Automatic Creation of Expressive Caricatures: A Grand Challenge For Computer Graphics

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Examples of Expressive 3D Caricatures Created in my Computer Aided Sculpting Course

1. Motivation

One of the ultimate goals of computer graphics is to develop representational techniques to create wide variety of artworks such as drawings, paintings, sculptures and animations. Development of these representational techniques requires a good understanding of abstraction, simplification and exaggeration.

Salvador Dali by Sebastian Kruger
Pablo Picasso by Lenn Redman
Benito Mussolini by Lou Hishman
Bob Hope by Al Hirschfeld
George W. Bush by David Cowles
Barbara Streisand by Hanoch Piven

Figure 1: Examples of caricatures of some great caricaturists.

The concepts of abstraction, simplification and exaggeration are essential parts of visual arts. These concepts are always employed even in creation of drawings, paintings, sculptures and animations. The close examination of very realistic looking artworks reveals that abstraction, simplification and exaggeration are widely used in creation of even such realistic works [2].

Fine artists always ignore unnecessary details and focus on the characteristic features of their subjects. For instance, no classically trained painter will draw every visible detail in a still life. Caricaturists not only ignore unimportant details, but also selectively exaggerate the features that makes their subjects unique.

Although abstraction, simplification and exaggeration are very common tools used in visual arts, only in caricature we consciously learn to apply them. Unfortunately, caricature is one of the orphan fields in fine arts. In United States, caricature is not considered high level of art and disregarded in academic circles.

Even public view caricature as a consumer product1. Caricature is consumed and forgotten. But, we have so many things to learn from Caricature process.

Figure 1 shows the ingenuity of great caricaturists. As it can be seen in the figure, there are a wide variety of ways for abstraction, simplification and exaggeration. For instance, Hanoch Piven’s Barbara Streisand is just a microphone. Lou Hishman’s Mussolini consists of a plunger and a shoe. Hirschfeld can draw an arm with a simple S shape. In all these examples, the level of abstraction and simplification is so high that it is easy to see to automatically create such caricatures is a great challenge. However, I call automatic caricature creation a grand challenge not only because of abstraction and simplification aspects of the caricature process. Even exaggeration is extremely hard.

2. Exaggeration

I have seen and reviewed many caricature papers that attempts to automatically exaggerate from frontal face images and all of them were unsuccessful. I am not saying this as a computer scientist but as a caricaturist2. In fact, I also failed miserably in terms of my pre-

1Not many people know the names of more than one or two great caricaturists. To prove my point, I will list the names of some of great caricaturists: Thomas Nast, Al Hirschfeld, Daniel Adel, Steve Brodner, Joe Cardiello, Paul Conrad, David Cowles, Jack Davis, Thomas Fluharty, Mark Fredrickson, Drew Friedman, Robert Grossman, Lou Hirschman, Ori Hofmekler, Taylor Jones, John Kascht, Sebastian Kruger, David Levine, George Lundy, Rick Meyerowitz, Ranan Lurie, Jan Op De Beeck, Roberto Parada, C. F. Payne, Hanoc Piven, Lenn Redman, Robert Ris, Ronald Searle, Gerald Scarfe, Edward Sorel, Ralph Steadman, Sam Viviano, Nikolaus Wahl. There may be some people who know Nast or Hirschfeld, but the rest are all unknown.

2In my first life (much before I got my PhD in Electrical & Computer Engineering) I was professional cartoonist and caricaturist starting from high

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Caricature is really like science. Each person is an unknown to be discovered. Each caricature of the person is like a science paper that provides us another information about the person. The caricaturists collectively discover the truth. We, caricaturists, have our Newtons or Einsteins like Kruger or Piven, but most of us are like average talented scientists. We learn from each other. We perfect each other. Caricaturing is a collective process. You can see this collective process is in action as soon as a new president is elected. For instance, George W. Bush’s eyes are smaller than normal. But, the caricaturists did not discover it as soon as he was elected president. But, after six months, every caricaturist was able to draw a good likeness.

3. Measure of Success

Automatic creation of very extreme caricatures such as Hanoch Piven’s is a grand challenge or Turing test to me. However, unless we develop a community that realize the difficulty of the problem, it will be hard to progress and it will even be harder to measure the progress.

To measure the progress, we have to be very careful about people’s tolerance is so high that it is easy to make people accept unsuccessful caricatures as successful ones. There are several tricks of trade, we need to be careful to avoid.

1. Line Drawings. Changing a photograph to a line drawing can be acceptable to many people as caricature. In fact, several research papers first convert the photographs to line drawings to exploit this fact.

2. Deformations. Most people tend to accept even wrong exaggerations, which I will call deformation. Deformations look funny and since people think caricatures must be funny, mistakes become acceptable.

3. Giving hints. If a caricaturist could not manage a caricature, s/he can just simply write the name of the person and people accept it.

I have very simple litmus test to measure the success of caricature. If caricature is good, the original image should not look like the person. In other words, the caricature must blow out our common sense. Although, we know that which one is real, we should still feel that the caricature is better likeness (see [3] for an example).

Bibliography

