



# **JURY'S SPECIAL RECOGNITION AWARD**



## VANTIKA DIXIT

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***Vantika Dixit won the PoleStar Award for 2010 for her article, 'Digital Resurrection of Indian Heritage', which appeared in Technology Review (India Edition), dated May 2010.***

Vantika Dixit is Associate Editor (India Edition) of Massachusetts Institute of Technology's (MIT) Technology Review magazine. She began her career with Hindustan Times continuing with HT Broadband channel, HT's online UK edition and India Today's Men's Health magazine. She has also worked as a book editor for some of India's leading publishers such as Prentice-Hall of India, Oxford University Press and Tata McGraw-Hill. Vantika holds a B.A. Honors degree in English Literature from Miranda House, University of Delhi.

# Digital Resurrection of Indian Heritage

Vantika Dixit

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## Digital Resurrection of Indian Heritage

A 3-D APPLICATION THAT CAN RECREATE VIRTUAL HISTORY IN REAL-TIME.

By VANTIKA DIXIT

Imagine getting the power to recreate history as it existed 500 years ago and witness it today in real-time. Ramachandra Budihal, founder of Mahabharata Research Foundation (MRF) and India Innovation Labs, Bangalore has developed an application to make this possible. His software together with a 3-D console can enable users to experience the past in present, virtually.

With interest in cognitive science, augmented reality, humanoid robotics as well as history and heritage of India, Budihal is a solution architect and researcher at Wipro Technologies, Bangalore. Along with a team of 10, he has developed a software application that computes human gestures into virtual reality.

To execute this application, the user needs to wear a pair of 3-D glasses fitted with a camera. As the user sees through the 3-D glasses, his or her hand gestures are captured by the camera on the console and are wirelessly transmitted to the

computer where the program is stored. Accordingly, the program inserts artificial information in real time and presents it to the user as an information layer on top of the real world view.

"Human beings communicate with symbols, speech, sound along with gestures and expressions. We sense visual, auditory, tactile (touch), olfactory (smell), and gustatory (taste) stimuli. Our actions are dynamic and dramatic in space and time. We at India Innovation Labs are trying to explore if we can extend the human computer interface technology by incorporating tactile and olfactory perceptions into the system," explains Budihal.

He has created Digital Hampi - a project in which his application has been put in use to not only bring the ruins of Hampi to glory, but also to allow users to virtually experience the era and see the monuments that were present then but are broken now. Digital Hampi is an Indian public private non-profit

partnership project, with international cooperation, to holistically resurrect Hampi digitally.

### HISTORY

Hampi, a World Heritage Site since 1986, used to be the capital of the last Hindu kingdom of Vijayanagar which flourished under the rule of King Krishna Deva Raya (1509-1529). The kingdom's Dravidian temples and palaces won the





1. The E3IT software together with a 3-D console can enable users to experience the past in present, virtually.
2. The rear view of how the 3-D console may look like.
3. When the user makes hand gestures the camera on the console captures it and wirelessly transmits it to the computer where the software is stored.
4. The E3IT software inserts artificial information in real-time and presents it to the user as an information layer on top of the real world view.

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admiration of travelers between the fourteenth and sixteenth centuries. Conquered by the Deccan Muslim confederacy in 1565, the city was pillaged over a period of six months before being abandoned (UNESCO World Heritage Centre). The site, now in the Bellary district of Karnataka, also holds great importance according to the Hindu mythology, *Ramayana*.

Budihal's efforts are marked towards preserving the unique history and heri-

tage of the site. His Digital Hampi project was first demonstrated at TEDIndia conference on November 4-7, 2009 in Mysore as a proof of concept. Much of the project work is still in progress.

#### TECHNOLOGY

The software application developed by MRF, as part of the organization's aim to contextualize India's ancient wisdom and knowledge, is called E3IT (engage, enter-

tain, educate, immerse, and transform).

The E3IT application is enabled with GPS to detect the user's location and navigate accordingly. The software enables the user to create a profile and customize the kind of information that should be delivered. For example, while an architect would receive the guided tour with architecture details of Hampi, a historian would get all historical details of the same place. The application will also comprise



5. The ancient scripts on palm leaves and paper. The E3IT application can show user the scripts that were written during a particular era, along with the translation in the user's preferred language.

features such as voice recognition, pupil recognition, and content delivery in 10-12 languages initially.

Some of the key aspects of the technology are digital time machine and immersive modes. The digital time machine mode delivers mixed reality digitally. It allows users to set the date back in time and see what existed on that spot at that specific time of the day. For example, if the user is in front of a broken temple structure in Hampi at 6 PM, setting a date back up to 500 years he or she will see how that temple looked like and what used to take place at the temple at 6 PM, 500 years ago. However, the time machine content is close to reality. "The content for the entire experience has been collated from extensive literature that is available to us. As far as the time and exactness of rituals are concerned, there will be some fiction associated with it to complete the story and give user a feel of that era," explains Budihal.

The immersive mode is a step ahead. It actually creates virtual structures and through the exo-skeleton - a robotic arm - allows the user to feel the virtual reality and hear the sound. In Hampi, the musical pillars of the Vijay Vittala Temple are famous for producing

sounds of different instruments. However, now they are prohibited to touch as the structures have become fragile over the years. With the E3IT application the user can make a gesture and see virtual musical pillars. It even allows the user to hit the virtual pillars by exo-skeleton arm and hear the same sound that the real pillars would have produced.

The user could also use the general guided tour or a free roam mode to see around the site. The application even allows users to virtually scribble on monuments and save it for future generations - a feature that is meant exclusively for Indian tourists who are fond of scribbling their names on monuments. Through the application the users can also track their group partners in the vast site. Each user can interact and show his or her partner what he or she is seeing at a different location. They can share photos and video in real time.

The feature intensive application showcases both tangible and intangible past. On demand, it is even capable of showing user the scripts that were written during a particular era, along with the translation in the user's preferred language.


Budihal has been working hard for

past 15 years on digitizing Indian scripts. In 2007, he received the Badrayan Vyas Samman award from then president of India APJ Abdul Kalam for digitizing over a million of ancient Indian scripts and for developing digitization technologies for promotion of Indian classical literature.

"India will have to remain India in order to be a change agent in the new world and the new economy. For this, as Indians we should know India, its people, culture, and heritage better than anyone else. The power of being traction of its culture is what people call as the soft power that influences and tracts other countries in the twenty-first century. India has infinite powerful stories that are imbibed in its ancient manuscripts. It has the world's largest number of manuscripts. If we do not value and save them, we will lose our foundation and source of strength to tract other nations, and perhaps even our greatest identity as a country with immense knowledge heritage," says Budihal. He plans to build similar kind of extensive data on historical places.

**WORK IN PROGRESS**

"Much work needs to be done before the final prototype is ready in two years. By the final stage we want to make the application capable of capturing emotion and have better touch capability. We would also be developing the device ourselves along with a complete suit that can give the user a complete experience of traveling in time," says Budihal. The MRF will be filing many patents for the technology.

The first prototype of the digital travel guide is expected to be ready in 2010 in commemoration of the fifth centennial coronation of Krishna Deva Raya. 

SHRUTI SUJAN