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Implementation of adaptive coded aperture imaging using a digital micro-mirror device for defocus deblurring

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ABSTRACT:

Digital image processing (DIP) and computational photography are ever growing fields with new focuses on coded aperture imaging and its real world applications. Traditional coded aperture imaging systems consisted of statically coded masks that were designed and constructed from cardboard or other opaque materials and could not be altered once their shape had been defined. This is undesirable as numerous aperture pattern masks exist, each with their own advantages and disadvantages, and alternating between aperture shapes with a traditional camera quickly and efficiently is impractical. This paper aims towards developing an adaptive coded aperture imaging system utilizing a digital micro-mirror device (DMD) as a programmable aperture that is able to switch between different aperture patterns quickly and efficiently. This provides all the advantages of traditional coded aperture imaging systems but without the disadvantage of having a static aperture in the aperture plane.