Ways to fight terrorism (1-3)

1. Finding a face in the crowd

Mug shots and photos of suspected terrorists are useless when the police are eyeballing mobs of people at airports or public events. That is why Tony Woo, a professor of industrial engineering at the University of Washington is one of many professors nationwide designing systems that can pluck a face out of a crowd. His software stretches and grafts a two-dimensional picture onto a three-dimensional head. The software can adjust and compare the enhanced model to real faces captured on surveillance cameras in order to find matches. The scheme, adapted from an industrial application from ensuring that auto headlights from subcontractors fit into their housings, currently filter faces at the rate of one per second. That is far more efficient than human monitors, but Woo wants to improve the speed by tenfold before the software is ready for deployment.

2. Driving away

Car bombs are a favorite terrorist tool. Fortunately, researchers at Utah State University have already begun exploring ways to inspect parking lot full of vehicles. They have come up with a 4-inch tall, three-wheels robots dubbed ODDIS – for Omnidirectional Inspection System – which a remote control operator can direct by joystick to inspect the underbelly of cars. Smart, mobile wheels allow the robot to to turn quickly and travel in any direction, much like a helicopter. Armed with a camera, the device streams video back to a central headquarters for analysis. Kevin More, an associate professor of electrical and computer engineering, hopes to test three ODDIS robots during this month's Olympics. Future generations could use the robot to monitor other vehicle checkpoints such as international border crossings.

3. Getting mugged

Second counts in crime fighting, which is why highway patrol officers in North-Carolina become frustrated whenever they stop a suspicious character. The slow wireless network they use means that downloading a mug shot from the law enforcement database takes up to 10 minutes before they know whether they have corralled the right person. But until the network gets an upgrade, Hamid Krim, a North Carolina State University assistant professor of electrical engineering, has created a way to shrink the size of the pictures. Using a new method of compression, optimized just for faces, he believes he can reduce the transmission time to seconds. After September 11, he hopes the innovation will help nation law enforcement as well as state patrol and says that it may even lead to new ways of storing digital photos for easier access.