Benaras. We are going to take 40 such people and document them," says Khanna. The people chosen are an eclectic bunch — including Panini, the Sanskrit grammarian, Adi Shankaracharya, Chaitanya Mahaprabhu, Dara Shikoh Aurangzeb's brother, who had the Upanishads translated into Persian — the Daniel brothers who were architects, Mark Twain and Chinese travellers Fah Yian and Huen Sang.

The forms of documentation also vary. The scholars could be explaining the meaning of life and death. Or these could be in the

its accessibility and usability. This would be demonstrated primarily through the Crossing project, which is looking at cultural interfaces based on the traditions of Banaras, as well as a secular example showing street art on taxis in Bombay. And if time permits, I will talk about an authoring tool I am developing in a village, precisely dealing with this issue of bringing in tangible computing and the latest IT methodologies and inserting them in a village context so that these communities can appropriate these technologies at an early stage in the cycle of development and leapfrog into innovation.

MV: People who read this interview on the website and don't belong to this 20%, may feel rather intimidated by the challenge of having to compete with the strong and well-funded technology companies in the developed world. What do you say to them?

RM: The 20-80 is just for the sake of argument. Really we are all one world. If tools and services and products need to be deployed in these emerging areas, and probably they will, then these has to be designed right. Then let's look at all those classical question: let's not forget our heritage, let's remember nature, earth as a mother, let's respect the woman, let's think about minorities, ecology, recycling, not polluting. Let's learn from Mahatma Gandhi: do we need more, or do we need less to do more? These are my design values, my principles, and they are relevant whether you are in the 20 or in the 80. For modern man especially, given that you are interacting with displays more than you are interacting with people. People spend more time in front of a machine display or a keyboard than they spend with a real person. Don't you need texture, ornamentation, mythologies, or culture? These are the classical issues of our times. They don't belong to India, Peru or Mexico. They belong to the whole world. And they are very critical issues as well. We are all in this world together. If you don't pay attention to them right now, they will definitely surface at some point. It is a zero-sum game. If you delay, it doesn't mean that the issue will go away. These issues are rightful issues and they are critical to the future of design.

MV: Thank you very much.

Ranjit's favourites:

People I draw inspiration from
1. Louis Kahn, architect
2. Ali Akbar Khan, musician
3. Ludwig van Beethoven, musician
4. Adi Sankara, philosopher
5. Sri Ramakrishna, mystic saint

Favourite books
1. I don't read books
2.
3.
4.
5.

Favourite websites
1. Victoria and Albert Museum
2. Doors of Perception
3. MIT Media Lab
4.

the building I guess –software – which is money, but also talent, faculty and research. You mailed me all these beautiful postcards of the research and I was really happy to see such a diverse body of work emerging so quickly. What is more important is that design is driving innovation here in Ivrea. This may be one of the very few institutes where design with a substrate of technology is driving innovation, and this as opposed to the classic situation where computer science driving innovation and where the there the designer gets called in when there is a problem, for packaging or the last mile of design. Here designers get to do the first mile. Given the right combination of implementers and designers, something great could happen here.

MV: You are also getting involved with students' work and sharpening their thesis concepts?

RM: Yes, I am having a lot of fun, talking to the students and looking at some neat ideas, which are emerging. For example in the mid-eighties and nineties we were talking about learning through peripheral participation-some of the work that's been happening at IRL. And it is really touching to see a student build on this to use devices to deliver in situ learning, for example. Or the whole question about creating clouds of information, as mobile devices become GPS friendly. It's really nice to see such ideas come out. Each of these, for example, and there are many more to come, are powerful approaches that have applications beyond just the thesis.

MV: We have 24 nationalities here at the Institute. And there is a large contingent of Indian students here. We have six Indians, the third largest national body of people here after Italians and Americans. You know several of these students, some that you met before, one you actually worked with. Do you see or feel a specific Indian sensitivity coming through in their thinking or work, or is that not so relevant here in Ivrea?

RM: There are a lot of things that India could teach you, because it is a nature based traditional society where interaction with the elements is of great importance. Some of these ancient concepts are now being validated by contemporary ecological thinking. That is a default, regardless of whether there are Indian students here or not: we ought to be thinking about the environment, we ought to be thinking about gender issues, we ought to be addressing all these great design needs. This has nothing to do with India. But India certainly can offer, because it's had 2800 years of real tradition dealing with thinking about nature. One example is India's goddess traditions, which is in fact ecology personified so that man's relationship with nature can be celebrated. That is a global issue even though it may have originated in India. Now more specifically about the Indian students: if they were to go back to India, it would be really fantastic if they were to work on developing computing appropriate for India, help traditional communities appropriate concepts of tangible computing and help reverse the digital divide. That way Interaction-Ivrea will have empowered these students to become tangible computing designers, to go back to their communities, and to spin off other designers. And while the Indian students are in Italy, I am sure they carry with them a rich worldview that can contribute to all kinds of design fields.

MV: What will you talk about tomorrow night?

RM: Tomorrow night, I think I titled my lecture 'culturally reflective computing' which is looking at developing culturally reflective interfaces for the rest of us, which is those four billion lying across the divide in emerging nations and emerging economies. As computation migrates from developed nations to developing nations, it's very important that

something larger and to transfer something back, which you call the reversing of the digital divide. Can you tell us something more about this approach? Can you give us some examples of how this approach could be relevant for an audience or a group of people outside of that specific cultural tradition?

RM: I think there are two questions here. The first question is what we call in situ research: do we do research in the abstract or do we do research based on a concrete situation? Because of my personality and my past track record, doing an in situ research-that means having a focused theme with real goals, real applications and real aesthetics-allowed us to study a larger cross-section of the problem. Rather than going at it abstract and trying to solve all the cases and then trying to figure out the instance, I'd rather work with the instance and going to the class.

MV: Bottom-up.

RM: Yes, bottom-up. One can argue both ways. But in situ research has worked very well for me. But there is also a larger question. This exhibition and the workshop, made us realise how important it is that we do not accidentally dump Silicon Valley concepts onto developing nations. That is the digital divide question. If you can create a methodology, by which cultures can create their own forms and their own operating systems, then that will be very important towards healing the digital divide. I think you reinforce the digital divide by forcing people to think about Silicon Valley concepts and black and beige boxes. If the net goal is communication, usability, pleasantness, then you got to make sure that users get a say in the design of the technology that's being thrust upon them.

MV: So one approach you take is concrete: working on alternatives to the Graphical User Interface that are more intuitive for non-experienced users like there are all over the world-not only in India by the way. The other one is more strategic: developing a methodology for how you can design culturally relevant technologies.

RM: In the Crossing project, we communicated the multiple layers of Banaras through tangible computing. I am sure that there is a critical mass in the work that is happening in Ivrea and in MediaLab. There are a lot of people working on tangible computing. Whether it's called pervasive computing or ubicom, it's all tangible work. Now given that there is such a critical mass, why could we not develop a framework to create authoring tools so that more and more people can create applications-a framework to author compositions using such tangible devices. If you were to reflect on the practical experience here in Ivrea and take the results of the very diverse applications of tangible interfaces a bit further, well, maybe there is a revolution waiting to happen here. Like the way personal computing came. Suppose you could figure out a way that you can take the abstraction and hand it to a list of people, so that everyone can create their tangible application. There is a lot of potential there.

MV: You are now in Ivrea. I think it is the third time that you are here now. You have seen the evolution in the Institute from, I think, a construction site to the second-year students now developing their theses. What is your impression of the developments going on here and what are you specifically involved with during these few days that you are here?

RM: I am actually really pleased to see the Institute's vision

traditional connection: pilgrimage, symbols, interaction with the elements, how one integrates with nature. Banaras as you know is a place that many Indians consider the ultimate destination, where you cross over from the rounds of rebirth so that you never come back. It has a transcendental quality. The exhibit is divided into themes relating to the sacred city, from the good life on the streets, the joy of living and happiness, to issues of transcendence. These themes are expressed through traditional cultural forms embedded with technology, designed with craftsmen. The designs will unlock the content.

MV: So people saw interactive displays shaped within a traditional ritualistic form?

RM: That's right. Our forms were derived from time-tested forms and ancient visions. When we later analysed them, we realised that they were actually highly contemporary. The form of the egg for instance, is an Indian symbol of the cosmic primal state of the cosmos, but is also derived from the form of the concavity created by clasped hands. The pot is a symbol of the goddess Ganges, and represents fertility, fecundity. It is also a cosmic primal form, but if you hold it, it communicates: certain things will happen to you, you feel compassionate. There is an iconography in this connection to the forms. We are trying to make sure that modern man has a connection to these primal forms, so that you remember eco-consciousness, as the goddess is a personification of nature, for example. Holding the pot is a way to remember both the fertility of nature but also a contemporary element. This happens at both the content level as well as the form level.

MV: Was the exhibition targeted towards the more urban Indian who was perhaps disconnected from these ritualistic traditions or towards the people who participate in these traditions but are not very well in touch with technological possibilities that could be relevant for them?

RM: Actually, it is both. Our exhibitions were in urban cities. And urban cities by default had the advantage of allowing us to disseminate the value of tradition to people with modern sensibilities. We also had workshops with village children and underprivileged children, children from the slums. There we realised that these interfaces without keyboards, mice, multiple overlapping windows, and cut, copy and paste commands, are actually quite natural for people to relate to. People found it much easier to interact with traditional cultural forms with embedded computation, tactility and tangibility, than with keyboard and mouse. In hindsight, we reached out to both audiences, although we set out to educate the urban audience about mythology. We realised that these are forms, which can bypass any form of contemporary computing access. Our work did, in that sense, achieve a culturally reflective quality and this may be the way for people who are illiterate with respect to English and to understanding files and folders on the screen, to easily access the magic of computing.

MV: In a workshop currently going on at the Institute, second-year students have been asked to develop a personal communication device for somebody they know. The design is therefore highly personal, yet based on the underlying thinking that if you develop something for a very specific person-a friend, a family member-some of the lessons learnt can be transferable to a large group of people. And in fact, that is indeed the case. All the projects have relevance for a larger context. It strikes me that your approach is somewhat similar. You develop culturally relevant technological devices for a

foundation there. How did you make that decision and what are you working on in India?

RM: The Sacred World Foundation, as the name implies, is about realising a sacred world. We are documenting the world's sacred traditions through digital media. But there is a larger theme behind this: 20% of the world controls 80%. The 20% defines and produces the technology and the design of the technology for the whole world. The other 80% is situated in a social discourse, in traditional interaction design, but have no control on the forms of expression of the technology. Can you build bridges between the two worlds? Another way to put this would be through the digital divide argument. Can you design for the remaining four billion and can innovation arise from those people? The Sacred World Foundation is trying to develop bridges of understanding because we believe that both sides need each other. It's for the mutual benefit of both to build technology that is integrated with art and culture, and have culture reinforce technology. In the context of developing nations, it's about culturally-reflective, culturally appropriate computing. In the context of modern man, it's about the need for bringing ornament and sensuality back in a world, which would otherwise homogenise its users through black and beige boxes.

MV: How do you do that?

RM: The foundation's projects would generally focus on a very highly expressive domain, such as for example Chinese art, the goddess Guanyin or the sacred city of Banaras. These are all domains that are highly rich and force designers to respond to that rich content, provoking better and richer designs. Second, since I am in India, I have the option to include the world's traditional designers in the process itself: craftsmen, artists, painters, musicians, dancers. So you get to get a much richer result. I really believe that these craftsmen are designers. But instead of disenfranchising them, can we just include them in the loop? Our project team's aim is not to creating a mass-produced technology, but rather to make sure that there is sufficient variation, so that the resulting technology is not homogenised and mass-produced.

MV: Can you give us an example of a project that you have developed with this approach?

My recent work, the Crossing, is looking at new forms of hardware and mobile devices that unlock the symbols, spaces and interpretations of Banaras. This would be an example of a project in which there was multiple layers of design: from crafts, to metal work, to wood crafts, to paintings, to all the stuff that we do with embedded programming such as in situ embedded audio and graphics, to video, to graphic design, to multimedia design—all of this integrated to create very rich experiences.

MV: Can you describe the experience? If people walked in, saw the Crossing, what did they see? What did they experience?

RM: The Crossing project exhibition ran during the era prior to tangible computing and Ubicom [Ubiquitous Computing]. It explored mobility, gesture and what the notion of connection means for a traditional society. Traditional societies gather around pilgrimage spots. Banaras is such a pilgrimage spot where large gatherings of people cross over into the world of transformation. Whereas a cell phone or digital technology are modern forms of connection, Banaras stands for the traditional connection. How do you intersect the two forms of connection to create a new form of art? When you enter the Crossing exhibit, you would see these two themes. You have innovative interfaces using gesture, hand-

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Interview with Ranjit Makkuni
REVERSING THE DIGITAL DIVIDE
Wednesday 22 January 2003

Interviewer: Mark Vanderbeeken, Interaction Design Institute Ivrea

*Ranjit Makkuni is one of the Explorers of Interaction Design Institute
Ivrea. He is now visiting the Institute and will be giving a lecture
tomorrow. This interview gives those who can't come to the talk the
opportunity to know more about who he is, what he has done, and
what he will be talking about.*

**MV: You have quite a unique life story. You are from India, went
to work in San Francisco, became involved with pioneering
interface development, grew into an interaction designer and
are now back in India. Can you tell me a bit more about that?**

RM: I have been involved with interaction design at multiple levels. My
undergraduate training was in architecture, a discipline of interaction,
with space, the elements, the landscape, be it without computing. My
Indian context itself is also relevant in my growth towards interaction
design because there is a strong ritual tradition, which values and
celebrates the five elements-earth, water, wind, fire and space-which
form the vocabulary and substrate of expression in traditional society.
Integration and interaction with nature are fundamental. Then I went to
Los Angeles to study architecture. There by (happy) accident I got
involved with the early age of computer aided design, where the focus
was on CAD programmes and representation of designs. Since these
were the early days, we were in fact inventing the field of CAD. Then,
Xerox PARC hired me into the SmallTalk group, which had a focus on
user interfaces. The first notion of user interface came from this group.
They invented the GUI (Graphical User Interface) and Windows. In my
nearly 18 year career at PARC, I graduated from design to multimedia
tools that relate to the body. My unique contribution at PARC was the
study of how the hand, the body interacts with both hardware and
software. In terms of hardware: I explored why hardware itself cannot
become a communication device instead of being just black and beige.
Interaction design after all doesn't start on the screen, but much
beyond at the hardware level. At the software level, my focus was on
the hand gesture? What happened to the individual signature that one
would find in a Chinese calligraphic painting, where you could see the
brush stroke inside the painting. What happened to all those
dimensions, which have been excluded from modern software? So
these are the different levels of interaction design that I bring to bear
starting from the traditional interaction design with India, architecture,
design to CAD, to artefact representation, to body-friendly and hand-
friendly software and hardware.

വി. ജയദേവ്

ശാസ്ത്രം
ചരിത്രം
സമന്വയം

Knowledge egg

Move over buttons, windows and mouse, a new breed of interactive devices has arrived

The bearded figure with a rudraksha chain round his neck urged the villager to lean closer to the wheel of the rickshaw. The boys who gathered around egged him on. As the villager ran a tentative finger over one of the spokes, a brief, melodious sound of the sitar was heard. Amused, he took a swipe at another spoke and there was a tabla beat. The audience at the presentation of 'The Crossing—Living, Dying and Transformation in Banaras', by the yogic Ranjit Makkuni, had just been introduced to the delights of technology. It was also a moment of truth for Makkuni after 17 years of research at the Palo Alto Research Centre (PARC) of Xerox Corporation in the USA.

He quickly drew the crowd to another device; a cycle rickshaw fitted with a monitor and painted over with Indian motifs. Pedal the vehicle, and it starts you on a virtual tour of the busy streets of Banaras. As the rickshaw enters a crowded intersection, you almost reach out for the bells to ward off pedestrians. If you have a destination in mind, all you have to do is to check out the directions from the sanyasins sitting at street-corners!

Makkuni meanwhile hands over a big knowledge egg, the *mouj masti*, and awaits the response. It is spontaneous: the shape of the egg itself amuses the children. The device, a smart, high-touch user interface, is embossed with scenes from mythology. It acts according to the user's wishes beaming images produced by physical interface and transmitting them through infrared technology to a hidden computer nearby. Press a button and you are transported on a virtual journey through the innards of Banaras; tilt it and you move into a left alley or a cul-de-sac. Every action produces a reaction—the computer translating the user's touch, browsing through a hypermedia database and responding through the interface. "It was an experiment to alter the traditional books," says Makkuni. "The *mouj masti* showed us that children learned faster and far more attentively."

With the telerobotic equipment you can manipulate remote cameras and robotic arms by using a hand-held box and, through this, the user can participate in ceremonies like making offerings in the Ganges and in experiences on the street.

Makkuni seeks to bridge technology and art, advancement and tradition. "I have always been inspired by God. In fact, during my long stints in research and development with The Crossing, it was Lord Shiva who energised me," he says. Unmarried but wedded to the

cause, Makkuni, 42, is seeking salvation in the holy city of Banaras by delivering *moksha* to millions of the 'uninitiated' through a new breed of devices quite different from the buttons, windows and mouse. He has blended technology with philosophy to inspire learning.

'The Crossing' has three references—*tirtha* (pilgrimage), technology and design, shadowed by the powerful posture of Lord Shiva. "In *tirtha*, one is in journey mode, crossing a stream, a cosmic point. In technology crossing, one matures or moves away from traditional technologies like keyboard and mouse to gestures and touch. In the third, design crossing, we overcome the traditional limitations and ideas in computing and display means to come out with new, identifiable designs," explains Makkuni.

But why Lord Shiva and Banaras? The technologist, who is also a musician, passionate sitar player and disciple of Ustad Ali Akbar Khan, explains his philosophy "Pilgrimage is time for

Cyber guru: *Project director Ranjit Makkuni*

reflection, learning and inner transformation, and each centre reflects the relation between individual and the whole and is invested with cosmic significance. Banaras is one of the world's oldest cosmic sites, deriving its sacredness from the ultimate association with Lord Shiva. It is believed that the Lord lives in Banaras to liberate the ignorant."

The holy city has 2,000 temples dedicated to Lord Shiva, who is visualised as an ash-smeared yogi, meditating in the cremation ground and eternally bestowing grace and liberation on his devotees. "The Banaras ghats present an incredible multimedia theatre of activity," says Makkuni. The Ganges, the skyline, the pavilions of learning, pilgrims performing rituals and fires of cremation—all make a rich multimedia experience. "Banaras ghats and activities provide the spatial periphery; the myths and metaphysics of Shiva the physical

periphery. The exhibit will incorporate both virtual access and spatial design," he sums up.

To depict architectonic space, backdrops, lighting systems, aroma and wind effects, there was a need for broadening the basic display notion. He came up with wearable forms of communications to overcome such constraints. "To provide kinesthetic-based interactions with The Crossing content, involving the whole body, the project is looking at a range of high-touch interfaces such as computer-based clothing and craft objects through which one can access the content," he says. These act as portals as well as memory aids. The living documents shift the presentation medium from screen-based to rendering digital presentations in 3-D, physical space, engaging the body's natural ability for peripheral awareness.

The Crossing is expected to help students, IT experts, scientists, technologists, the art and culture community and millions of pilgrims who are keen to learn rich Indian traditions through Banaras. "We go down to Indian villages to spread the message of The Crossing, taking the learning space to communities," says Makkuni.

He is seeking state government and Central agencies' participation in his projects. "I would be grateful if they can provide me some learning space through greater participation and access. I am sure the project will pay ample dividends by educating the masses in the remote, rural areas," he says.

His next project is a virtual documentation of Rajasthani culture and other sacred places. He singles out examples like Theyyam in Kerala and Rameswaram in Tamil Nadu as ideal and dynamic

visual learning material.

Makkuni, a B.Arch from IIT Kharagpur with a Master's in Design Theory and Computer Aided Design from University of California, challenges the customary notion of multimedia presentation—the display of objects on a rectangular screen. He had earlier collaborated with top scholars at the Indira Gandhi Centre for Arts to develop Gita Govinda Multimedia Experience. This was ten years after his much acclaimed efforts in bringing out an electronic sketchbook on Tibetan Thangka paintings in 1989.

Spreading the message of e-learning in India is no mean task. "We are looking forward to a scenario when a child in a distant village can do a graphic using our device. It would mean challenging all traditional beliefs, methods and systems to redesign the learning source and space. I am also looking forward to the day when India designs its own computer, in its inimitable style," says Makkuni. It could be in the shape of a Shiva ling, symbol of both knowledge and power. Or, like the eternal Maya, there would not be any shape or form to it.

P. Sreevalsan Menon

Handle with care: *The high-touch user interface 'knowledge egg' embossed with mythological motives*

Virtual ride: *A monitor mounted on a cycle rickshaw ready to take you on a visual interface through the streets of Banaras*

People continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free and where people are continually learning to learn together."

These lines by Peter Senge could very well have been written for the research team working at New Delhi's Xerox Palo Alto Research Center (PARC) office. Together they are creating what they call, 'A living document', which is basically an innovative experiment in multimedia presentation.

To explore this unique interactive experience in learning, where the body becomes an extension of technology and instruction goes beyond the desktop and the mouse, Xerox PARC has chosen the ancient city of Benaras. Christened 'The Crossing, Learning and Transformation in Benaras,' it is an interesting experiment in how art, culture and technology can converge on one interactive platform.

Though the project is yet to be completed, a preview of its potential in New Delhi recently showcased the innovative shifts in the documentation presentation paradigm from a usual screen-based presentation to different 3D, digital formats. There were not one or two, but a number of technology-driven tools that made the history, geography, culture and ambience of Benaras come alive for the viewer. The interface gadgets consisted of wireless, mobile computing boxes and screen, a physical browser, a wearable computing garment and a music wheel.

Each one of them, when held in the hand or touched, unfolded a world of learning – the temples of Benaras, it's ghats, rivers, priests, cremation points, weaving traditions, music and mythology in the most interactive manner. " As the birth place of major world religions and rich cultural heritage of classical and folk art forms, India serves as the best experimental lab to bring hi-tech digital documentation and traditional art together for building the future technology of learning," explains Ranjit Makkuni, a leading research scholar at Xerox PARC who

Learning @ The Crossing

Preeti Mehra reports on a unique project undertaken by Xerox PARC where art, culture and technology converge to create new paradigns in interactive learning.

has specially set up a media lab in New Delhi to develop this project.

For the experiment Makkuni's team is also hundred per cent Indian. It includes Robotics/Embedded systems experts from the Indian Institute of Technology, designers from the National Institute of Information Technology and creative professionals from the National School of Design. Assisting them in the project is a network of museums including the Indira Gandhi National Centre for the Arts, New Delhi, National Gallery of Modern Art, Mumbai and the Asia Society, New York.

What was it be experiencing the team's high-touch interfaces? At first very confusing, *k/you* wondered how the gadget functioned and would it really be effective in conveying what it's trying to. Is in hindsight, the experience was memorable, with a high recall potential. That is what obviously makes he interfaces effective tools of learning and bring alive a subject.

Take for instance the hand-held, book-like device palm, with an aspect of Benaras culture. To get behind the painting and learn about the historical symbolism of one tree, plant, temple etc. all you have to do is gently press the defined icon spaces. Lo and behold! you have the entire mythology and history of the icon.

Next is a computing garment embroidered in intricate zardozi and worn by a mannequin. Within the floral design are hidden press buttons which, when touched, set off a historical journey on an accompanying digital screen. The interactive device not only teaches, it fascinates.

The 'magic eye' device also makes for exciting, interactive instruction. A large canvas painted with the temples, ghats and mythology of Benaras serves as the teaching backdrop. A movable computing eye can be shifted on it, up and down, side to side and reveals the historical background in each icon. For instance at a temple, the computing eye will turn into a video screen and provide you a commentary along with someone actually performing the classical dance of that particular period.

Then there is an ordinary-looking spoked wheel, which when touched makes the music of a bygone era. Side by side lies a flat digital screen that seems to extend from outwards from one's body and provides the ambience of the subject. In this case, one experienced an aspect of Benaras and 'the crossing.'

The Crossing Project, however, will only be complete by September this year and this physical/virtual multimedia exhibit is slated to be showcased in India, Paris and New York.

However, this is not Xerox PARC's first initiative in India. In 1997 Makkuni was acclaimed for his multimedia effort at the IGNCA, New Delhi. Known as the Gita-Govinda project, it was a collaborated effort with well known scholars, artists and designers to develop a multimedia exhibit based on an 12th century lyrical Sanskrit poem Gita-Govinda, the project won an Interactive Media Award from the ID Magazine, New York.

Makkuni's second project that made waves was an Electronic Sketchbook of Thangka Paintings, which served as an interactive exhibit at the Asian Art Museum, San Francisco. "The museum visitors used the electronic sketchbook to penetrate the 'outer' form of Tibetan paintings to access the world of the 'inner' process," reveals Xerox PARC.

The current project is no less ambitious. It promises to change the face of museums and learning, technology in the world.

And Benaras may be it's via media – the crossing. ■

Pictures: (Clockwise from top) Ranji Makkuni, a research scholar at Xerox PARC, New Delhi; a hand-held interactive device that chanitrises Benarasi culture; the spoked wheel creating music of a bygone era.