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Virtual Airplay Drum Kit based on Hand Gesture Recognition

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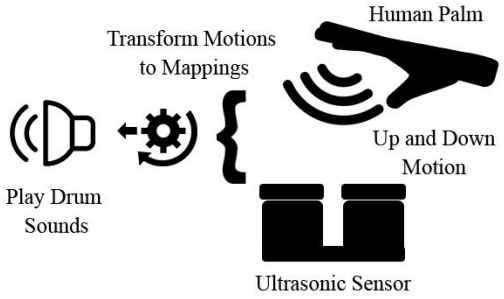
In the music industry, a drum kit plays a vital role in the production of masterpiece musical melodies. It is also one of the instruments that is in greatest demand by youngsters who are passionate in learning and practicing music. But acquiring a typical drum kit is become a difficult task because of its high cost as well as it requires a large storage space to hold. This research is targeted in examining the possibility of engineering a cost-effective solution to build a portable drum kit. In this approach, ultrasonic sensors are used in order to identify hand gestures. Ultrasonic sensor is used to measure the distance to an obstacle using the theories of sound reflectance. The obstacle in this scenario is the human palm. When the palm of the human is moved up and down above the ultrasonic sensor, mimicking the typical actions of playing a drum kit, the changes in distances to the palm are mapped to corresponding drum sounds using a sound generation algorithm. This algorithm is further optimized in such a way that it yields an optimal consistency in readings, regardless of the typical issues of the low cost ultrasonic sensor such as noise, low accuracy of distance readings and random loss of signal. The solution was tested with the feedback of the general audience and it yielded satisfactory results, in achieving our goal. In conclusion, this approach could be well used in reaching our goal based on over 75% of positive feedback (rated very good and good) received. But in order to improve its accuracy and efficiency, more expensive and more accurate distance sensors such as high precision ultrasonic sensors or infrared sensors could be used. The portability, the low cost of engineering, and yet the deliverance of acceptable level of quality of music, could be identified as the unique key point of this research.

Keywords: virtual; airplay; drum kit; hand gesture



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