## CLAIMS

1. A flexible pressure sensor comprising:

a first flexible layer;

a second flexible layer;

one or more pressure sensitive layers;

wherein each of the first flexible layer and the second flexible layer comprises electrodes spaced apart at a distance sufficient to minimize cross-talk,

wherein the first flexible layer and the second flexible layer are arranged to have the electrodes of the first flexible layer correspond in position with the electrodes of the second flexible layer;

wherein the one or more pressure sensitive layers are configured between the first flexible layer and the second flexible layer, and in contact with the electrodes of both the first flexible layer and the second flexible layer,

wherein the distance between adjacent electrodes of each of the first flexible layer and the second flexible layer is in a range of 2 mm to 3 mm,

and

further comprising

a processing module operably coupled to the flexible pressure sensor, wherein the module:

(i) is trainable to discriminate:

a point of contact,

a direction of the contact, and

if an object is sharp or blunt,

and

(ii) aids in generating a pressure map on a user interface for identifying the point of the contact, the direction of the contact, and if the object is sharp or blunt.

2. The flexible pressure sensor of claim 1, wherein the first flexible layer and the second flexible layer comprise polyimide, silicone, a thermoplastic elastomer, an insulating material, or a printable resin.

3. The flexible pressure sensor of claim 1 or 2, wherein the one or more pressure sensitive layers are piezoresistive.

4. The flexible pressure sensor of any one of claims 1 to 3, wherein the one or more pressure sensitive layers comprise a polymeric material incorporated with carbon black, carbon fiber, activated carbon, carbon nanotube, or graphene.

5. The flexible pressure sensor of any one of claims 1 to 4, wherein the electrodes of each of the first flexible layer and the second flexible layer are arranged in an array electrically connected by interconnects.

6. The flexible pressure sensor of claim 5, wherein the electrodes and the interconnects comprise electrically conductive nanoparticles.

7. The flexible pressure sensor of claim 5 or 6,
wherein each of the electrodes has a thickness in a range of 0.1 μm to 1 μm; and/or
wherein the interconnects have a thickness in a range of 0.1 μm to 1 μm.

8. The flexible pressure sensor of any one of claims 1 to 7, wherein the flexible pressure sensor is operable in a range of 0 to 600 kPa.

9. A device comprising the flexible pressure sensor of any one of claims 1 to 8.

10. A method of forming the flexible pressure sensor of any one of claims 1 to 8, the method comprising:

forming the first flexible layer and the second flexible layer both comprising electrodes patterned thereon;

providing the one or more pressure sensitive layers to be configured between the first flexible layer and the second flexible layer, and in contact with the electrodes of both the first flexible layer and the second flexible layer;

arranging the first flexible layer and the second flexible layer to have the electrodes of the first flexible layer correspond in position with the electrodes of the second flexible layer, and

having the processing module operably coupled to the flexible pressure sensor,

wherein forming the first flexible layer and the second flexible layer both comprising electrodes patterned thereon comprises printing the electrodes to be spaced apart at a distance sufficient to minimize cross-talk, wherein the distance between adjacent electrodes of each of the first flexible layer and the second flexible layer is in a range of 2 mm to 3 mm.

11. The method of claim 10, wherein forming the first flexible layer and the second flexible layer both comprising electrodes patterned thereon comprises printing the electrodes on each of the first flexible layer and the second flexible layer.

12. The method of claim 11, further comprising cleaning of the first flexible layer and the second flexible layer, prior to printing the electrodes.

13. The method of any one of claims 10 to 12, wherein forming the first flexible layer and the second flexible layer both comprising electrodes patterned thereon comprises mixing conductive nanoparticles in an aqueous medium to form a nanoparticle ink.

14. The method of claim 13, wherein the nanoparticle ink comprises the conductive nanoparticles in a concentration range of 20 wt% to 60 wt%.

15. The method of any one of claims 10 to 14, wherein forming the first flexible layer and the second flexible layer both comprising electrodes patterned thereon comprises printing interconnects to have the electrodes of each of the first flexible layer and the second flexible layer electrically connected.

16. The method of any one of claims 10 to 15, further comprising sintering the electrodes at a temperature in a range of 100°C to 300°C.