Faithfully: Print Integrity Checker

Overview
Customers who use printers (both in business & private sector) require images produced from the printer to be “faithful” to the original; i.e. the print must match the original image correctly. If the print is not faithful to the original, vital information may not match the desired result, and the paper will not be adequate for the user.

Objective
Design a system that will check printed images using a remote device such as a mobile phone, and then analyze the image against a database of original images to ensure print quality. If the print is not satisfactory, alert the user of any errors.

Approach
- Visited the sponsor for detailed problem statements and design specifications.
- Broke down the system into 2 parts: front-end physical stand, and back-end coding.
- Constructed the front-end stand for consistent snap-shot distance between the mobile device and the printed paper.
- Found an efficient image transfer method that sends the image taken from the mobile device to the computer wirelessly via a router.
- Chose “MATLAB” as our simulator, due to both Penn State and Xerox having existing licenses for its use, and it’s being the most suitable for image analyses.
- Created a method to load images automatically into the software for analysis.
- Designed a work-flow-process on how each step process is needed to obtain the result.
- Created a way to display the result to the end user.
- Performed multiple tests under different conditions to discover any limitation and restraint in the system that could affect the end result.

Outcomes
We generated a new process for our needs in this project
- The sponsor will not need to obtain new software licenses for this process to be used in their products.
- The algorithm is open source and efficient. OCR and Chroma Key can be coded for better performance.
- Can be added to existing printers for enhanced performance.
- More features can be added to this concept, which leads to continuation of this project, possibly in a second follow-up project in the future.