"FACE PAINTING" - Interactive Virtual Child

An interactive art installation, called "*Face Painting*" was created utilizing a digital facial model of a baby/child to create an interactive experience via camera controlled *vision subsystem* and *touch screen* capabilities. The installation's primary goal was to demonstrate a new kind of user interface in a playful manner for children and adults alike. At the center of this application was a virtual child, shown in Figure 1 below that reacts to the visitors with its elaborate repertoire of facial expressions. As shown in the figure the system was configured to use two cameras placed at different heights.

- The first one is at the same level as that of a child's head sitting on top of the monitor showing the life size digital baby face.
- The second one was located higher to be able to collect images from the accompanying adults.

The system used *face recognition algorithms* on both of these image streams to determine not only if there are users to interact with, but also whether it is a child alone or with an accompanying adult or perhaps just a grown up standing in front of the installation. Based on this information the system deployed different strategies (e.g. child like behavior or more adult actions) to address its audience standing in front.

The facial expressions of the digital character were linked to the faces as they move in within the field of view of the cameras. This from of non-verbal feedback, based on *visual perception*, was supplemented by the tactile subsystem in the form of a touch screen located in front of the virtual face. This is demonstrated in Figure 2.

As the children reached the virtual baby's face, it noticed being touched and reacted accordingly with a repertoire of negative and positive facial expressions. It was also designed to allow the user painting with his or her finger by changing the colors and properties of the underlying skin.

Fig 1: "Face Painting" interactive art installation (original concept drawing) using a virtual digital baby and computer vision techniques to sense the presence of the audience.

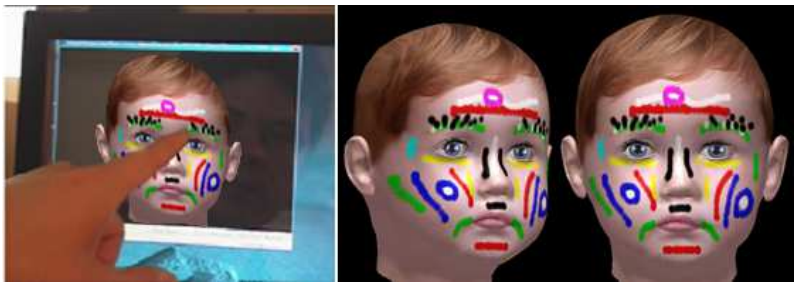

Fig 2: Implementation of the face painting interface using the tactile subsystem.

Fig 3: The virtual child appearing on the touch screen monitor (lower right) and projected in large scale (background). The face recognition camera input image shows the user in the lower left corner allowing the virtual baby to maintain eye contact and look at visitors.