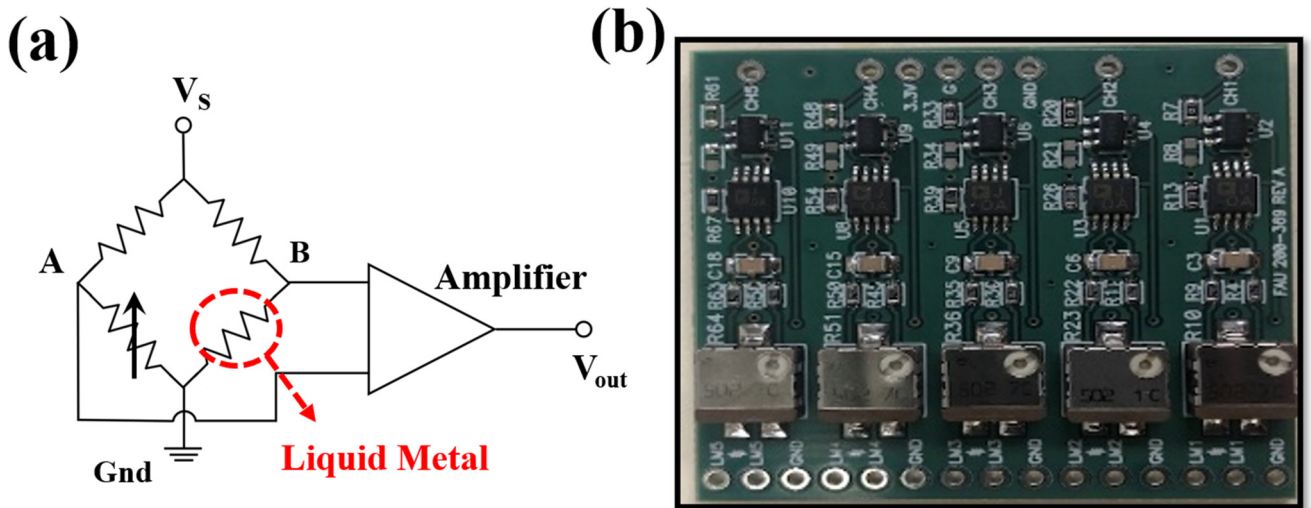
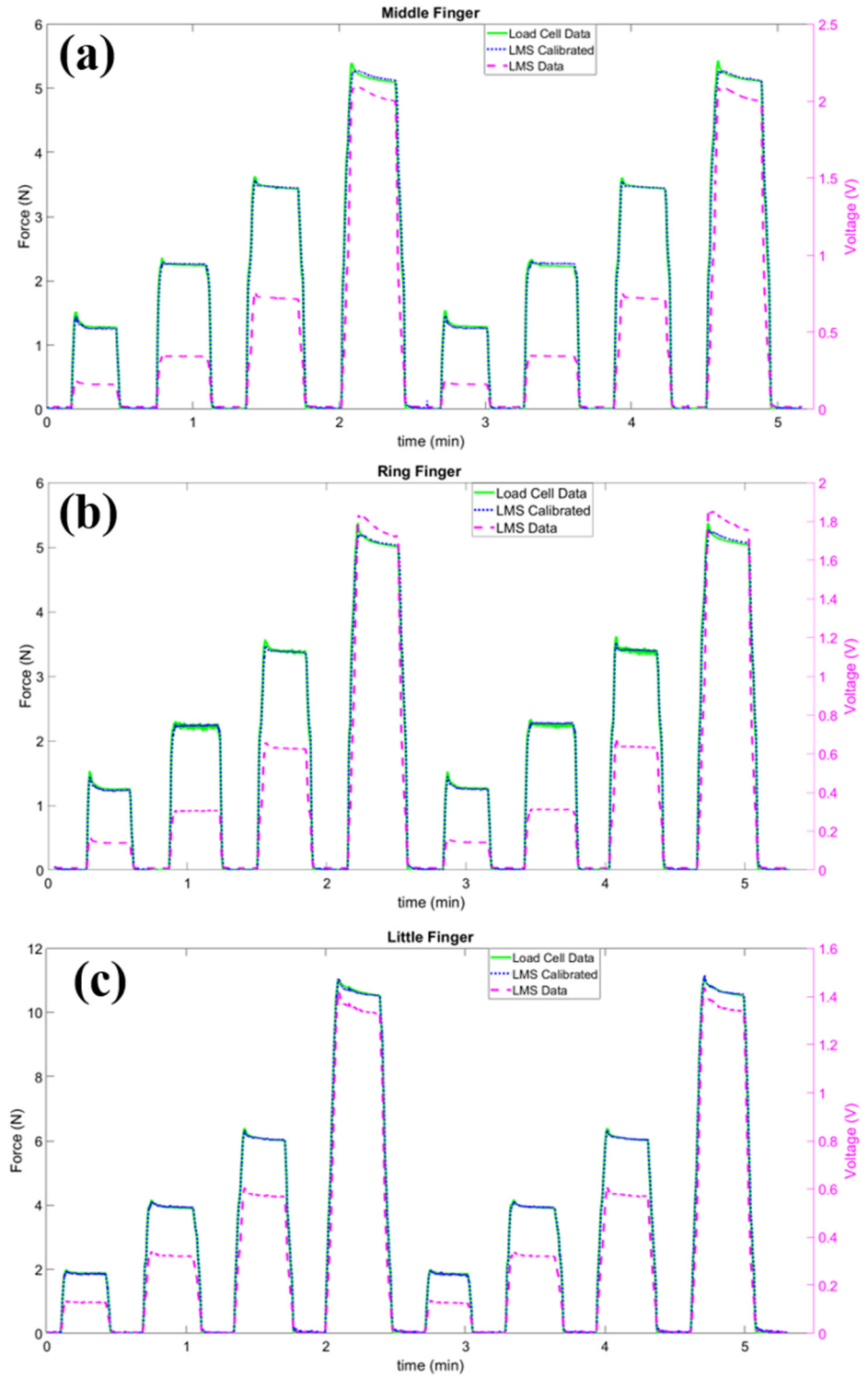


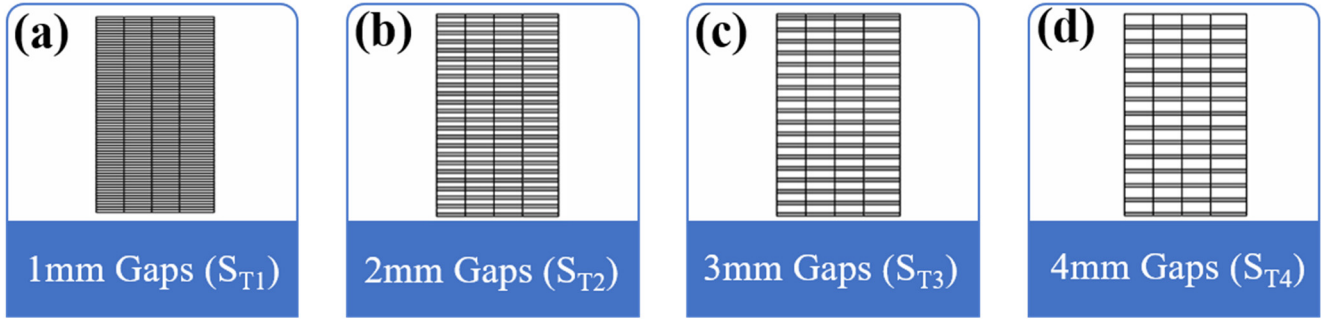
**Figure S1.** Sensing principle of the LMS. (a) The liquid metal sensor is encapsulated in Dragon Skin-30 (DS-30). (b) Pressing onto the LMS causes deformation of the microchannel containing the liquid metal. This change in cross-sectional area and length of the microchannel changes the electrical resistance of the conductive liquid metal element.



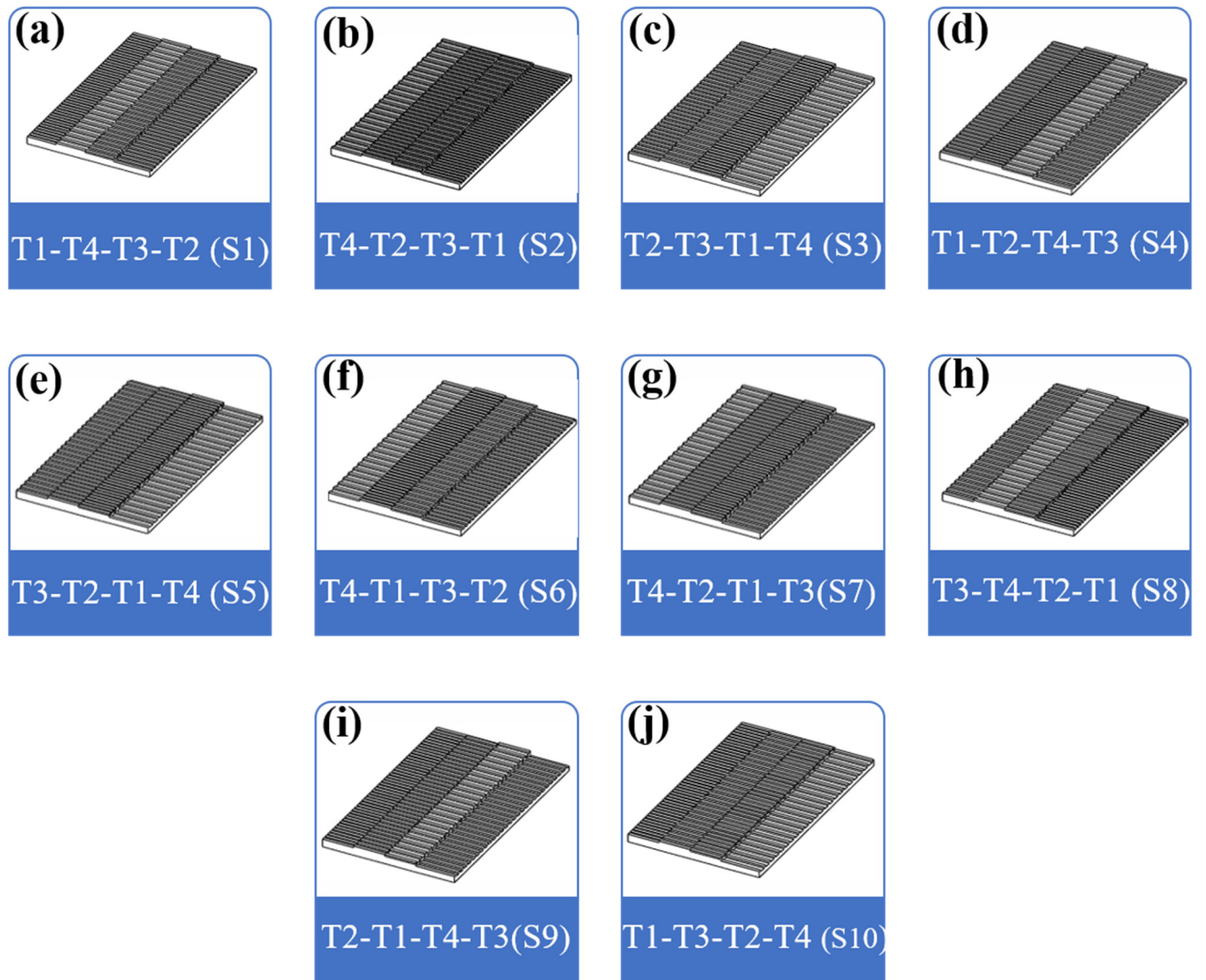
**Figure S2.** Electronics for the LMS. (a) The liquid metal conductive element was placed in a Wheatstone bridge configuration. (b) A five channel Wheatstone bridge PCB was used to amplify the signals from the LMSs on the fingertips of the i-limb prosthetic hand.



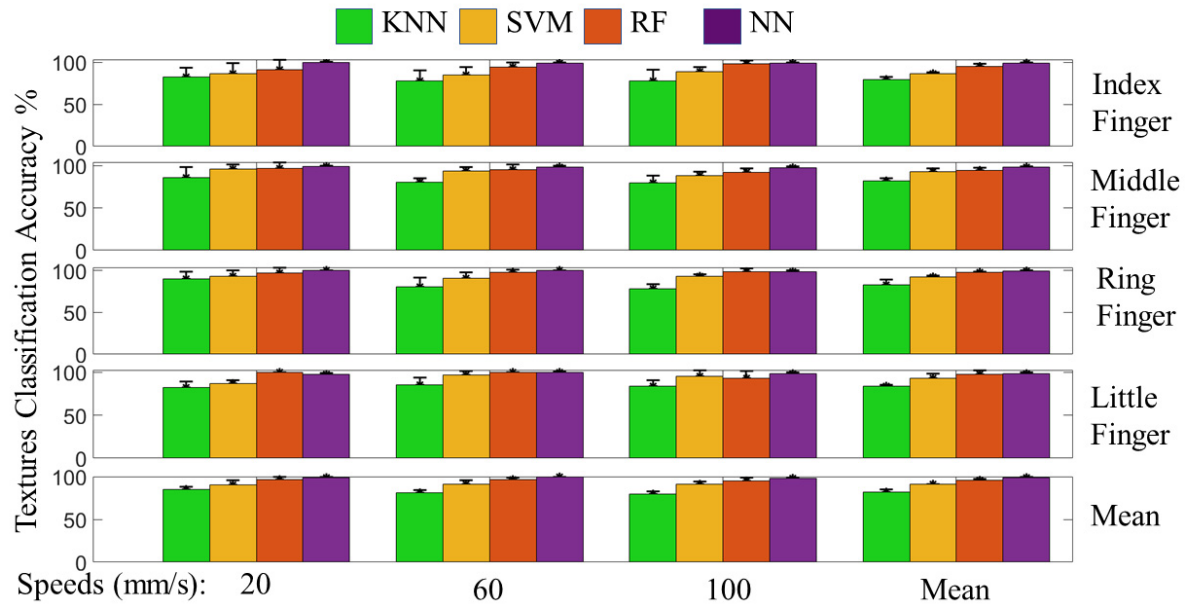
**Figure S3.** Calibration of the liquid metal sensors. (a) Middle finger calibration. (b) Ring finger calibration. (c) Little finger calibration. An external load cell was used as a reference.



**Figure S4.** Single-texture surfaces to detect speed of sliding contact and textures. Each of the four different surfaces had four copies of the same texture. (a) Surface  $S_{T1}$  had four copies of texture T1 for all four fingers to contact. (b) Surface  $S_{T2}$  had four copies of texture T2. (c) Surface  $S_{T3}$  had four copies of texture T3. (d) Surface  $S_{T4}$  had four copies of texture T4.



**Figure S5.** Ten different multi-textured surfaces ( $S_1$ -  $S_{10}$ ) were used to validate the potential for hierarchical tactile sensation integration from four fingertips simultaneously. Each of the ten surfaces had the four different textures (T1-T4) in different locations.



**Figure S6.** Texture classification accuracy for each finger with three different speeds of sliding contact. See also Figure 9.

Figure S1: Sensing principle of the LMS.

Figure S2: Electronics for the LMS.

Figure S3: Calibration of the liquid metal sensors.

Figure S4: Single-texture surfaces to detect speed of sliding contact and textures.

Figure S5: Ten different multi-textured surfaces (S1- S10).

Figure S6: Texture classification accuracy for each finger with three different speeds of sliding contact.