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ORIGINS OF

UNDERSTAND
THE ZOMBIE
APOCALYPSE

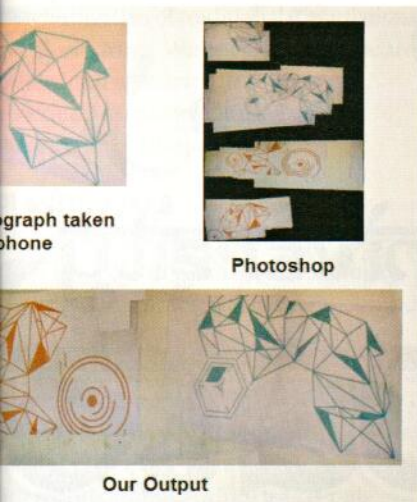
COVER STORY

- 20 promising Indian startups
- 14 problems India needs to solve using tech
- 10 things in tech we wouldn't have without Indians
- 5 cutting edge research initiatives from Indian institutes

Our Tech Story

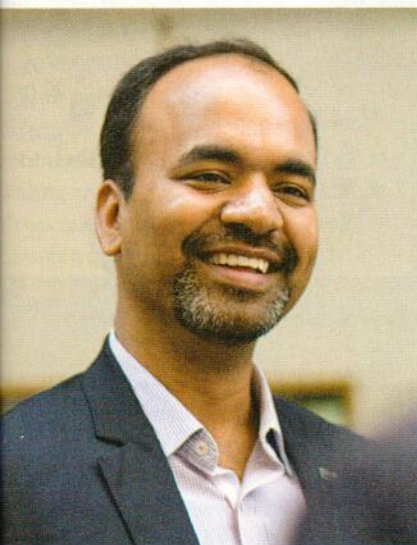
Celebrating India's contribution to technology: past, present and future





technique used in 12 courses in India and abroad. The most recent of those is a MOOC on History and Philosophy of Science by the National Open University of Nigeria. mooKIT has also been adopted to run courses in the blended mode (Flipped classes) at IIT Kanpur.

The connectivity challenges of users in a developing country include frail, unstable connections that aren't able to stream video, and are expensive to boot. mooKIT has an indicator showing the current bandwidth of the internet connection, quite like the bars we have on a cell phone. This gives a visual indication to the student if the connection is bad, and she can use other content delivery options that mooKIT provides - for example, stream only audio and play it in sync with the slides, which is often very close to the video experience. If the



Professor PK from the Precog division!

bandwidth is too low for that even, you can receive a call on the phone and listen to the audio from there!

A unique feature is the integration with social networking platforms such as Facebook and Twitter. All discussions in the course automatically get posted on a FB group, and also go out as tweets.

A very powerful analytics interface is available to give insights on course activities. Instructors get sophisticated information related to the level of involvement of each student, and also get predictive assessments related to these. Sentiment analysis can be performed on forum posts to analyse the satisfaction of students.

mooKIT is built entirely using open source technologies, and the core engine runs on the MEAN stack, making it extremely scalable.

FIND MALICIOUS FB PAGES

Facebook is home to your friends and family, and also to hostile entities who post malicious content. Because Facebook is such a vital part of our lives, we need to identify and stop them.

Precog is a group of researchers from IIT Delhi who work on different aspects of social networking (yes, the name is intentionally from *Minority Report!*). Praateek Dewan, Ph.D Student, Shrey Bagroy, an Undergraduate student, and Prof. Ponnuram Kumaraguru (PK) from the group have worked on identifying such malicious pages that published untrustworthy information, misleading content, adult and child unsafe content, scams, etc., and have submitted their findings to at IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM) 2016, where it has been accepted.

"We scanned close to 400 thousand Facebook pages and leveraged Web of Trust's (WOT) crowdsourcing mechanism to identify pages which engaged in spreading any such malicious content. We identified over 600 Facebook pages which posted malicious content at least once in their one hundred recent posts. Upon comparing the behaviour of these 600 odd pages with an equal random sample of benign pages, we noticed that malicious pages were not only more active, but also very well interconnected within themselves as compared to benign pages.", explains Prof. Ponnuram. He adds,

"We also noticed differences in the textual content posted by malicious and benign pages. We then built an engine to automatically identify malicious pages from the benign ones. We used bag-of-words based neural network model which could automatically identify malicious pages with over 84 per cent accuracy, looking at only a hundred posts worth of textual content published by a page"

Though the research is based on the last 100 posts of a particular page, it can be extended to the entire history of that page, depending on how much computing power is available. Plus, since malicious pages might switch to sharing benign stuff



The mooKIT team - Front(L-R): Revathy, Deepak, Tulika. Back: Prabhakar, Gaurav

every now and then, a self adaptive model is needed. As a whole, this method sets an exciting precedent for automatic content monitoring and filtering.

ARSENIC PURIFICATION

Availability of potable water has been one of the most persistent problems in India. And with growing industrialisation and lack of proper regulation, even pristine rural landscapes are falling into the categories of polluted areas. One such significant type of pollution is arsenic pollution in water bodies. In fact, Arsenic pollution in the Ganga- Brahmaputra fluvial plains in India and Padma-Meghna fluvial plains in Bangladesh and its consequences to the human health have been reported as one of the world's biggest natural groundwater calamities known to mankind, with

levels being above the acceptable range. Prof. Praateek Dewan from IIT Madras has developed a based water purification system which provides provision of safe drinking water at affordable rates in the country. The noble metal based catalysts degrade haloaromatic carbon and nitrogen compounds, has led to the development of a based filter for a group developed to remove contaminants from water. Comb

an all-inclusive water purifier has been developed. The technology is based on arsenic adsorption. Over 400,000 people are dependent on installation of such purifiers. Moving forward, a purifier with the purifying activity is being developed. This technology is being implemented in providing safe drinking water per litre. "We are working on materials with very low arsenic contamination. The requirement is that the purifier can deliver safe drinking water. It has been possible to do this through a