

## **OPTIMIZING FACE TRACKING ALGORITHMS FOR REAL-TIME**

**APPLICATIONS.** *Yuriy Luzanov, Benjamin Castaneda and Juan C. Cockburn\*.*  
*Active Vision Laboratory, Department of Computer Engineering, [yx14459@rit.edu](mailto:yx14459@rit.edu),  
[bxc0593@rit.edu](mailto:bxc0593@rit.edu), [jcccec@rit.edu](mailto:jcceec@rit.edu).*

As technology progresses, more powerful and lower-cost microelectronic devices are opening the path to the next generation of computing and information technology. Smart rooms, perceptual user interfaces and ubiquitous computing are representative examples. Smart cameras promise to play a central role in this new generation of computing. One fundamental characteristic of these cameras is that they should be able to move in a purposive manner to acquire information. In this paper the issues involved in the implementation of a real-time face tracking system for smart cameras will be described. The objective of this project is to design a system that can detect a face and change the position of a pan/tilt camera to keep the face centered in the field of view in real time. Skin Color Segmentation is used to identify possible face candidates and identify the area of interest and shape analysis to find a face and determine its position. Once a face is detected the camera moves to center the face. Strategies to optimize the algorithms to run in real time in a multiprocessor system will be presented. The code has been optimized to run in a multithreading environment and to use SSE2 extensions for vector computations available on Pentium 4 processors.