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## **The study on walking intention detection of knee joint anterior displacement using rollator based on IR sensor**

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To compensate the defect of rollator based on FSR (Force Sensing Resistor) or force sensor such as velocity control problem on gait slopes, Knee joint anterior displacement was investigated to detect walking intention detection using IR (Infraed Ray) sensors. Leg muscle activities and foot pressure are also measured in order to verify our investigation. Two IR sensors are placed on the center of rollator to sense right and left legs' walking intention. EMG signal was monitored rectus femoris, biceps femoris, tibialis anterior, and gastrocnemius. Pedar-X system measured foot pressure (forefoot, mid foot, hindfoot, and average pressure). Twenty healthy males (age  $24.3 \pm 1.5$  years, height  $174.7 \pm 5.3$ , and weight  $72.6 \pm 4.6$ kg) were involved in experiments which had been preceded 30 minutes a week, during 3 weeks. The gait slope and increasing velocity situation show that knee joint anterior displacement was increased. Based on EMG and foot pressure results, femoral region muscles' activation increased and load activated was concentrated on hindfoot in volar titling case. On the contrary, lower leg muscles were more activated and concentrated load was located in forefoot. These results were similar to knee joint anterior displacement from IR sensors.

### **Biography**

Seongmi Song has completed her bachelor's degree from Chonbuk National University in Biomedical Engineering and she is working towards a master's degree from Chonbuk National University in Healthcare Engineering. She is interested in fall detection based on gait analysis and nanomaterials.

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