

Printed Smart Objects and Their Digital Fabrication

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Abstract

Printing Technologies are additive technologies which allow the deposition of functional materials exactly at positions where they are needed to assure a certain functionality, e.g., employing traditional inks, printers print the functionality color. During the development of traditional and digital printing technologies press makers and printers gained a number of very special competences which enable them to extend their scope to print inks addressing functionalities beyond color. By printing inks which represent the functionalities insulation, conductivity and semi-conductivity in appropriate patterns on top of each other, electrical circuitry, can be manufactured which allow introducing new functionalities into printed matter. The choice of the technology per printed functionality depends on the printability of the functional ink.

Future Hybrid Manufacturing Systems will consist of a modular designed machine base which will allow the user to "knob-in" the printing technology he needs for a given functionality, efficiently conflating the traditional and the modern non-impact ones. The deposition of the materials in required patterns will be complemented by further digital manufacturing technologies. Most promising is laser technology for pattern improvement, post-press treatment of the printed patterns, and cutting. This employment of digital fabrication technologies will facilitate very short runs and change over times.

The paper will discuss opportunities, challenges and limitations of printing smart objects with functionalities beyond color.