

# INNOVATIVE GRAPHICAL BRAILLE SCREEN FOR VISUALLY IMPAIRED PEOPLE

Dimitar Karastoyanov, Ivan Yatchev, Iosko Balabozov

IICT-BAS

## Abstract

The graphical interfaces based on visual representation and direct manipulation of objects made the adequate use of computers quite difficult for people with reduced sight. Within the European Union, the problem with the access of blind people to computer resources is quite pressing. A new type graphical Braille screen is developed.

The Braille screen is a matrix with linear electromagnetic micro drives and non magnetic needles, passing through the axes of the electromagnets. Over the electromagnets is mounted a grid with holes. The needles go through the holes and move up pimples. The visually impaired people feel them tactile way and can adopt symbols and graphics. Permanent magnet linear actuator intended for driving a needle in Braille screen has been optimized. Finite element analysis, response surface methodology and design of experiments have been employed for the optimization.

The influence of different parameters of the construction of a recently developed permanent magnet linear electromagnetic actuator for driving a needle in a Braille screen is studied. Static force characteristics of recently developed permanent magnet linear actuator for driving a needle in Braille screen are presented.

Using the graphical Braille screen, we can present symbols and simple graphics – Windows icons for example.

The results of experiments for high speed moving of Braille needles using linear electromagnetic micro drive are presented. The experiments were conducted in the laboratory "Smart lab" with using of high speed camera NAC Memrecam.

The international of Bulgarian patent application is presented as follows:

Braille Screen – WIPO Patent Application, No P C T / B G 2014 / 000038, October 24, 2014

Braille Screen – Bulgarian Patent Application, No 111638, November 29, 2013

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