

# 15 seconds of fame\*

Franc Solina

University of Ljubljana  
Faculty of Computer and Information Science  
Tržaška c. 25, SI-1000 Ljubljana, Slovenia  
`franc.solina@fri.uni-lj.si`

24 July 2003

## Abstract

“15 seconds of fame” is an interactive installation which every 15 seconds generates a new pop-art portrait of a randomly selected person from the audience. 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 to crop them from the wide-angle picture of people who are standing in front of the installation. Pop-art portraits are then generated by applying different, randomly selected filters to a randomly chosen face from the audience. These portraits are shown in 15 second intervals on the flat-panel computer monitor which is framed as a painting. Electronic copies of each displayed portrait can be ordered by e-mail.

## 1 Introduction

The Computer Vision Laboratory and the Video and New Media Department of the Academy of Fine Arts, both at the University of Ljubljana, have collaborated in bringing together modern arts and information technologies since 1995. Projects involving Internet, teleoperation, mobile robots and web cameras were successfully exhibited [1, 2, 3]. The installation “15 seconds of fame” [4] is a result of this intermingling. Because of my research interests in computer vision 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 in 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 succeeding 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 over and over in different art installations, often as some sort of electronic mirror. Daniel Rozin’s “Wooden

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\*This paper was accepted for publication in the journal *Leonardo*, MIT Press, 2004

Mirror”, for example, features a display made out of several hundred wooden tiles that rotate to make a pattern of lightly or more darkly illuminated pixels [7]. Alba d’Urbano’s work “Touch Me” merges on the monitor her face with the observer’s picture [8]. In “Liquid Views” (Monika Fleishman, Wolfgang Strauss & Christian-A. Bohn, 1993) the observer by touching its image on the screen initiates virtual waves that distort the image [9].

## 2 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 (i.e. Mao-Tse Toung, 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 generating their Warhol-like celebrity portraits and putting them on the gallery walls.

15 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 it to allude that fame tends to be not only short-lived but also random. In his film and video projects Andy Warhol was in fact fascinated with celebrification of “nobodies” which marks the beginning of an era in which media attention became the new mirror of the individual’s self-perception [12].

The installation was envisioned by the author in 1996 and implemented in 2002 with the help of his graduate students Peter Peer, Borut Batagelj and Samo Juvan. It was exhibited several times, first at the 8th International Festival of Computer Arts, 28 May-1 June 2002 in Maribor [13].

## 3 How the installation works

The visible part of the “15 seconds of fame” installation 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 which are standing in front of the installation (Fig. 2) are taken by the digital camera using a wide-angle lens setting (Fig. 3a). The camera is connected with a computer which processes the pictures and displays them on the monitor.

### 3.1 Automatic face detection

Each digital photo is analyzed by the computer to detect faces in it. Automatic face detection is like most other automatic object detection methods difficult,



Figure 1: Computer monitor framed as a painting. Behind the round opening above the monitor is hidden a digital camera.



Figure 2: A group of people in front of the installation.

especially if sample variations are significant. Large sample variations in face detection arise due to a large variety of individual face appearances and due to differences in illumination (for a detailed survey see [14]). We decided to use a color-based approach for face detection that we developed earlier [15] and was simplified for this installation [16]. The steps in face detection are shown in Fig. 3. First, all pixels that do not correspond to skin color are eliminated (Fig. 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 also not detected. The side benefit of the simplified method is that faces seen from the profile can be detected.

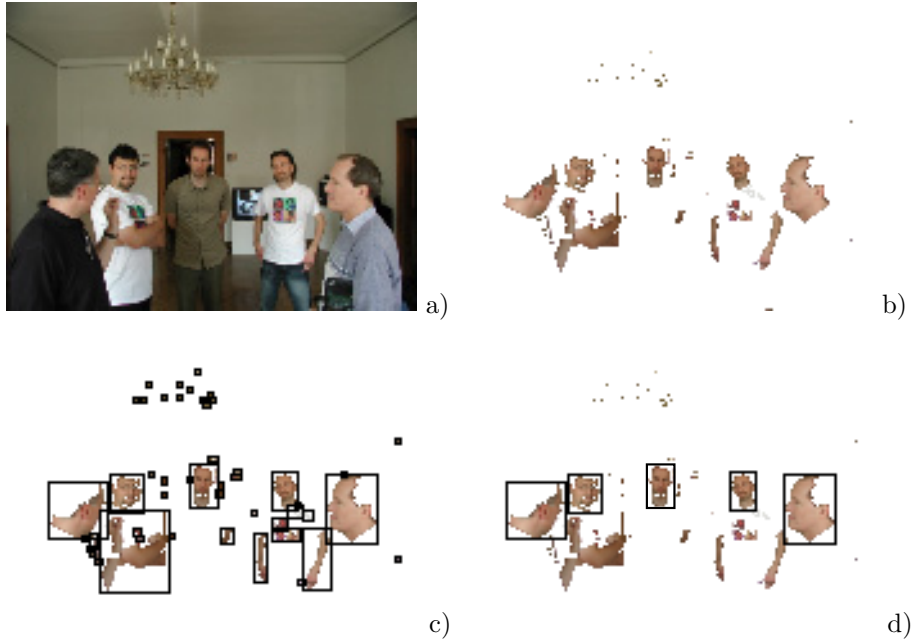


Figure 3: Steps in face detection: a) downsize the resolution  $2048 \times 1536$  of the original image to  $160 \times 120$  pixels, b) eliminate all pixels that do not correspond to skin color, c) segment skin colored pixels using region growing into connected regions (depicted by rectangles), d) eliminate regions which can not represent a face using heuristic rules (only face regions should remain).

The color-based nature of our face detection makes it very sensitive to illumination. Since it is not always possible to exhibit the installation under 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.

### 3.2 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 who would take with a telephoto lens from that viewpoint 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 that tries to prevent the selection of the person at the same location in two subsequent 15 second intervals.

### 3.3 Pop-art color transformations

To make his celebrity portraits Warhol sometimes segmented the face from the background, delineated the contours, highlighted some facial features (the mouth or the eyes), started the process with the negative photo, overlayed the photo with geometric color screens etc. [18]. This techniques of transforming a

photography 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 its 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 segmentation. 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.

### 3.4 Display of portraits

The “15-second” portraits are displayed in two possible configurations: in 75% of cases it shows just a single processed portrait, in 25% of cases it shows four smaller version of the portrait. This multiple imagery is also a tribute to Andy Warhol’s way of displaying images.

In the lower left corner of the display is a counter counting the seconds from 15 to 0, reminding the currently “famous” visitor that his fame is fading away. When a portrait is being displayed, the processing of the next portrait is taking place, so that after 15 seconds another one can be displayed.

### 3.5 E-mail ordering of portraits

During the first exhibition of the installation we realized that most people featured by the installation desire a copy of their portrait. Since then, a unique ID number is displayed along each portrait and if this ID is e-mailed in the subject field to `15sec@lrv.fri.uni-lj.si` up to one 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.

## 4 How the audience interacts with the installation

Even people without any prior information on how the installation works quickly realize that the installation displays portraits of people who are present at the moment. Suddenly, subtle staging takes place in front of the installation to get one’s most favorable image on the screen, especially since the audience does not know the exact moment when the next picture is taken. But getting a share of that “fame” and seeing one’s own portrait on the wall proved to be quite elusive

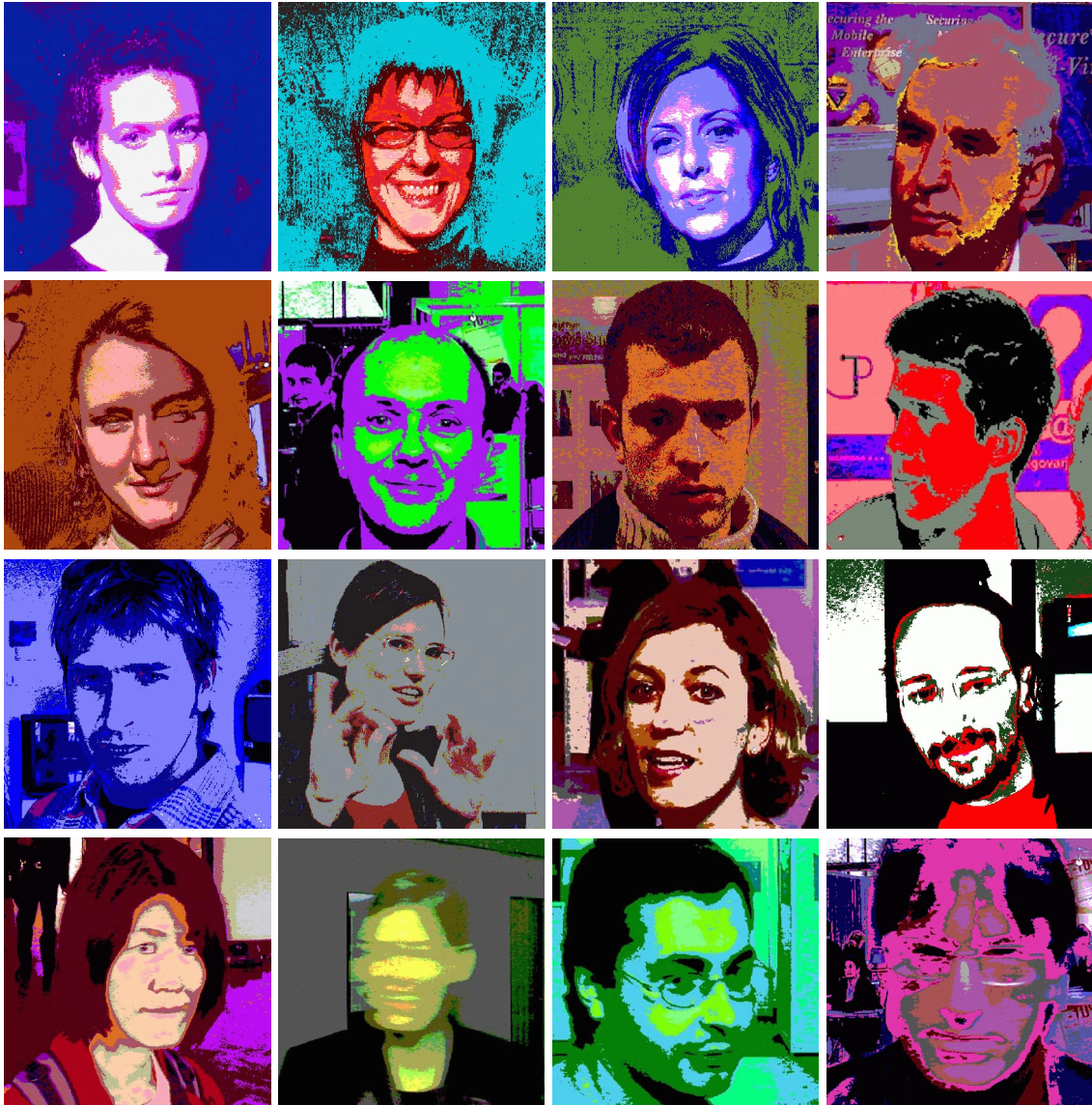


Figure 4: Some pop-art portraits generated by the installation “15 seconds of fame”.





Figure 5: Temporary web page showing the e-mail ordered portrait.

if several people were in the audience. People who would step right in front of the installation, somehow trying to force the system to select them for the next 15 second period, would be more often disappointed, seeing that somebody else way back or on the side was selected instead. A mini reality show in the manner of Big Brother would sometimes take place with open (Fig. 6) or more subdued competition for “media” attention, illustrating the theatricalization and the need of self-presentation in all spheres of life [22]. The only strategy that worked was to stay in front of the installation long enough. The installation hence makes a fluid, constantly reasserting 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 discreet viewing of others [23]. The installation, intriguingly, takes this decision among the narcissistic or voyeuristic use out of the hand of the observer. In the next instance, the observer can see in the “mirror” his autoportrait or the portrait of somebody else in the audience. If the audience consists of mutual strangers, the installation offers an unobtrusive and socially acceptable voyeuristic gaze at other people. The downcounting on the display raises the expectations in the audience of whom the installation will select next.

In real mirrors one can observe oneself only from the frontal view, but this installation can depict also faces of people who “disinterestedly” stare somewhere else. Due to the simple color-based face detection, 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-



Figure 6: Children having fun in front of the installation.

art filters perform simplifications that make some of the personal characteristics stand out more clearly. If the facial expressions could be classified as happy, angry or sad [24] the color filters could match the particular mood.

## 5 Conclusions

The motivation and realization of an interactive installation based on computer vision technology is described. Our primary goal was not to mimic Andy Warhol’s pop-art portraits per se—any computer literate person could 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 comparison to other video camera based installations, our’s does not require exact positioning of observers due to 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 specific. The vision system should find in each input image at least one face to feature it 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 its technical performance is analyzed in [26]. The installation can be exhibited under a large variety of illuminations and the computer on which the installation is running can be administered remotely over the Internet.

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