Real-Time Augmented Face

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This real-time Augmented Reality demonstration relies on our tracking algorithm described in [1]. This algorithm considers natural feature points, and then does not require engineering of the environment. It merges the information from preceding frames in traditional recursive tracking fashion with that provided by a very limited number of reference frames. This combination results in a system that does not suffer from jitter and drift, and can deal with drastic aspect changes. The tracker recovers the full 3D pose of the tracked object, allowing insertion of 3D virtual objects for Augmented Reality applications.

The system uses hardware as simple as a standard laptop and an attached firewire camera, and runs at a rate of 25 Hertz. The demonstration consists in tracking in real-time a diverse set of objects — human faces as in Figures 1 and 3 or the tea box of Figure 2 — and adding virtual parts to them. The tracking starts when the object reaches a position that is close to a reference one displayed on the screen.

This demonstration has been presented at different public exhibitions. In particular, the "augmented face demo" is very popular: Even if our algorithm is not specialized for face tracking, the stability of the inserted objects, the high video rate and the robustness of the tracking process make the insertion of the virtual objects very realistic and funny. We successfully tracked the faces of over one hundred people of all ages (see Figure 3).

References

[1] V. Lepetit, L. Vacchetti, D. Thalmann, and P. Fua. Fully automated and stable registration for augmented reality applications. In *Proc. International Symposium on Mixed and Augmented Reality*, 2003.

Figure 1. Screenshots from our tracking demo: we use a generic model to track the face of the person in front of the camera. Then, virtual glasses and moustaches are added.

Figure 2. Our system is general and can track objects of different types, here a tea box going through aspect changes. In the last two pictures, the box is turned into a Swiss Chalet by texture mapping it.

Figure 3. Some of the people who tried the "augmented face" demo.