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AUTOMATIC DOCUMENT SCAN FROM FLATBED

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Automatic document scan from flatbed

Abstract

A digital document scanner capable of scanning multiple documents from flatbed without multiple press of start button is claimed. The said scanner can be a standalone unit or it can be part of a multi-function device. The extra effort needed from the user to start a scan is reduced with the help of input from the flatbed cover sensor and a firmware module that interprets the state of the sensor differently to initiate a scan operation with the help of this invention.

Current state of the art/problem

Currently, if a user has to scan or copy multiple pages from flatbed (glass), he has to open the cover, keep the paper on the glass and then press start. This has to be repeated for all the documents he has to scan. Other methods include user being prompted to select if more documents needed to be scanned/copied and then he/she selecting yes or no. These procedures are cumbersome and not much user friendly.

Proposed solution

Scanners come with a flatbed cover (with many having ADF placed on top of them). When a scan/copy is in progress, the ADF cover will be closed. To change the document being scanned/copied, the cover has to be opened and then closed. The proposal is to use the above events as a trigger to initiate the scan of the next document. The details are described below.

Figure 1: Representative image of scanner with cover sensor

The invention consists of the following components

1. A flatbed scanner unit which has a cover status sensor
    a. This sensor could be a feather touch toggle button or a light sensor
    b. This button is connected to the ASIC/CPU via a GPIO or other similar means
2. A UI firmware module that allows the user to select multi-page scan from flatbed
3. A firmware module that can detect the state of this button and in combination to user selection in point-2 can trigger appropriate events during a job cycle

When a user starts a scan/copy operation, the UI module allows the user to select multi-page scan from flatbed option. Along with this option, user makes other options necessary to start a scan/copy

(Eg. Color mode, resolution etc) operations and presses the start button. This is the only time the user presses start button. After that as one scan is over, user just opens the lid, replaces the document and closes it. This will result the sensor status to toggle twice and the firmware module will be intimated accordingly. The firmware module will then initiate the next scan start event at the earliest possible juncture. This has two advantages.

1. The user does not have to press the start button again and again
    a. Better user experience in terms of reduced effort
2. The user usually waits for a few seconds and then presses start button to ensure that operations pertaining to last scan has completed fully. As the start event is sent from the firmware in this case, the firmware can understand when the last scan is completed and immediately start the next scan, avoiding un-necessary delays.

Overall, the user will have an effortless, fast and friendly experience for the end user with this invention.

In figure-1, the sensor is shown as a simple touch/pressure sensor. However, it need not be so. Especially, when book copy needs to be made, the cover need not be closed fully. Specific sensors can be used to detect if the motion of the cover has stopped.

Drawings/Diagrams

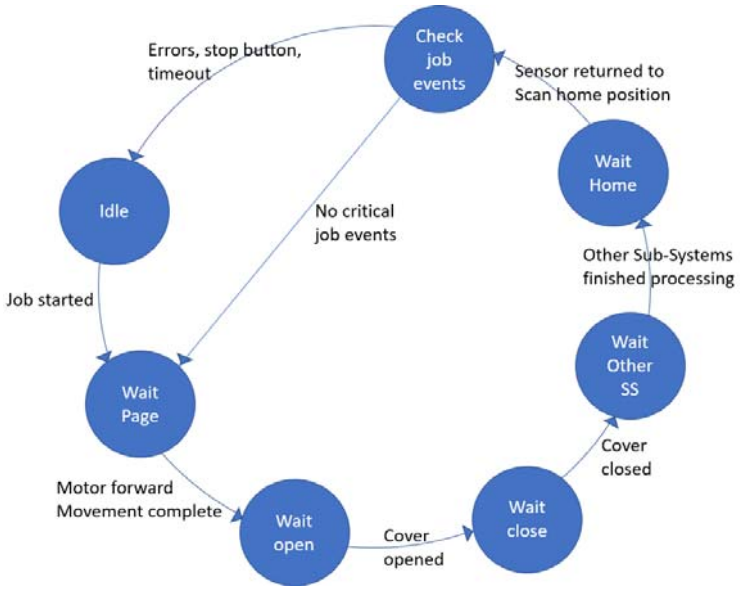

Figure 2: Overall system state diagram

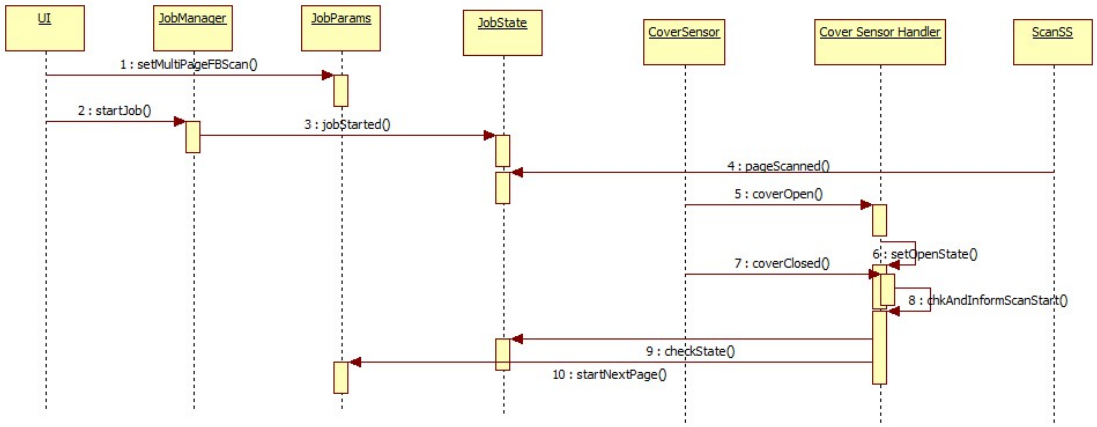

Figure 3: Simplified sequence diagram of the flow

Advantages

Biggest advantage is the simplified/effortless execution steps for the end user where the end user does not have to make frequent interaction with UI for a multipage scan from flatbed. Usually, the machine detects if a job has got over and then prompts the user to select if he wants to copy another document. Avoiding this step and allowing the machine to start a scan based on it detecting if a new document is placed on flatbed or not allows faster completion of jobs. This solution in comparison to some other solutions mentioned in reference patents need only minimal hardware modifications.

Reference patents/prior arts

1. https://patents.google.com/patent/US6055070A
    a. This patent mentions the issues that are currently faced in multi-page scan from flatbed. However, it has a different focus. The system disclosed herein is simple and addresses most of the issues addressed by this patent
2. https://patents.google.com/patent/KR20050072161A/en
    a. Describes a method of initiating a scan when a page is flipped. Relates to books and the hardware needed and the method are different. The systems and methods disclosed herein can work with minimal hardware, needs minimal change to existing hardware. It is more user friendly as there is no need to handle documents differently as it is handled now.

Disclosed by Sarin S B, HP Inc.