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March 2022

AUTOMATIC MEDIA LENGTH DETECTION

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Recommended Citation

INC, HP, "AUTOMATIC MEDIA LENGTH DETECTION", Technical Disclosure Commons, (March 24, 2022)
https://www.tdcommons.org/dpubs_series/5009



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Automatic Media Length Detection

Abstract

This disclosure relates to the field of improving the interaction between human and machines.

Machines are not able to detect in real time the length left of the media roll installed.

Currently, in most of the systems the operator of the unit selects the media roll that has being installed. Then the unit relate the media installed with the length expected of this roll.

This is a solution valid for new media rolls. However, for media rolls already partially used. This solution does not work. In this case, it is impossible for the machines to know in real time the length of the media left.

In this disclosure a solution for this problem is explained. This disclosure is proposed to have a way of control the length of the media roll in real time in any kind of machine.

PART A: How this problem was addressed before the new idea

The only solution known is that the operator of the system selects in the menu of the machine the media roll that has being installed. The unit relate the media installed with the length expected of this roll. Checking normally in a data base.

PART B: How the new idea solves the problem

The proposed solution is a system able to detect the width and weight of the media thanks to different sensors installed in different parts of the media path of the machine.

PART C: How someone would use this idea

1. Sensors to detect the weight of the media roll

- a. Load cells located where the media roll spindle rests*

The strain gauge sensors will be able to measure the weight of the substrate roll in real time. It does not matter the kind of media installed.

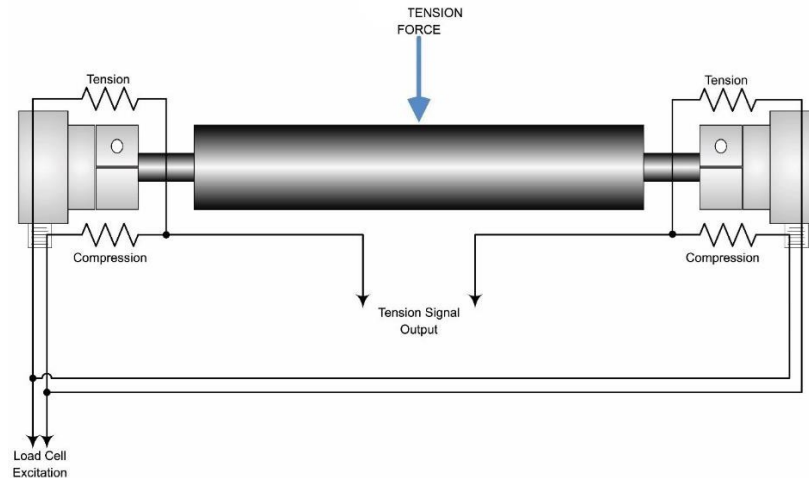


Figure 1 – Media roll weight sensor based on load cells

The load cells must be installed in the unit where the corners of the roll spindle rest.

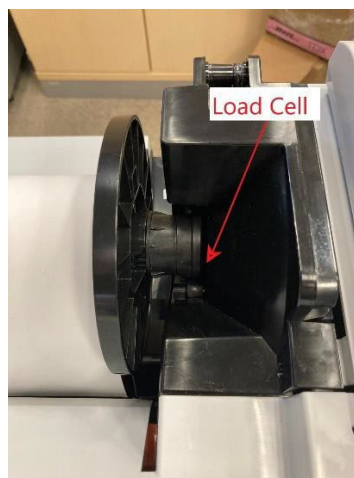


Figure 2 – Holder of the spindle in the units

With this system the unit can detect in real time the weight of the media left in the roll.

2. Sensors to detect the width of the media roll

- a. Spectrophotometer sensor located in a mechanism able to run over the whole media width.*

With a spectrophotometer installed at the bottom of a mechanism that runs the whole media width. It is possible to detect media edges and therefore the width of the media installed in the media print zone.



Figure 3 – Spectrophotometer sensor to detect media width

To detect the media edges, the machine runs the spectrophotometer along the media width. During this movement, the spectrophotometer is always readying. Thanks to this, it can detect when the media starts and when the media ends.

This is possible because the media is white, the print zone is black. It means that it can be detected by the spectrophotometer acting as a color sensor. See the picture below.

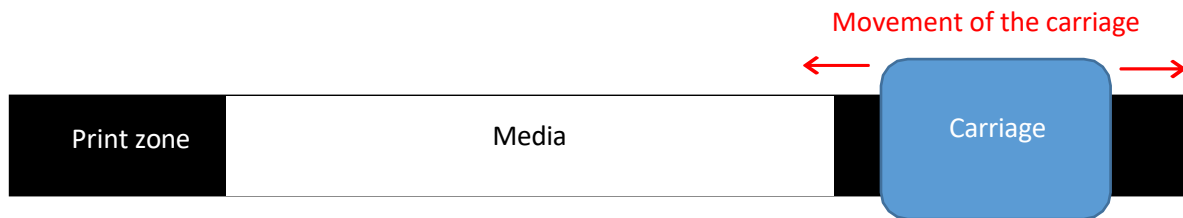


Figure 4 – Recreation of the media edges detection with the spectrophotometer in the carriage

3. Calculating the length of the media left in the roll

- Net weight of Paper M
- Width of Roll W
- Basis Weight of Paper G

Metric or ISO Units (Weight in Kgs, Width in cm and Basis Weight in g/m²)

Length of Paper in Meter:
$$\frac{100,000 * M}{W * G}$$

Example:

Let Net Weight of Roll (M) is 500 Kgs, Width of Roll (W) is 100 cm and Basis weight, or GSM is 100g/m².

*Length of Paper in Meter = $100,000 * 500 / 100 * 100 = 5000$ m*

The basis weight of Paper comes from a data base, which the units can access.

Therefore, after installing the media and indicating the type of media installed. The printer has everything needed to detect in real time the length of the media left.

CLOSURE

To conclude this document, it has been studied that other kind of sensors that may perform in a similar way. The technology described in here is not unique. There are plenty of possibilities among different spectrophotometer and load cells. The sensors used in this project.

This new system propose in this document is based on widely used technologies like load cells and color sensors already installed in many machines. This means that this disclosure is cheap and relatively easy to implement.

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