**FUNDING PROGRAM FOR NEXT GENERATION WORLD-LEADING RESEARCHERS**

| **Project Title**: Creation of QOL technology based on tactile and touch feelings | |
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**1. Background of research**

Tactile sense and the sense of touch are active senses that humans actively move their hands and fingers to receive stimuli from mutual deformations of hands/fingers and objects, and so on. Clarification of the mechanisms of tactile sense and the sense of touch demands a clear understanding of relations between finger motions and the obtained various information by the motions. However, there has not been adequate study done on this, so that development of a device for obtaining information of the senses is strongly desired both domestically and internationally.

**2. Research objectives**

A driving equipment to enable human finger motion and a multifunctional sensor are fabricated. The driving equipment and the sensor are consolidated into one sensor system to measure and obtain various tactile information, by studying signal processing. The mechanism of tactile sense and the sense of touch are clarified and systematized by using the obtained information. Then findings concerning the mechanism are fed back to the improvement of the sensor system. In particular, a palpation sensor, a compact sensor system for reading Braille, and a touch motion measurement and display system are developed as QOL technologies.

**3. Research characteristics (incl. originality and creativity)**

Palpation objects with various physical values are prepared. Human subjects touch the palpation objects and answer inquiries on the tactile sense and the sense of touch. At the same time, hand and finger motions, force, deformation, oscillation are measured. Driving equipments and sensors are designed and fabricated on the basis of the measurement results. Furthermore, the sensors are improved and fabricated by studying other necessary tactile information. By investigating the relationship among results of measurement using the fabricated sensor system, the touch feeling measurement by hands and fingers, and physical values of objects, the mechanism of tactile sense and the sense of touch are clarified and systematized.

**4. Anticipated effects and future applications of research**

Clarification and systematization of the mechanism of tactile sense and the sense of touch can be expected to apply to digital examination device for palpation in vivo and to use for identifying diseased tissues early. Touch motion measurement and display system can be the guide of hand and finger motion trainings in the fields of medicine, welfare, healthcare and others.