Design of a Laser Projection System for Intelligent Learning Environments

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Abstract: In this paper, the design and implementation of a laser projection system for use in intelligent learning environments is presented. Such a system has the advantages of drawing interesting, bright and vivid laser animations, which draw the attention of students better than most standard display technologies. In addition, the projection may be done on actual physical items standing in front of the students, which opens up many possibilities for gamification and augmented reality use cases in education. Besides the hardware of the laser projection system and the associated firmware, we also designed, created and tested our own desktop software that optimizes and prepares the data for projection. Our goal is to enable the creation of high-quality laser animations while reducing the time and efforts needed by teachers to prepare them. Our experimental results show that our concept has good potential and that the hardware and firmware of the system perform very well. Our data optimization strategies implemented through the desktop software also gave excellent results. This means that intelligent learning environments may employ laser animations successfully and let students benefit from this new approach to presenting information.