

AMENDED Exhibit 940

PLAINTIFFS' OMNIBUS OPPOSITION TO DEFENDANTS' MOTIONS FOR SUMMARY JUDGMENT

Case No.: 4:22-md-03047-YGR

MDL No. 3047

In Re: Social Media Adolescent Addiction/Personal Injury Products Liability Litigation

DOCUMENT SLIPSHEET

P-SNAP-0670

Bates Number: SNAP0850987-SNAP0850992

Custodian: BRODY_JACK

Author: [REDACTED]

Filename: D12367A8E29042B5C2E06204473C7399BAB573E95DD6749116A93580D77A3470.EML

Create Date: 10/20/2015 12:08 PM

Last Modified Date: 10/20/2015 12:08 PM

TNAG BEGBATES:

TNAG ENDBATES:

MAAG BEGBATES:

MAAG ENDBATES:

File Path: /D12367A8E29042B5C2E06204473C7399BAB573E95DD6749116A93580D77A3470.EML



From: [REDACTED]
Sent: 10/20/2015 12:08:52 PM
To: [REDACTED]
Subject: Re: BeautyCam

Yes, I agree. We can use GrabCut to segment the neck area as well as the forehead region.

On Tue, Oct 20, 2015 at 12:03 PM, [REDACTED] wrote:
I think we need the skin detection too for neck area, etc. Any thoughts on that?

--
Cheers,

On Tue, Oct 20, 2015 at 10:25 AM, [REDACTED] wrote:
Yes, we need the detailed landmark locations to extract the skin area for tone mapping and edge-aware smoothing. These landmarks will also give us contour information of the facial features, which is necessary for face slimming/stretching, dark circle removing, and eye enlarging in the future. The client side library we have can provide enough landmarks for these purposes.

Best,

On Tue, Oct 20, 2015 at 9:47 AM, [REDACTED] wrote:
We are not sure if the Apple API is sufficient. We can provide a client side face library to provide 68 landmarks on the face. Thanks!

Regards,

On Tue, Oct 20, 2015 at 9:07 AM, [REDACTED] wrote:
Yeah, I think so -- the smoother is not applied to the entire image. Just face and skin.

Sent from my iPhone

On Oct 20, 2015, at 9:02 AM, [REDACTED] wrote:

I feel smoothing is on face and skin area only, if u check the hair region on Beauty Plus. But we can develop smoothing and face/skin detection separately.

On Tuesday, October 20, 2015, [REDACTED] wrote:
Np.

One question: after trying the beauty plus app, I feel that the beauty filters are globally applied to the entire image rather than face region. Do we need to run face detection first before applying these filters?

Yep the color correction is global, but it's based on the skin tone of the face, which we have to detect that first. [REDACTED] if we only used a few sample points of the face (which we can do with the Apple's face detection API), how far would that get us? Do we need full face landmark detection?

Also, just to clarify, are we going to implement the face smoother in addition to the three beauty filters? This should be simple to build once you have #1, #2, and #3 ready so I guess the answer is yes, but it is not listed in the goal so I figured it is better to double check.

Good q. I'd like the face smoother to always be part of the three beauty filters, because that's what it looks like Beauty Plus is doing. (try comparing to the native camera app.) I can't 100% tell if the smoothing is only on the face, or if it's applied to the whole image. Maybe smoothing the whole image is OK for prototype if that lets us implement it faster. What are your thoughts?

Also not noted above --- we'll need a sunlight overlay for the Sunlit filter. That shouldn't be hard.

On Mon, Oct 19, 2015 at 11:51 PM, [REDACTED] wrote:
Thanks for the update, [REDACTED]

One question: after trying the beauty plus app, I feel that the beauty filters are globally applied to the entire image rather than face region. Do we need to run face detection first before applying these filters?

Also, just to clarify, are we going to implement the face smoother in addition to the three beauty filters? This should be simple to build once you have #1, #2, and #3 ready so I guess the answer is yes, but it is not listed in the goal so I figured it is better to double check.

On Mon, Oct 19, 2015 at 11:25 PM, [REDACTED] wrote:
Hi All,

Thanks [REDACTED] and [REDACTED] for meeting today! Really glad we get a chance to work together on this prototype.

Notes from today:

- We will present an iOS prototype for Evan next Wednesday with 3 image filters similar to Beauty Plus' Fresh, Sunlit and Natural
- Algorithms
 - Requirements for prototype
 - Easy to develop
 - Good results
 - Able to parameterize for different filters
 - 1) Skin Smoothing - based on blurring, only on face regions
 - 2) Skin Tone Color Balancing, based on detected face color
 - 3) Warming/Cooling
- Timeline

- Tomorrow: [REDACTED] to talk to Lookery to understand their face detection + existing filter tech, see if anything re-usable
- Thursday: [REDACTED] to get face detection working on client
- Friday: [REDACTED] to create app filters and hook up face detection algorithm
- Monday: [REDACTED] to have algorithms #1 and #2 done. [REDACTED] to have #3 done, and hook up to filters + parameterize
- Tuesday: Polishing
- Quip doc to collect ideas: <https://quip.com/hkUjAYL665rk>
- Finally, let's try to think of any ways to make beauty filters unique or fun for our users on Snapchat. Couple ideas:
 - Learn to do better beautification based on usage
 - Different beauty filters for different users (male/female, age, location/culture)
 - New algorithms for video snaps

Any thoughts are welcome about the plan.

I'll set up a calendar meeting to sync up on prototype progress this Thursday, and let's share any progress we make with each other before then.

Best,

On Fri, Oct 16, 2015 at 8:56 AM, [REDACTED] > wrote:
+ [REDACTED] for preview page changes

Evan also mentioned putting them into a 9-grid layout (if we have too many of these filters). I don't know how this is going to align with the plan of review page revamp, so defer to [REDACTED] / Jack [REDACTED] for decision.

On Thu, Oct 15, 2015 at 6:42 PM, [REDACTED] wrote:
+cc [REDACTED]

Thanks [REDACTED] Let's discuss :)

On Thursday, October 15, 2015, [REDACTED] wrote:
Sure [REDACTED] happy to lead this from Camera side.

[REDACTED] - I hear you have developed similar tech already? How about we meet next week to sync up and brainstorm what we need to prototype? I'm going to start investigating the existing apps and algorithms out there.

Best,
[REDACTED]

On Thu, Oct 15, 2015 at 5:22 PM, [REDACTED] wrote:
Folks,

See below for more information. Evan wants us to deliver a demo that imitate what BeautyCam does. As a starting point, he wants to build the following

- Beauty Filters: natural, sunlit, fresh
- Face Smoothing

We can include them as additional visual filters for selfie camera. [REDACTED] and I chatted about it, I think our two teams can work together on this. [REDACTED] will find a researcher to work with us? [REDACTED] would you like to take the lead on our side? Jack, any design suggestions are welcome.

- [REDACTED]

----- Forwarded message -----

From: [REDACTED]

Date: Thu, Oct 15, 2015 at 2:32 AM

Subject: Re:

To: Evan Spiegel [REDACTED]

Cc: [REDACTED]

Evan,

Here is our initial assessment of project scope if we want to implement BeautyPlus' features with in-house technologies

- **Skin smoothing / whitening:** This can be done by a combination of face detection + skin detection + color smoothing / whitening. We should be able to build this on top of the Lookery's face detection and face modeling tech. Expect 3 weeks prototyping (1 engineer) + 1 month productionalization (2 engineers)

- **Acne / Blemish removal:** There are known [blemish detection](#) and ["impainting"](#) techniques for this purpose. Similar scope to skin smoothing: expect 3 weeks prototyping (1 engineer) + 1 month productionalization (2 engineers)

- **Dark circling / Eye enlarger / Eye brightening:** We can apply the similar image patching approach as described in this [article](#) to remove the dark circle, enlarge the eyes or brighten the eyes. Expect 1 month prototyping (1 engineer) + 1.5 month productionalization (2 engineers)

- **Slimming / Stretching:** Expect 1 month prototyping (1 engineer) + 1.5 month productionalization (2 engineers)

- **Beauty filters:** I expect it will take multiple design iterations to finalize the look-and-feel for each filter, but once that is done, it should take less than 1 week (likely 1 - 3 days) to implement each new filter.

- **Auto-beauty enhancement:** This will be powered by a combination of the above technologies. Expect 2 weeks for prototyping efforts after the underlying components are ready.

In summary, our current estimation is that it will take **2 engineers 2 months** to prototype all the face beautification features (except for beauty filters), and **4 engineering 2 months** to productionalize

them. The time for building beauty filters might vary, depending on the number of filters we plan to implement, and how long it takes to finalize the design decision.

BTW, there are a few other popular camera apps which feature similar beautification functionalities as BeautyPlus,

BeautyCam
YouCam Perfect
MeituPic

I guess you might already know this, but just want to point them out in case it is helpful.

Best,

██████████

On Wed, Oct 14, 2015 at 11:39 AM, Evan Spiegel <██████████> wrote:
Terrific thank u

On Oct 14, 2015, at 11:34 AM, ██████████ > wrote:

Evan, we will do a tech due diligence today and give you an estimation.

- ██████████

On Wed, Oct 14, 2015 at 10:28 AM, Evan Spiegel <██████████> wrote:
BeautyPlus – The magical beauty camera by CommSource Technology Co., Ltd.
<https://appsto.re/us/rDzgL.i>

██████████ how hard is it to make these effects?

--
Regards,

██████████

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P-SNAP-0670

Cheers,

[REDACTED]

