

Introduction

In paper and printing industry, it is necessary to count the number of sheets accurately. At the moment, there are various methods to count security documents such as banknotes, passports, tax stamps. However, most of the existing methods make physical contact with documents, and therefore generate some marking and potential damage. They are not suitable to be deployed in counting complex secure documents that have many added security features, special inks, holograms and watermarks. In addition, some materials are transparent, and make edge detection particularly difficult. A non-contact optical counting method is required to count thin paper and banknotes, and presents a number of opportunities. This Knowledge Transfer Partnership (KTP) project aims to develop an optical counting machine by using advanced computer vision techniques. The new machine would totally eliminate the risk of damage to documents, and would be much quicker than mechanical counting. It would also allow for counting of thicker materials or those materials that are not 'pliable' and cannot presently be counted mechanically. This would offer customers increased accuracy, reliability, efficiency and productivity from their machines.

Objective

The Objective of this project is to develop a novel optical paper counting technique and enhance existing counting technology in order to improve the performance when counting items that have variable patterns and materials. There are two key technical challenges. Firstly, it is necessary to ensure that the developed computer vision algorithms can achieve 100% counting accuracy for all materials, including those with variable patterns and thicknesses. Less than 100% accuracy will not be acceptable and presents a significant challenge. Secondly, the new non-contact counting technique must be reconfigurable according to customer needs and therefore the learning algorithms and the flexible integration of the learning algorithms with machine vision algorithms will be a major challenge



Research Plan

- Review of options and customer needs analysis
- Novel counting software development
- Modular hardware development
- System integration and machine assembly
- Testing, evaluation, improvement, including demonstrations to customers
- Productisation
- Embedding knowledge and team skills development

Team members

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