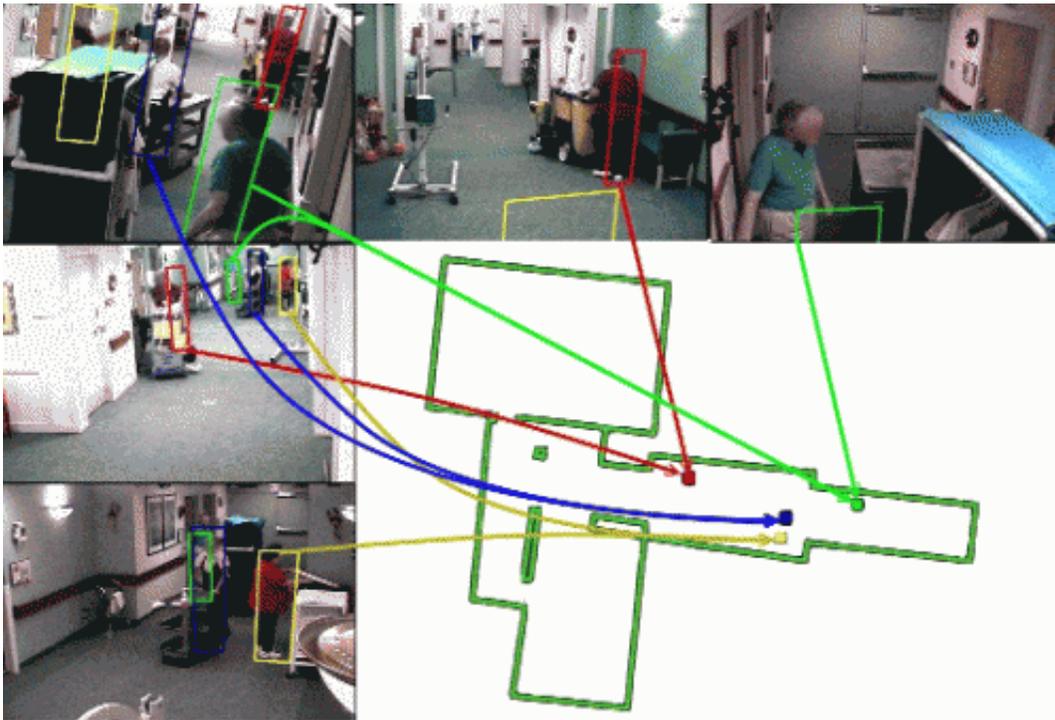


# Carnegie Mellon tracking algorithm inspired by Harry Potter's Marauder's map (w/ video)

May 30 2013, by Nancy Owano

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Credit: Shoou-I Yu

(Phys.org) —Researchers from Carnegie Mellon have developed a solution for finding people through computer analysis making use of facial recognition, color matching and location tracking. With homage to the fictional map used by Harry Potter, they came up with a solution that can effectively track people in the real world just like The Marauder's Map locates and tracks people in Harry Potter's magical world. Security

camera footage across a network of cameras can be analyzed via an algorithm that combines facial recognition, color matching of clothing, and a person's expected position based on last known location.

In designing the map, Shoou-I Yu, a PhD student at Carnegie Mellon University, who has been working on multi-object tracking in multi-camera environments for surveillance scenarios, sought to take on the challenge of finding and following individuals in complex [indoor environments](#) where walls and furniture may obstruct views. He and his team found a solution by combining several tracking techniques.

In one of the settings tested, a nursing home, 13 people were tracked as they moved through the building. The result was that their algorithms were far more accurate than other [software systems](#) tested, they said. The researchers will present a paper on the work at the IEEE [Computer Vision](#) and Pattern Recognition conference in Portland, Oregon in June. This is considered a top-level conference in computer vision.

In their paper, "Harry Potter's Marauder's Map: Localizing and Tracking Multiple Persons-of-Interest by Nonnegative Discretization," authors Shoou-I Yu, Yi Yang, and Alexander Hauptmann noted that their algorithm's advantage is its ability to track people not only in outdoor but also in complex indoor environments that may involve many walls and corridors. "An ideal Marauder's Map algorithm should integrate different sources of information," they said, which led them to propose their localization and tracking algorithm. They said their algorithm makes use of "color, person detection, face recognition and non-background detection cues to perform robust tracking." Being able to incorporate all the available cues seamlessly, though, into a framework was not trivial. Their paper detailed their methodology and results. "Our algorithm is effective because of reliable face recognition and the combination of manifold learning with nonnegative discretization," they said.

While an easy application assumption may be for law-enforcement investigations, other potential applications for such a Marauder's Map might be to find a nursing home resident with dementia who is lost, or as a service application used in large stores and malls.

**More information:** Project site: [www.cs.cmu.edu/~iyu/cvpr13.html](http://www.cs.cmu.edu/~iyu/cvpr13.html)  
Research paper: [www.cs.cmu.edu/~iyu/files/cvpr13/cvpr13.pdf](http://www.cs.cmu.edu/~iyu/files/cvpr13/cvpr13.pdf)

[Press release](#)

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