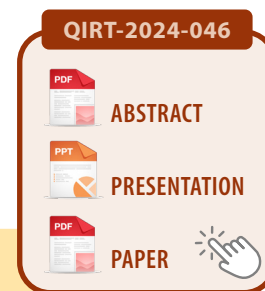




mgr. inż. Krzysztof SZAJEWSKI
Military University of Technology
Ul. gen. Sylwestra Kaliskiego 2
00-908 Warsaw
Poland
e-mail: krzysztof.szajewski@wat.edu.pl

Krzysztof Szajewski is a research and teaching assistant at the Military University of Technology (WUT) in Warsaw, Poland.



dr. inż. Anna SZAJEWSKA

Fire Academy, Warsaw, Poland

Sebastian URBAŚ

Łódź University of Technology, Institute of Electronics, Łódź, Poland

dr. inż. Robert OLBRYCHT

Łódź University of Technology, Institute of Electronics, Łódź, Poland

prof. dr hab. inż. Bogusław WIĘCEK

Łódź University of Technology, Institute of Electronics,

Department of Electrical Engineering, Electronics, Informatics and Automation, Łódź, Poland

IMAGING IN NIR SPECTRAL RANGE WITH A SINGLE DETECTOR USING HADAMARD MATRIX PATTERN-BASED SLM

Hadamard matrices have many interesting properties that make them useful in various field of mathematics, computer science and engineering. The Hadamard transform, like the Fourier transform, can be used for image analysis and image compression, where the reduction of redundant information can be achieved by transforming the image into the Hadamard domain and then retaining only the most important components. Using an appropriate SLM (Spatial Light Modulator) it is also possible to transform the stream of recorded one-dimensional samples taken from a single NIR detector placed behind the modulator into 2D space. The article pre-

sents the construction of a single-pixel camera using a rotating disc with an aperture encoded using a Hadamard matrix. The matrix was generated with a quite rarely used generator using prime numbers (two-primes). This simplifies the complexity of the aperture. Previous work on SPC (Single Pixel Camera) was based on images in visible light in which modulators are made in the form of DMD matrices used in vision projectors adapted only to the visible range. The presented solution is an example of the first use of a movable aperture for imaging beyond the visible light spectrum in which only one detector is used for imaging.