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MIDI GLOVE

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Abstract- **T**his paper aims to develop a music system using PIEZO Sensor by inter facing LabVIEW . When we press the sensor we get the ADC values. By using that ADC values, we can turn into the DC values and give that values to Microcontroller. For this project we are using microcontroller and LabVIEW MIDI (Musical Instrument Digital Interface) is a protocol that was established in the early 1980's to standardize the emerging field of digital instruments. A MIDI controller is a piece of a hardware or software, typically a keyboard, that allows a user to connect to a digital synthesizer and play any instrument. Our final project for ECE 4760 was to prototype a glove MIDI controller that transmits MIDI signals corresponding to individual finger taps. We attached a piezoelectric vibration sensor to each of 8 fingers on a pair of leather driving gloves. The gloves are attached to a microcontroller which processes the taps and outputs MIDI signals via a standard MIDI output port. Additionally, the user can select a variety of note mapping schemes and presets for the gloves via a user interface in LABVIEW.

Index Terms- MIDI controller, Lab VIEW, Piezo sensor.

I. INTRODUCTION

MIDI (Musical Instrument Digital Interface) is a protocol that was established in the early 1980's to standardize the emerging field of digital instruments. A MIDI controller is a piece of a hardware or software, typically a keyboard, that allows a user to connect to a digital synthesizer and play any instrument. Our final project for ECE 4760 was to prototype a glove MIDI controller that transmits MIDI signals corresponding to individual finger taps. We attached a piezoelectric vibration sensor to each of 8 fingers on a pair of leather driving gloves. The gloves are attached to a microcontroller which processes the taps and outputs MIDI signals via a standard MIDI output port. Additionally, the user can select a variety of note mapping schemes and presets for the gloves via a user interface in LABVIEW.

II. LITERATURE SURVEY

Data gloves have been widely used in art and entertainment for human computer interaction (P5 3D Virtual Glove, 5DT Data Glove, Reality Quest N64 Nglove, DG5-VHand, and Wireless MIDI Glove [Eric Singer], The Lady Glove [Laetitia Sonoma and Bert Bongers], The Hands [Michael Waisvisz], Shaman Hands, [Matthew Burtner], etc.). Many types and combinations of sensors have been used for capturing gestural data, and some data gloves have been intended for use with other specially designed interfaces for capturing other gesture data [2].

EMG sensors record electrical activity in muscle tissue through electrodes attached to the skin or in the muscle, and represent it as an audible or visual signal. The sEMG measures muscular electrical activity through surface electrodes [3], and is quite well tried out as a musical instrument ([8] and [6]), for monitoring purposes in music related activities ([9] and [10]), sports activities [4], learning [7], and numerous other situations [1]. EMG sensors have previously been used for generating sound and images in real time ([11], [12]), where the extracted data was digitized into MIDI data and mapped onto sinusoidal waveforms for additive synthesis and frequencymodulation.

III. PROPOSED WORK

The sEMG sensor used is an active dry surface single differential recording electrode that uses metal bars to make electrical contact with the skin (Fig. 3; [10]). The signal is attenuated to lie in the range ±1V, filtered, and sampled before being passed on for analysis. The sEMG sensor is embedded in the sleeve of the SoundGlove II. The muscles that flex the fingers are the flexor digitorum superficialis (FDS), flexor digitorum profundus (FDP), and flexor policis longus (FPL). The muscle immediately available for sEMG measuring is the FDS (Fig. 4). It flexes the middle bone of the 2 nd to 5 th finger at the level of the joints, and secondarily flexes the corresponding first finger-joints and the wrist-joint. Skin contact is secured by a velcro strap keeping the sensor in place. The hand of the glove has the function of keeping the sensor at the appropriate distance and angle from the hand. The measurements reflect tension, and not motion. If the hand is clinched there will be plenty of muscular activity, but no motion. When the hand is relaxed (and the arm is released) there will be motion, but no muscular activity. This implies that the SoundGlove II could to advantage be combined with a 3D positional sensor.

The present work designed MIDI gloves which produces the music without using a musical instrument in music recordings. This has several applications like it can be applied in gaming therapy and in many more areas. We can replace musical instruments with the glove and not only that we can reduce the equipment required for conventional devices.

V. CONCLUSION

Current we use midi glove for music recording which enables a person to play the song concurrently This reduces the strain of a person and also reduce the equipments in the music recording studios.

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IV. RESULTS AND DISCUSSION