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RFID AUTOMATIC MULTI-ROLL DETECTION SYSTEM

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- ## ABSTRACT:

Normally, a printer can have one or more input media rolls with different media types to simplify customer life. With several media inputs already loaded in the printer, the user can select which one he/she is willing to use in a simple way, without having to unload and load another media type.

However, knowing in advance how many rolls are loaded and which media type is rolled in which media input roll is not an easy task for the printer. Current printer implements this feature manually. The user needs to select which media is loaded in which media input roll through the Front Panel or any other input interface.

Do you imagine a scenario where the printer can automatically detect and know which media type is loaded in which input roll/position?

The present disclosure proposes an intelligent algorithm based on RFID technology to automatically detect the position of the media loaded without user interaction.

The present disclosure has been investigated and tested in Polestar program.

- ## PROBLEM SOLVED:

The present disclosure proposes an intelligent algorithm to automatically detect: the number of media input rolls, in which position are loaded and which media type without user interaction. Currently, user needs to configure in the printer the number of media rolls loaded, the type and in which position they are. This can lead to user mistakes and therefore waste of time and even worse, selection of wrong printing parameters (which are highly dependent on media type) and consequently, image quality issues.

- ## PRIOR SOLUTIONS:

Current solutions are based on manual selection. That means, the user needs to select through the Front panel all the medias that are being loaded.

- ## DESCRIPTION:

First of all, this solution is based on RFID technology. The printer needs to have a UHF RFID transceiver and an RFID tag must be place in each media roll.

Having said that, the solution consists on an algorithm based on two features that RFID technology have available in their tags:

- - RSSI: it is a term used to measure the relative quality of a received signal which is related to the received signal power.
- - Output Antenna Power: UHF transceivers can set different output power levels to the antenna. This feature is the key for the presented algorithm

Assuming the antenna is in a place where *media input roll 1* is the closest and *media input roll 2* is the one further to the antenna, the algorithm implements the following process:

1. Set an Output Power P1
2. Read all RFID tags near the antenna.
    a. If there's only 1 detected, this tag assembled in a media is located in the first position: *media input roll 1*
    b. If there's 2 tags detected, read RSSI from each tag. The one that receives more power will be the one located in *media input roll 1* (the closest to the antenna). The one that receives less power will be the one located in *media input roll 2* (the furthest to the antenna)
    c. If all tags have been detected, the algorithm ends in this point. On the other hand:
3. Set an Output Power P2 > P1
    a. Check again the number of tags detected and in case of more than 1, check RSSI metric again.

Following you have a figure showing the HP Latex 500 Media input Media Output system. In the picture you can see the possibility of installing 2 media rolls. They can have different configurations:

- 1 media input and 1 media output
- 2 media inputs
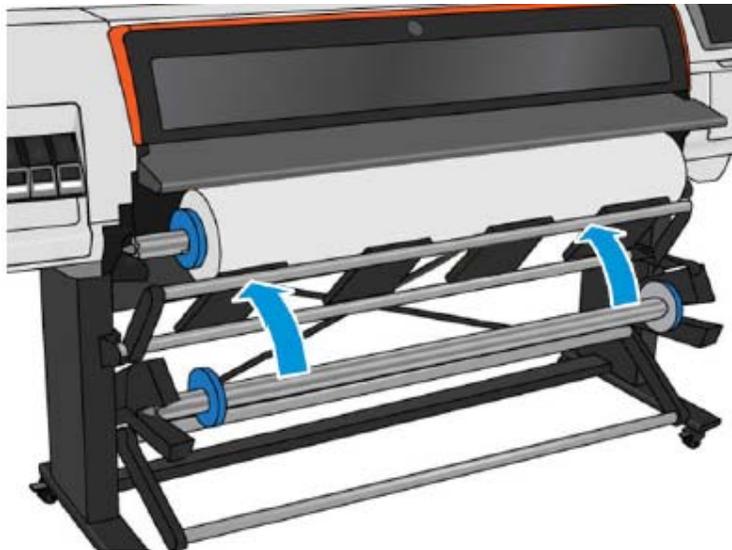
Figure 1. Latex 500 MIMO system

However, in other printers you can have even more media inputs (3 or more through a similar system or through drawers). The higher the number of media input rolls available, the more useful is the presented algorithm.

The following figure shows the way the user is currently selecting the media in each media input roll:

Select the category and name of the substrate you are loading.
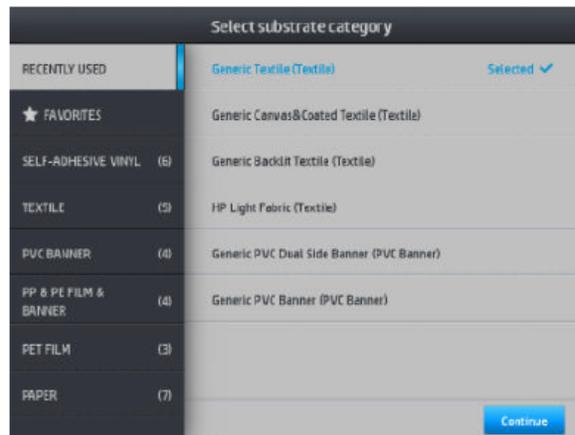
Figure 2. Latex 500 – Select substrate category

With the presented disclosure, all this manual selection does not need to be carried out and it dramatically simplifies the media loading. Once the user loads the medias, the user can check in the Front Panel which are the medias loaded and in which position they are located.

- ADVANTAGES:

There are many advantages related to this invention:

Improve media loading user experience. First and Best Customer experience. Currently the manual media loading, mainly in latex printers, is very complex. With the proposed solution, the workflow is super smooth and will avoid user mistakes. Printer automatically detects the number of medias that are loaded, and in which position they are located.

Improve Customer Productivity. The user will dramatically improve the end-to-end printer productivity as the user does not need to manually select each media that is being loaded and in which position, leading to less errors.

Media waste reduction. if a user makes a mistake selecting the media profile, it is highly likely to produce media crashes or image quality defects and therefore, media waste. With the automatic media loading and media profile configuration, these drawbacks will be dramatically reduced.

Easy detectability. It is very easy to detect if this patent is being infringed. If the printer uses a RFID antenna/device or a hand-held device connected to it, and it automatically detects the number of medias that are being loaded, it means it will use this design to get media information.

Disclosed by Jordi Hernandez and Josep Maria Rio, HP Inc.