15 seconds of fame

Franc Solina

ABSTRACT

15 seconds of fame is an interactive installation that every 15 seconds generates a new pop-art portrait of a randomly selected viewer. The installation was inspired by Andy Warhol's ironical statement that "in the future everybody will be famous for 15 minutes." The installation detects human faces and crops them from the wide-angle view of people standing before the installation. Pop-art portraits are then generated by applying randomly selected filters to a randomly chosen face from the audience. These portraits are then shown in 15-second intervals on the flat-panel computer monitor, which is framed as a painting.

The Computer Vision Laboratory and the Video and New Media Department of the Academy of Fine Arts, both at the University of Ljubljana, Slovenia, have collaborated in bringing together modern arts and information technologies since 1995. Projects involving the Internet, teleoperation, mobile robots and web cameras have been successfully exhibited [1,2,3]. The installation *15 seconds of fame* [4] is a result of this intermingling. Following upon my research interests, I wanted to use computer vision in the context of an interactive art installation. The objects of images being analyzed by computer-vision methods are to an increasing degree people, and the goals of these systems are to find people in images, identify them or determine their activity, which opens the door to a multitude of possible applications [5]. A core task in this people-centered computer-vision objective is face detection, which with subsequent face recognition is an increasingly important goal in video surveillance, which is in turn becoming a major focus of cultural production [6]. A video camera in combination with various types of displays has been used in numerous art installations, often as a sort of electronic mir-

Alba d'Urbano's work *Touch Me* merges her face with the observer's picture on the monitor [8]. In *Liquid Views,* by Monika Fleischmann, Wolfgang Strauss and Christian-A. Bohn (1993), the observer touches his/her image on the screen to initiate virtual waves that distort the image [9].

MOTIVATION

The installation *15 seconds of fame* was inspired by Andy Warhol's celebrated statement that "in the future everybody will be famous for 15 minutes" [10] and his photography-derived paintings of famous people. Warhol took faces from mass media, banal in their newspaper everydayness, and transformed them into paintings and prints. Warhol portrayed in this fashion celebrities from arts and politics (Mao Tse-tung, Marilyn Monroe, etc.). Some of these images are true icons of the 20th century [11].

Most people like to look at themselves, be it by way of photographs, paintings or mirrors, not just out of vanity, but as a way of seeking self-discovery and self-assertion. In our predominately image-mediated culture, seeing one's face in mass media is a sure sign of fame, whatever the true cause may be. The installation described in this paper tries to make instant celebrities out of common people by reversing Warhol's process—producing their Warhol-like portraits and putting them on gallery walls makes the subjects implicitly famous.

Fifteen minutes would hardly make the installation interactive, and therefore the fame interval was shortened to 15 seconds. The faces for the portraits made by the installation are selected by chance out of all people in front of the installation to allude to fame's tendency to be not only short-lived but also random. In his film and video projects, Andy Warhol was in fact fascinated with the celebrification of "nobodies" that marks the beginning of an era in which media attention has become the new mirror of the individual's self-perception [12].

I envisioned the installation in 1996 and implemented it in 2002 with the help of graduate students Peter Peer, Borut

HOW THE INSTALLATION WORKS

The visible part of *15 seconds of fame* consists of a computer monitor framed like a painting. A digital camera is hidden behind the frame, so that only a round opening for the lens is visible (Fig. 1). Pictures of gallery visitors standing in front of

Fig. 1. *15 seconds of fame*, installation, 2002. (© Franc Solina) A computer monitor is framed as a painting. Behind the round opening above the monitor is hidden a digital camera.

Franc Solina (teacher), University of Ljubljana, Faculty of Computer and Information Science, Tržaška c. 25, SI-1000 Ljubljana, Slovenia. E-mail: <franc.solina@fri.uni-lj.si>.

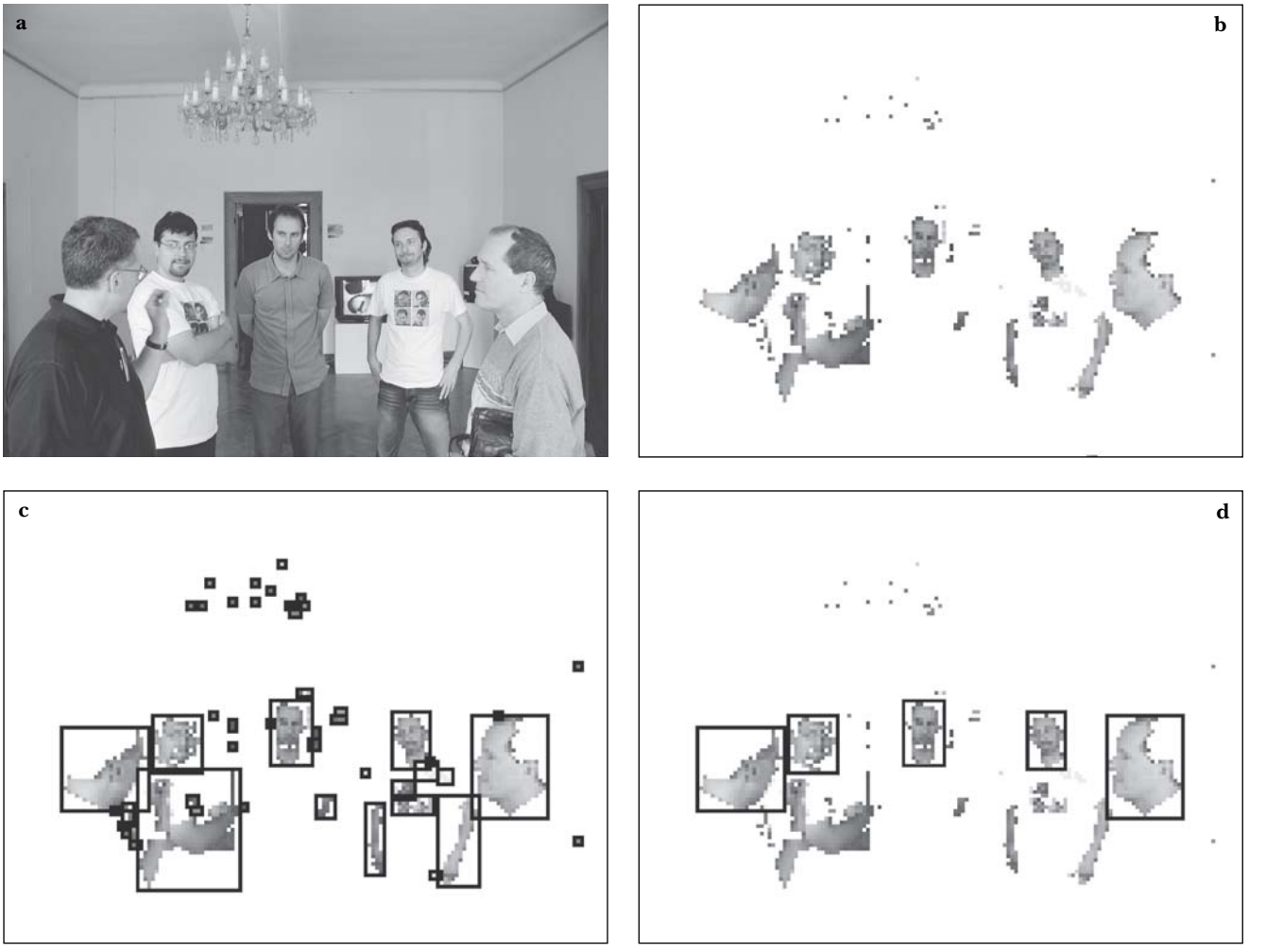
Fig. 2. A group of people in front of the installation. (Photo © Franc Solina)

the installation (Fig. 2) are taken by the digital camera using a wide-angle lens (Fig. 3a). The camera is connected to a computer that processes the pictures and displays them on the monitor.

Automatic Face Detection

Each digital photo is analyzed by the computer to detect faces. Automatic face detection, like most other automatic object detection methods, is difficult to effect, especially if sample variations are significant. Large sample variations in face detection arise owing to a large variety of individual facial appearances and to differences in illumination (for a detailed survey see Hjelmas and Low [14]). We decided to use a color-based approach for face detection that we had developed earlier [15], which was simplified for this installation [16]. The steps in the face-detection process are shown in Fig. 3. First, all pixels that do not correspond to skin color are eliminated (Fig.

Fig. 3. Stages in the process of finding faces in an image: (a) downsize the resolution 2048 × 1536 of the original image to 160 × 120 pixels; (b) eliminate all pixels that do not correspond to skin color; (c) segment skin-colored pixels using region growing into connected regions (depicted by rectangles); (d) eliminate regions that cannot represent a face based on heuristic rules (only face regions should remain). Figures b–d are shown in the low resolution used in face detection. (© Franc Solina)



3b). Next, the system applies a region growth algorithm, which segments all face-like pixels into candidate face regions (Fig. 3c). Each candidate face region must pass some simple heuristic tests (width/height ratio, percentage of skin pixels, etc.) to qualify as a true face region (Fig. 3d). The detection results are good, although still not perfect—sometimes someone's arm or palm becomes famous for 15 seconds, and faces of very dark complexion are not detected. The side benefit of the simplified method is that faces seen in profile can in fact be detected.

The color-based nature of our face detection makes it very sensitive to illumination. Since it is not always possible to exhibit the installation in daylight or white-balanced studio illumination, we improved our face detection results by applying color-compensation methods [17]. Thus the whole system is much more flexible, and the installation can be exhibited almost anywhere.

Face Selection

The next step in generating a "15-second" portrait is to randomly select one face among all detected faces and to crop it from the original resolution image. This processing performs the same function as a photographer using a telephoto lens from that viewpoint to take a portrait of one of the visitors.

Since gallery visitors often stay in front of the installation for several 15-second intervals, we integrated a rule intended to prevent the selection of a person at the same location in two subsequent 15-second intervals.

Pop-Art Color Transformations

To make his celebrity portraits, Warhol sometimes extracted the face from the

Fig. 4. Pop-art portraits generated by the installation *15 seconds of fame.* (© Franc Solina)

background, delineated the contours, highlighted some facial features (the mouth or the eyes), started the process with the photo negative, overlaid the photo with geometric color screens, etc. [18]. These techniques of transforming a photograph into a painting could be described with a set of formal construction rules used in shape grammars [19,20]. Using such rules in the installation would require automatic segmentation of input images into their constituent perceptual parts: face/background, eyes, mouth, hair, etc. These tasks are still too complex to be routinely solved in a few seconds on a large variety of input images. We decided therefore to try to achieve similar effects with much simpler means. Our system does not search for any facial features but just filters the input image.

We defined a set of filters that achieve effects similar to extraction. They drastically reduce the number of different colors by joining similar-looking pixels into uniform regions. They combine three well-known filters—posterize, color balance and hue-saturation—with an additional process of random coloring. Random coloring selects a color from the color palette of the already-filtered image and replaces it with a randomly selected new color. In this way, we achieve millions of different filtering effects. Some portraits generated by the installation can be seen in Fig. 4 and Color Plate A No. 3.

Display of Portraits

The 15-second portraits are displayed in two possible configurations: in 75% of cases just a single processed portrait is shown; in 25% of cases four smaller versions of the portrait are generated. This multiple imagery is also a tribute to Andy Warhol's way of displaying images.

In the lower left corner of the display, a counter counts down the seconds from 15 to 0, reminding the currently "famous" visitor that his or her fame is fading away. While a portrait is being displayed, the processing of the next portrait is taking place, so that after 15 seconds another one can be displayed.

E-mail Ordering of Portraits

During the first exhibition of the installation, we learned that most people featured by the installation desired copies of their portraits. To accommodate this, we have developed the following procedure: a unique ID number is displayed along the edge of each portrait and if this ID is e-mailed in the subject field to <15sec@lrv.fri.uni-lj.si> up to 1 month after the end of each exhibition, the system e-mails the requested portrait as an attachment back to the sender. In addition, a temporary web page is generated showing the requested portrait (Fig. 5). On this page, one can change the random filtering effects and save the new versions. From all requested portraits a special web gallery of "famous" people is automatically built for each public exhibition on the project's web page [21] to extend the installation into network space.

Audience Interaction

Even people without prior knowledge of how the installation works quickly realize that the installation displays portraits of people who are currently present. Suddenly, subtle staging maneuvers take place in front of the installation, as viewers attempt to present their images in the most favorable light on screen, even though the viewers do not know the exact moment when the next picture will be taken. But getting a share of that "fame" and seeing one's own portrait on the wall proves to be quite elusive if several people are in the audience. People who step right in front of the installation, trying somehow to force the system to select them for the next 15-second period, are most often disappointed, seeing somebody else far in back or on the side selected instead. A mini reality show in the manner of *Big Brother* sometimes takes place, with either open (Fig. 6) or more subdued competition for "media" attention, illustrating the theatricalization and the need for self-presentation in all spheres of life [22]. The only strategy that works is to stay in front of the installation for a long enough period. The installation hence effects a fluid, constantly reasserted connection between its audience (off space) and the pictorial field.

The installation resembles an electronic mirror with a 15-second delay. A mirror can offer intimate self-observation or the discreet viewing of others [23]. The installation, intriguingly, takes this choice between narcissistic or voyeuristic use out of the hands of the observer. In the next instance, the observer can see in the "mirror" his or her autoportrait or the portrait of somebody else in the audience. If the audience consists of

Fig. 5. Temporary web page showing the e-mail–ordered portrait. (© Franc Solina)

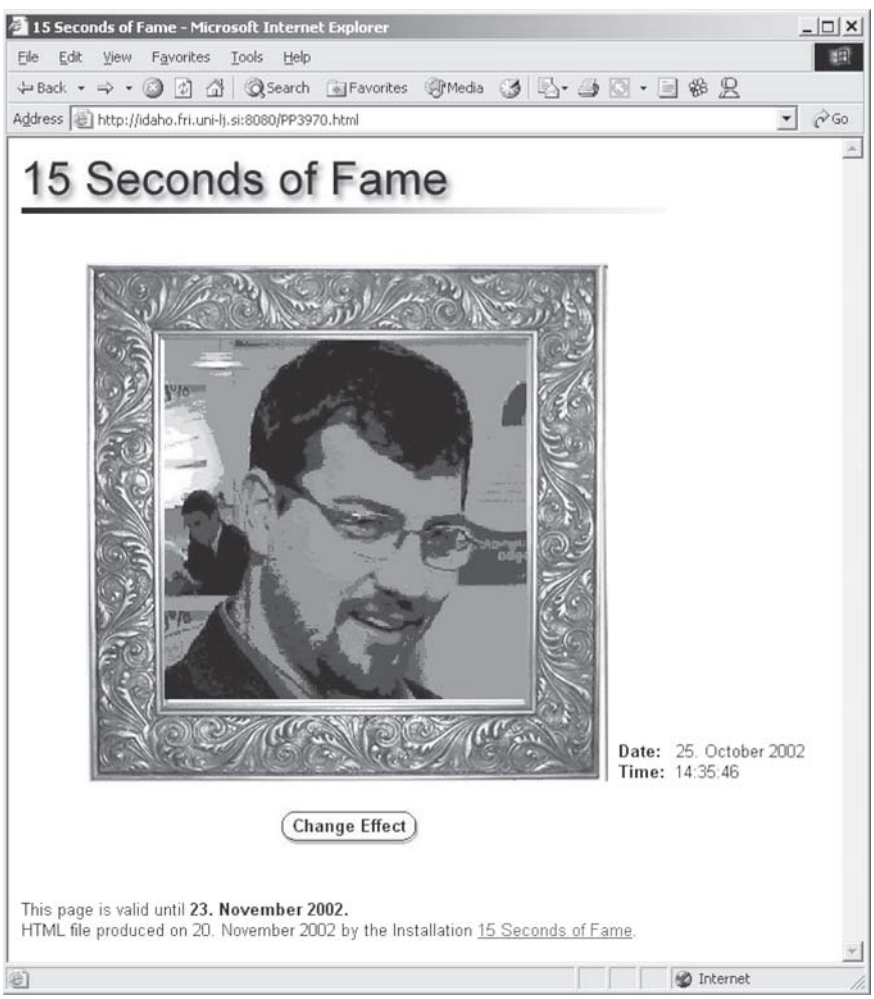


Fig. 6. Children having fun in front of the installation. (© Franc Solina)

mutual strangers, the installation offers an unobtrusive and socially acceptable voyeuristic gaze at other people. The countdown on the display excites anticipation among the audience members: Whom will the installation select next?

In real mirrors, one can observe oneself only from the frontal view, but this installation can also depict the faces of people who "disinterestedly" stare somewhere else. Due to the simple color-based face-detection method, completely bald people can even enjoy Magritte-like mirror images of themselves.

Standing in front of a mirror, we often search for our double or inner self. Pop-art filters perform simplifications that make some personal characteristics stand out more clearly. If a facial expression can be classified as happy, angry or sad [24], the color filters can match the particular mood.

Conclusions

My primary goal was not to mimic Andy Warhol's pop-art portraits per se—any computer-literate person could re-create them using a Photoshop-like program—but to play upon the celebrification process and the discourse taking place in front of the installation. The craving for media attention as a means of self-presentation and self-promotion are becoming the norm in our mediated culture. As Thomas Macho writes, "Whoever plans 'to stand out' and wishes to rise to 'excellence' and 'prominence,' must ensure that his or her actions are rewarded with a maximum of attention. Among the rewards for a successful rise is a passive surplus of visibility, a kind of imaginary account in which the looks of recognition that contribute to a rise in status could be accumulated" [25].

In contrast to other video camera–based installations, this one does not require exact positioning of observers owing to its reliance on automatic face detection, with the additional benefit that a group of people can interact with the installation simultaneously. The interaction is technically very simple—no visible interface is actually involved—but unpredictable and socially revealing.

The use of computer vision in this project was stimulating and somewhat different from a typical engineering project. The vision system should find in each input image at least one face to feature as a portrait. Therefore, a high percentage of true positive face detections is required, so that the installation does not display too often other skin-colored body parts or objects. A few undetected faces are, on the other hand, not a problem, if at least one face out of many is detected in each input image. Several thousand pictures were processed by the installation, and I have analyzed its technical performance [26]. The installation can be exhibited under a large variety of illuminations, and the computer on which the installation runs can be administered remotely over the Internet.

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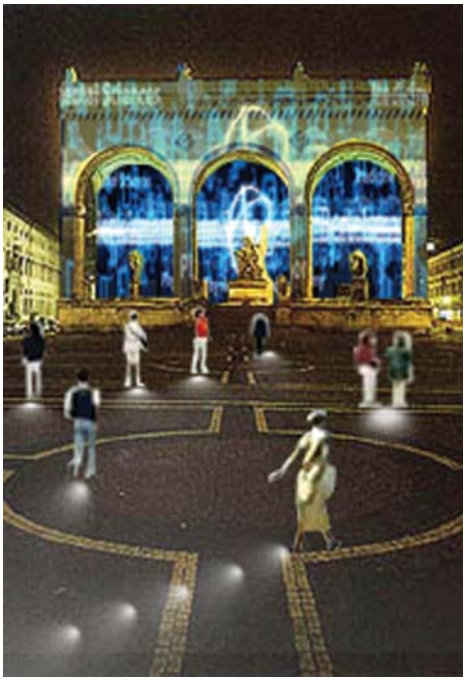
Franc Solina is a professor at the University of Ljubljana. He received his Ph.D. in computer science in 1987 from the University of Pennsylvania. He likes to combine his research in computer vision with the arts and new media.

No. 1. Joseph Scanlan, *Pay Dirt*, post-consumer data, dimension varies (3 tons) installation at Ikon Gallery, Birmingham, U.K., 2003. (© Joseph Scanlan. Photo © Chris Webb and Ikon Gallery.) Scanlan patented a "Plant growth medium," which he displays in an art context in various configurations, including in potting-soil commercial packaging. (See article by Robert Thill.)

No. 2. Wolfgang Strauss and Monika Fleischmann, the Interaction field of *Energy_Passages*, Feldherrnhalle/Odeonsplatz München. (© Wolfgang Strauss and Monika Fleischmann) Visitors' movement reveals portable sonic data and visual echoes on-screen.



No. 3. Franc Solina, a pop-art portrait generated by the installation *15 seconds of fame*. (© Franc Solina)