PrintBase: context-based training on an electrophotographic press by implementing an on background knowledge based expert system

Heiko Angermann[1]

[1]Hochschule Darmstadt – University of Applied Sciences, Faculty of Design,
Olbrichweg. 10, 64287 Darmstadt, Germany

E-Mail: heiko.angermann@h-da.de;

Short Abstract

Teaching graphic printing is facing various challenges across levels of education. At the secondary educational level, print shops have difficulties finding suitable trainees who would like to learn the profession of printer. As a result, there is a need to deploy people that are solely trained on-the-job. At the tertiary educational level, universities face similar difficulties of finding potential students, why some institutions have reduced the range of courses in the field. This in turn affects that profound expertise about printing technology and print product diversity is also dwindling at management level. Whereas technological expertise is partly overcome by technical progress, a decline of product expertise remains a challenging factor. For example, printing on a lithographic offset press requires experiencing special features like color water balance, etc. Instead, operating a print job on a digital electrophotographic press mainly requires knowing the sequence of press specific instructions. However, understanding, why a stitch bound print product requires a number of pages divisible by four, why a new substrate requires a particular color profile, how the thickness of the substrate influences different criteria of print product quality, etc., can still be only understood by professionally educated print experts. To provide an expert-like training, the method for an artificially intelligent expert system entitled PrintBase is proposed. The aim of PrintBase is to professionally train print job operators on-the-press by providing a context-based training environment, which enables a training progress regardless of educational and professional background, and without requiring a human trainer. The method of PrintBase is developed by mimicking the knowledge of a print expert with tertiary educational level as so-called background knowledge inside the intelligent system. This background knowledge is organized hierarchically inside a taxonomy to enable a context-based training environment. This is, as the instructions are similar to the expert-driven knowledge, also structured inside a taxonomy. Consequently, the interfacing between both taxonomies leads to a path of instructions to be choosen by the operator on the press, with explanations focusing on the path of instructions provided by PrintBase. For example, the graphic user interface of the press allows choosing from a number of standard color profiles to be used for a print job, and PrintBase provides the necessary explanations, why different color profiles exist. If a color profile is choosen by the operator, PrintBases evaluates if the choosen color profile matches the paper to be used for the press. Another example, if the operator wants to produce a 36 pages brochure on a paper having a too thick grammage, it is explained, how the thickness of the paper influences the envelope behavior, but also how the thickness may influence the opacity of the paper. At the conference, the method of PrintBase will be explained, including first results of implementing the prototype of the artificially intelleigent expert system prottotype for an electrophotographic press using the lobic programming language of Prolog. In addition, it will be discussed how the protoype is already used for teaching students on-the-press.

Keywords: Artificial Intelligence, Expert System, Taxonomy, Context-Based Training;