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May 06, 2019

PWA PRINTHEAD SERVICING BASED ON IMAGE PROCESSING

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Recommended Citation

INC, HP, "PWA PRINTHEAD SERVICING BASED ON IMAGE PROCESSING", Technical Disclosure Commons, (May 06, 2019)
https://www.tdcommons.org/dpubs_series/2180



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PWA Printhead servicing based on image processing

Abstract

Page Wide Array printing system uses an array of printheads to print at one pass. Printheads are perpendicular to the media advance axis. In these printing systems, the paper is moving during printing while printheads are static above the paper. For that reason, there is no chance to do printhead servicing between passes (like scanning printers) such as flying spit or wipe. Thermal inkjet printheads require refresh nozzles from time to time to maintain its health. The only way to refresh nozzles while printing in a PWA system is spitting on the page (SOP).

Usually, customers have various media roll widths depending on the image width. Since media width is a standard size, most of times images are narrower than the width of the loaded paper.

We used to service (refresh) all nozzles, even those out of the image and not printing anything.

Notice that in a scanning printing system, all nozzles are used almost all-time while printing, and they are refreshed while they are firing to print.

Description of the problem

In a PWA printing system, all nozzles on the media do servicing while printing (spit on the page). The problem is that many times images are narrower than media and many nozzles are out of the image. That means that we are wasting ink and reducing PH life only to servicing printheads that are not going to print. Our solution will skip this servicing when it isn't necessary, saving ink and printhead life.

In addition, for a mono-color images all nozzles do servicing regardless if it is necessary or not. In this case color ink is wasted and our solutions will avoid this waste.

Description of proposed idea

Our solution is adapting servicing to the images. Based on image processing these are the steps for the solution.

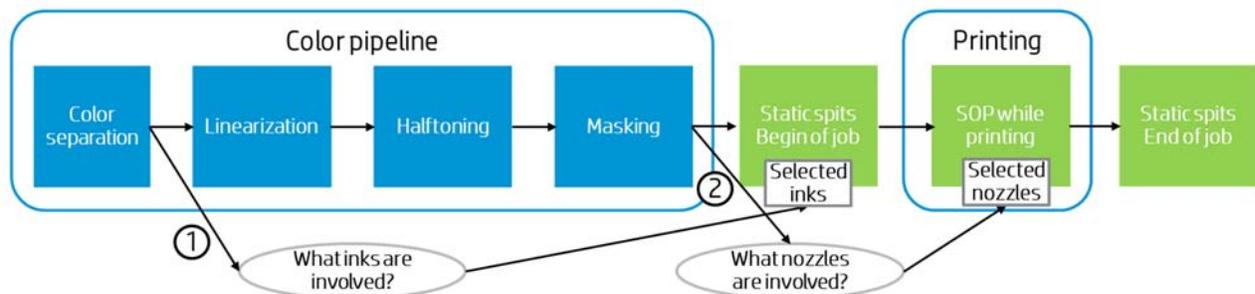


Figure 1 – Flowchart of servicing and pipeline with new solution

This is the workflow of our solution.

1. Color pipeline image processing. After color separation's step, we propose to analyze involved inks. At this point, we are able to know what inks will be used to print the image. For the unused inks, we propose to eliminate servicing (static spits at the beginning, or end of a job and spit on the page servicing while printing).
2. Binary masks analysis. After the color pipeline, there is another transformation (image processing) involving printing masks, and error hiding masks. At this point, we are able to know what nozzles will be used to print the image. For the nozzles that are not going to be used, we propose to eliminate servicing while printing (spit on the page).

Our solution is an optimization of the servicing, taking account needs for each plot. Here we explain situations where our solution is clearly better than the current one.

Example: Paper is wider than the image (almost always). In this case, after calculating binary masks, we will see exactly what and when nozzles are going to fire. Thanks to this information we can remove spit on the page (servicing while printing) on the areas where there is no image printed, saving ink and avoiding possible image quality artifacts due to this SOP.

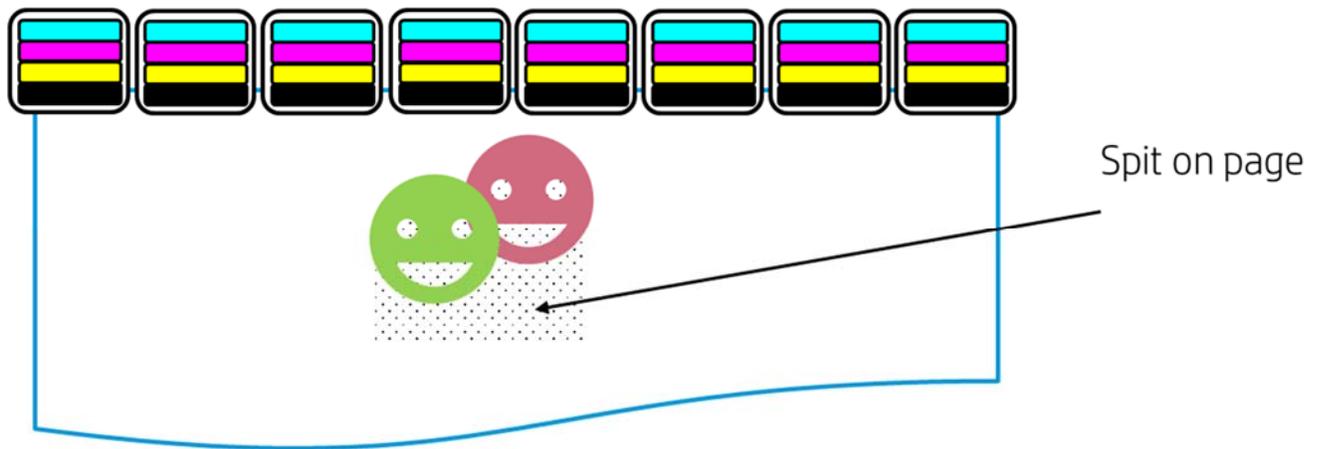


Figure 1. Schema of Spit on Page for the new solution

Advantages

- Reduce the amount of servicing and saving on ink used
- Adapt servicing to images printed
- Extend PH-life saving firing from servicing
- Reduce cost for final user
- Reduce Image Quality artifacts caused by Spit on Page

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