

Innovative computer scientist recognized by Computerworld

By Susan Trulove

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BLACKSBURG, VA., July 9, 2007 -- Naren Ramakrishnan of Blacksburg, associate professor of computer science and faculty fellow in the College of Engineering at Virginia Tech, has been named as one of Computerworld's "40 innovative IT people to watch, under the age of 40."

The award recognizes the contributions of Ramakrishnan, who is 35, to the areas of data mining, personalization, and problem solving environments. In particular, he is being recognized for the data mining paradigm called "storytelling."

"Naren's ingeniously innovative concept of "storytelling" is an excellent example of an algorithm that reveals and exploits the interconnectedness of information," said Dennis Kafura, computer science professor and department head at Virginia Tech. "By finding a sequence of documents that connect the concepts in two starting documents, Naren was able to help life scientists discover new biological insights. Because the storytelling approach mimics the way people make and follow information connections, Naren's work can also be used to help people with everyday exploration of the web or other repositories," Kafura said.

Storytelling, developed in collaboration with recently graduated students Deepth Kumar (Ph.D.) and Joe Gresock (M.S.) and biochemistry professors Richard Helm and Malcolm Potts, discovers connections between information that at first appear dissimilar. The original application context was in bioinformatics where the algorithm was used to connect research results published in disparate papers, by drawing together intermediate papers into a story.

For instance, a connection can be made between metabolic arrest in primitive organisms like cyanobacteria and the same phenomenon in complex organisms such as mice. While such a connection might appear tenuous, the storytelling algorithm provides a carefully argued chain of links that remove and add participants (genes, proteins, processes), yielding a continuous line of



Naren Ramakrishnan

reasoning.

This novel technique also has applications in homeland security, by linking events across databases and also in a general web search, by connecting user's imprecise requests to relevant web pages. The storytelling project garnered significant publicity last year, in data mining, bioinformatics, and web search news outlets.

In particular, the project and its findings were profiled in the winter 2007 issue of Biomedical Computation Review, a publication sponsored by the National Institutes of Health (NIH), and was featured twice in ACM Technews, a digest of computing trends.

"Storytelling is an example of Naren's ability to think broadly about problems and how computer science can be brought to bear," said Kafura. "He often uses the term "wacky" to describe solutions that only arise when one takes an innovative or unusual view of a problem that leads to an elegant solution. Faculty members in the department now use this term to compliment a really good piece of original thinking."

Previous research by Ramakrishnan's group have led to the "out-of-turn" interaction interface for websites, algorithms for recommender systems, and other data mining innovations. The out-of-turn interaction interface allows a user to "speak" into a web browser that employs speech recognition and communicates the words back to the web server. While there are many sites and browsers that allow you to "talk into them," especially when you browse a website over a mobile phone, "the trick here is the ability for the user to say something out-of-turn when the site is not quite expecting it, and being able to transform the website appropriately," Ramakrishnan said.

His work on recommender systems addresses the targeted marketing capabilities seen at sites such as amazon.com. A visitor to Amazon is greeted with recommendations like "People who liked the books you like also liked these other books." Ramakrishnan and collaborators have studied how rating patterns influence the quality of such recommendations, leading them to show how ratings can be selectively "rewired" to improve recommendations.

Ramakrishnan received his Ph.D. in computer sciences from Purdue University and has been at Virginia Tech since 1998. He is the recipient of a National Science Foundation CAREER grant, the New Century Technology Council Innovation award, and a certificate of teaching excellence from the College of Engineering. He is currently the program chair for the IEEE Conference on Data Mining (ICDM), the premier research conference in data mining, which is held annually in different parts of the world.

Computerworld editors' picks will be showcased in the magazine's 40th anniversary issue on July 9. Learn more about others who were [honored by Computerworld \(http://www.computerworld.com/\)](http://www.computerworld.com/) .

Learn more about [Ramakrishnan's work \(http://www.cs.vt.edu/~naren/\)](http://www.cs.vt.edu/~naren/) online. A detailed write up about storytelling will appear in the summer 2007 issue of the [Virginia Tech Research \(http://www.research.vt.edu/resmag/\)](http://www.research.vt.edu/resmag/) magazine, available in late August.

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