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CONTACTLESS HAND IDENTIFICATION USING MACHINE LEARNING

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Summary: Hand gesture recognition systems are becoming more popular for human machine interfaces (HMI) in consumer devices, as well as in industrial and medical applications. Therefore, it is desirable to control access rights by users or user groups. We propose a user identification system that is able to recognize users by their hands. Four concepts are presented, that vary in the degree of required user cooperation - ranging from high cooperation by performing a specific pose holding the hand spread out, to no specific cooperation by only performing the usual hand gestures of the HMI. A depth image of a time-of-flight sensor is used to detect hands and to segment them from the background. After transformations on the region of interest, an infrared image of the same sensor serves as input to a convolutional neural network for classification. Experimental results indicate the feasibility of the user identification system, with rates above 96% of success in classification of up to 23 users.