Abstract

In this thesis we analyse and improve the accuracy of paper displacement estimation of an optical paper position sensor developed by Océ Technologies. The goal of the research is to improve the sensor software, such that a higher accuracy is achieved in paper displacement estimation. Then it is possible for Océ to develop a cheaper sensor with less accurate components, which still gives the same accuracy as the old sensor. We demonstrate that with a few simple improvements a 65% increase in accuracy can be achieved.

For measuring the accuracy of paper displacement estimation, we developed a method which enabled us to measure and to compare different approaches under the same conditions. The accuracy of paper displacement estimation is influenced by many factors. The influence of illumination pattern, sensor's fingerprint, presence of noise, and the used algorithms on the accuracy is investigated and solutions to reduce these effects are found and tested. Some of these methods proved to be successful and enabled us to achieve a significant increase in accuracy.

Further we investigated the influence of this increase in accuracy on the total cost of ownership. Due to lack of available information about costs of possible substitute components of the sensor, we cannot give an exact overview of the influence on the total cost of ownership. However, we still managed to give an estimation of this influence and compared to the current sensor, it seems that less accurate components are not much cheaper, whereas more accurate ones do cost significant more.