Supporting Information

**Fabric-Based Self-Powered Noncontact Smart Gloves for Gesture Recognition**

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## 1. Supplementary explanation

The following is the supplementary explanation of the encrypting method that converts relative amplitude of voltage output into decimal numbers shown in a numerical indicator connected to the sensing system for distinct and straight forward readout. We convert the relative amplitude of peak voltages into a distinct 4-digit code. The first three digit is the electrode numbers with the sequence of relative amplitude from large to small e.g. in gesture 3 it is 324, and in gesture 5 is 342. While the last digit is the number of electrodes whose relative amplitude is greater than 0.5 e.g. in gesture 1 it is 1, and in gesture 3 it is 2. In overall, all the gestures in Figure 6 will have its unique 4-digit code e.g. gesture 3 corresponds to 3242, and gesture 5 corresponds 3422. As a result, even though the voltage output is widely distributed and the difference between some gestures are subtle, we can still make a clear recognition on most of the common gestures by converting the voltage output into digitalized numbers. In addition, the volume of this coding method is 96 (4! × 4), indicating that it can accommodate enough

gestures for daily usage.

Furthermore, the voltage output signal is converted into straightforward readouts. We encrypt the 4-digit code into 2 digit decimal numbers (01-96), and added numerical indicator into the sensing system to present them. In Figure S3a and c, the relative amplitude of peak voltages from four electrodes corresponding to 10 different gestures are shown which is identical to those in Figure 6. While the corresponding gestures and decimal numbers on the numerical indicator, together with the 4-digit codes is shown in Figure S3b and d. Only the last two digits shown in the numerical indicator is effective, while the first digit is fixed to 1. It can be concluded that when wearing the smart gloves, users are able to distinguish the output signal with distinct and straightforward readout.

## 2. Supplementary Figures
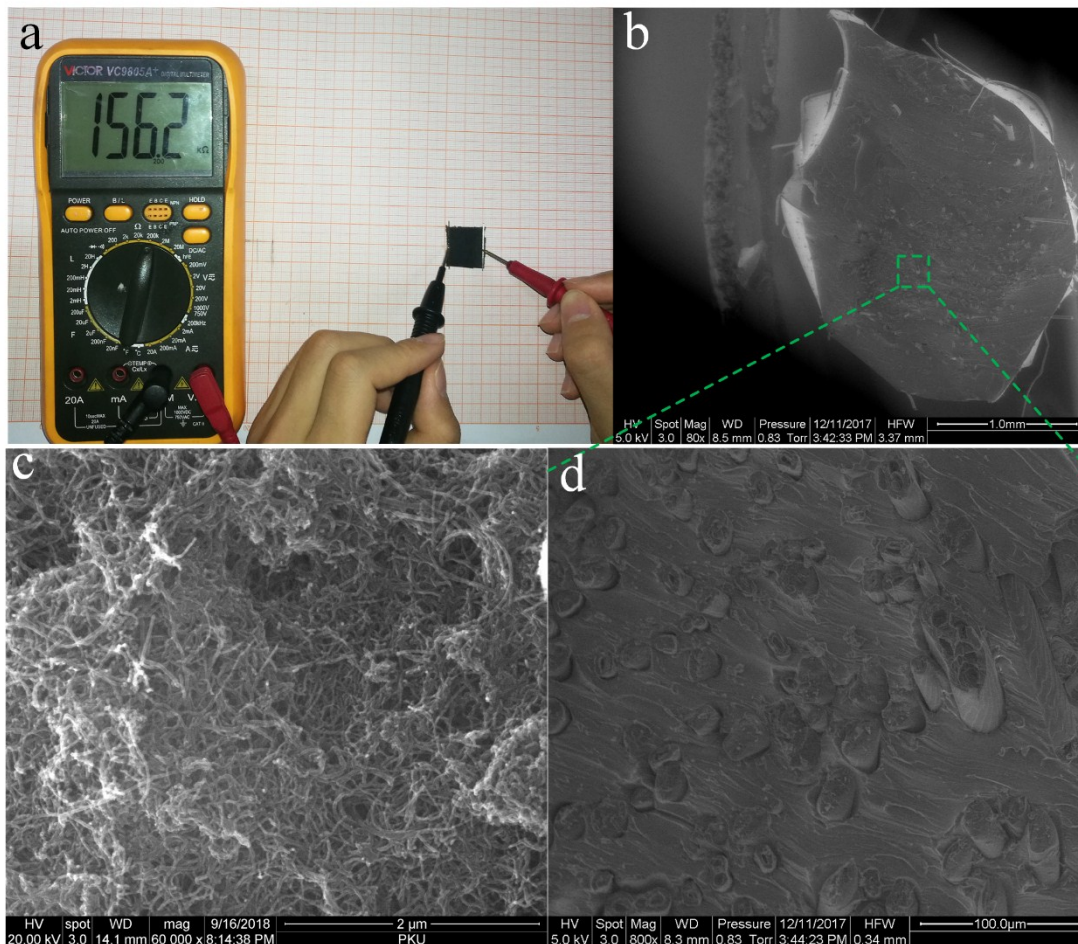
**Figure S1.** (a) Measurement of the sheet resistance of the CNT-coated cotton fabric. (b). ESEM image of the cross section of the PDMS-coated wool yarn. (c). ESEM image of the CNT-coated cotton fabric. (d). Enlarged image of the cross section in (b).
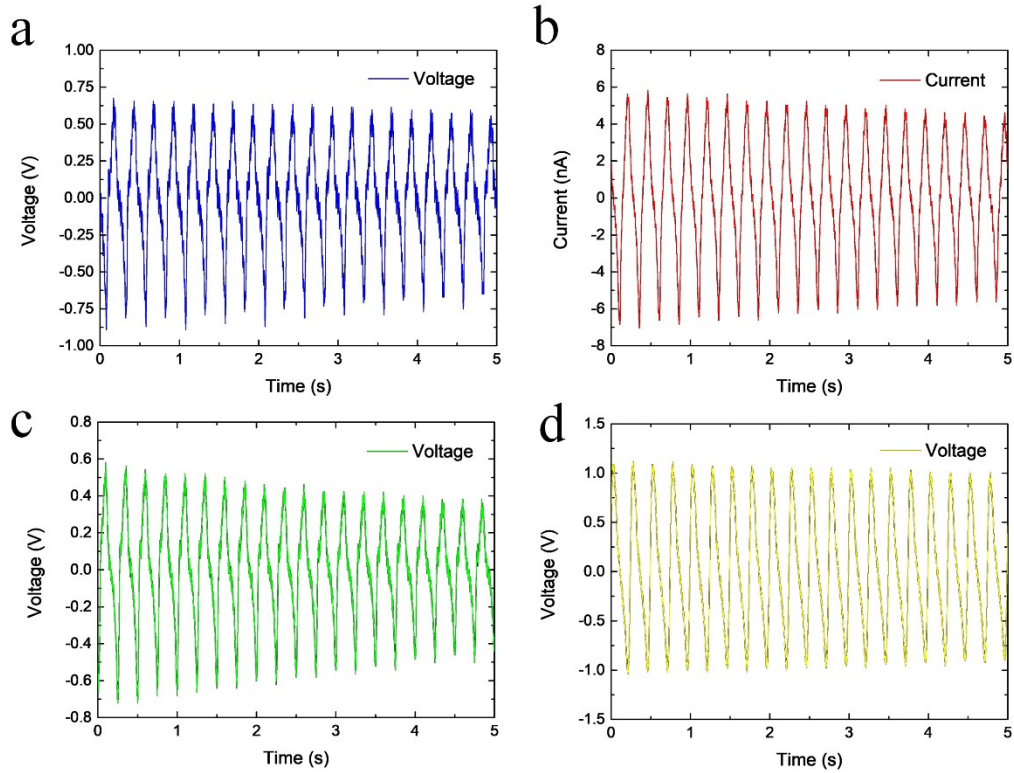
**Figure S2.** (a) The noncontact output voltage waveform for characterizing the derived power value. (b) The noncontact output current waveform for characterizing the derived power value. (c) Output noncontact voltage waveform before 100000 repeated contact and separation cycles. (d) Output noncontact voltage waveform after 100000 repeated contact and separation cycles.
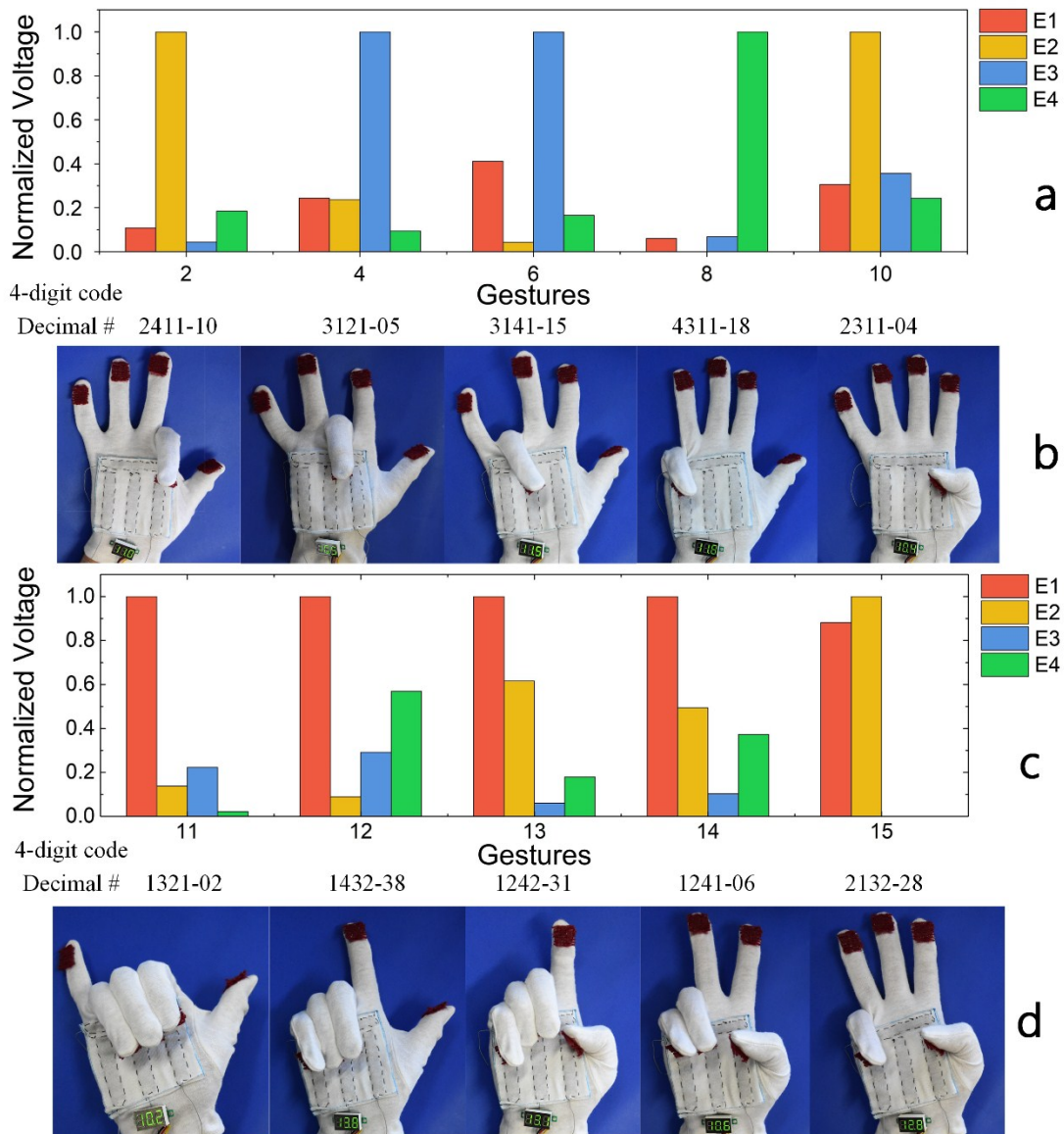
**Figure S3.** (a) Relative voltage amplitude corresponding to different finger bending. (b) Gestures resulting in the output in (a) with a numerical indicator for straightforward readout. (c) Relative voltage amplitude corresponding to common daily used gestures. (d) Gestures resulting in the output in (c) with a numerical indicator for straightforward readout.