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New anti-terror weapon: Game theory

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City airports can benefit from the new security software in use at the Los Angeles airport

A new weapon has surfaced in the war on terror. No, it's not some sophisticated or powerful firearm. It's an algorithm for airport security developed by two Indian researchers at the University of California's (USC) Viterbi School of Engineering.

The system is already in use at Los Angeles International Airport and could have applications in India as well.

The problem with airport security detail is that potential attackers can map predictable patterns and exploit them. Human attempts to break up these patterns also become predictable over time.

Now, a computer program called ARMOR uses game theory to randomise security schedules and make them unpredictable.

Officials at Los Angeles airport were so impressed with the new system, they instantly adopted it. Professor Milind Tambe, who helped develop the software, told DNA: "We considered games or situations where one agent (such as the police) must act first, while the adversary can observe the strategy and react accordingly."

Professor Tambe, who did his schooling in Thane, feels the software could have applications for security at airports and railway stations in India too. The Maharashtra police, in fact, has already tried to randomise security.

KP Raghuvanshi, chief of the Anti-Terrorism Squad (ATS), said, "As a result, there are no definite patterns to the way security checks are conducted."

But he admitted they weren't using computer programs for the randomness.

Sanjay Prakash, senior commandant of the Central Industrial Security Force (CISF) at Mumbai airport, said the security setups in India and the West are different.

"Unlike the West, our approach is that every entry point to the airport should be manned," he said, while acknowledging the importance of random checkpoints. "Unpredictability is a powerful weapon against troublemakers."

The ARMOR system had its genesis in a doctoral thesis by USC researcher Praveen Paruchuri, who was developing fast algorithms to solve the so-called 'Bayesian Stackelberg' problem in game theory, which stressed the importance of randomness.

ARMOR takes into account the entire security system — including the number of personnel and their breaks — and creates a randomised schedule. The placement of security checkpoints is so unpredictable that even security personnel have no inkling about it till they press the 'randomise' key on a computer.

So how did a doctoral thesis from USC reach Los Angeles airport? "There is an assistant chief of airport police named Erroll Southers, who is also an adjunct faculty at our university. He noticed our research on randomisation and invited us to give a presentation at the airport," said Prof Tambe, who was taken aback by the reaction of security officials.

"They were tremendously enthusiastic and positive, and gave Praveen and me a lot of feedback."

According to Paruchuri, "From what I gathered from my interaction with the police, they try to randomise their patrols as much as possible. However, they don't have a mathematical way to control the randomness. The problem is that after some time, people form habits, and then they start becoming predictable."

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