May Day Masks Augmented on Mobile Phones

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ABSTRACT
In this paper we describe a fun application of augmenting masks on people’s faces using mobile camera phones. The application was published on May Day 2008 in Finland, gaining thousands of visitors and downloads within a couple of days. We provide a description of the user interface and implementation issues, as well as analysis of user statistics and their comments.

Categories and Subject Descriptors
H.5.2 [Information Interfaces and Presentation]: User Interfaces – input devices and strategies, interaction styles

General Terms
Design, Experimentation, Human Factors.

Keywords
Augmented reality, face tracking, mobile phones, entertainment.

1. INTRODUCTION
Vappu is the Finnish word for May Day, i.e. 1st of May, also called as Labour Day, International Workers’ Day etc. [1]. For Finnish people Vappu means hard partying, starting on April 30th, typically lasting overnight, and always continued in the morning. On Vappu Finnish people gather together, some march in the streets, many have brunch in the parks, children carry balloons, adults dress in funny clothes, wearing student’s caps and – Vappu masks.

On Vappu 2008 we decided to offer people a new kind of solution for Vappu masks – have them augmented on mobile phone’s live camera view. For this purpose we established a web service vappunaamari.com (Finnish for vappumask.com) [2], and a client application of Nokia S60 camera phones.

In this paper we briefly describe the main features and user interface of the application, the face tracking algorithm behind it, as well as analysis of download statistics and user comments.

2. IMPLEMENTATION
The vappunaamari.com service (currently in Finnish only) enables downloading the application to the phone as .SIS installation file. The main page gives a brief introduction to the application, with installation instructions etc. and also a column for user feedback. See Figure 1.

![Figure 1: Vappunaamari.com home page (top part).](image)

The VappuMask phone client is operated as follows. After launching the application the user sees a mask augmented on the phone’s live camera view. The user is then able to:
- scale the mask using up- and down- arrow keys
- change the mask with left- and right- arrow keys
- fix the mask to a person’s face with key ‘5’
- release the mask again with key ‘5’
- save a snapshot image into gallery with key ‘3’
- send the image as MMS message with key ‘1’

Altogether we provided 16 different masks to choose from (some examples in Figures 2 and 3). The application also had the twin camera feature so people could take pictures not only of others but also of themselves. In this first experiment we only supported the 3rd edition of S60, while various generalizations and improvements are planned for Vappu next year (see below).

![Figure 2: Examples of Vappu masks on camera phone.](image)
3. FACE TRACKING

Face tracking with augmented masks is a feature offered as a bundled application with some web camera manufacturers. However we are not aware of such efficiency-critical implementations as required on camera phones, nor of applications such as in our MMU social application context.

Our face tracking algorithm is based on skin color detection. Initially the algorithm estimates the average skin color based on the pixels in the assumed face area (the area where the mask is attached to). For each frame we calculate a probability image illustrating how near each pixel’s color is to the estimated skin color. The probabilities near the previous face location are then tracked vertically using the PSA algorithm [3]. Horizontally we assume the mask should be located at the center of the detected probability peak. The face color is measured and tracked using only the chrominance components of YCrCb color space. Furthermore, the skin color estimation is updated continuously to adjust for changing lighting conditions.

4. USER FEEDBACK AND STATISTICS

Vappunaamari.com was advertised in the leading Vappu fun magazine “Julkku”, published by students at Helsinki University of Technology and addressing some 1 million people around the Helsinki area. The ad is shown in Figure 4. Before this official launch we also had an announcement of the application in VTT’s intranet on April 18th.

People who responded in vappunaamari.com feedback column felt the application was fun: out of 17 responses 14 were most positive. Here are some translations of the responses: “Great application, thanks!”, “F*cking cool!”, “Funny!”, “Muahahaaa. Great!!! Have a nice Vappu!”, “It’s fun :D”, “Hohoo, nice idea”, “Tops”, “Absolutely funny”, “Killer app”, “Great!”, “jollololol!” Out of the other three (3) responses, one requested for more masks, one complained about installation problems and one requested for a Windows Mobile version.

We collected user statistics to see how the web pages were visited and the application downloaded. Altogether we had 6366 visitors to the service and 1180 downloads between April 11th and June 5th. Figure 5 gives a relative overview of the web page visits (blue) and application downloads (pink).

5. CONCLUSIONS AND FUTURE WORK

Altogether, the activity and feedback around the service was even better than we expected and we intend to develop it further for Vappu 2009. Things we have in mind are plenty, for example: support for more phone models; easier mobile download; more robust face tracking; automatic snapping of masks to face; editing functionality to create new masks; 3D face tracking, and 3D masks; MMS with augmented video clips; photo gallery published in the web; competitions, e.g. recognize celebrities behind masks; sponsor banners, links etc.; and finally: English version and international launch.

6. REFERENCES