Multifunctional Orientation System

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The goal of the project is to research and develop methods and tools to improve the capability of people with visual impairments to orientate and to increase the safety of their traffic. To reach this target, a new approach is implemented, consisting of placement of sensors on three levels: at the height of the head, middle part of the body and on legs. This allows the user to increase the orientation accuracy in space. The developed device uses various types of sensors to determine the distance to obstacles. It increases the comfort of the user and the stability of the device. The proposed setup uses the following channels of information transfer to the user: sound, tactile and color. The device consists of three modules. The first is: glasses with ultrasonic and infrared sensors to determine the distance and LEDs, which light up in a certain color depending on the distance to the obstacle (it is intended for visually impaired people). This module allows detecting obstacles at the level of human height. The next module is placed on the belt. It is the sonar registering obstacles at the level of the abdomen. Vibrating motors operating at different frequencies signal the presence of obstacles. The third module is designed to determine sidewalk curb and other low obstacles and allows to walk the stairs. As a result of the project, the prototype of the autonomously working device has been developed. It brings to people with visual impairments the independence and safety of walking.

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