System Integration and Control of Dynamic Ankle Foot Orthosis for Lower Limb Rehabilitation

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Abstract—**Gait disorder is the inability of a person to assume upright position, maintain neither balance nor the aptitude to initiate and sustain rhythmic stepping. This form of disability may originate from cerebellar disease, stroke, spinal injury, cardiac disease or other general conditions that may bring about such disorder. Studies have shown that one's mobility may be improved with continuous locomotor activity. Traditional rehabilitation therapy is deemed labour as well as cost intensive. Rehabilitation robotics has been explored to address the drawbacks of conventional rehabilitation therapy and the increasing demand for gait rehabilitation. This paper presents a simple yet decent technique in the control and actuation of a new Dynamic Ankle-Foot Orthosis (DAFO) designed to rehabilitate the dorsiflexion and plantarflexion motion of the ankle. The DAFO is equipped with two force sensitive resistors (FSR), which act as a limit switch controlling the actuation of the DC motor to a certain dorsiflexion/plantarflexion motion according to the gait phases detected. The results show that the two FSR sensors are sufficient to detect gait phases and act as limit switches to control the actuation of the ankle DC motors, and thus proving the potential of the current system and design for future application.**

Keywords-Gait analysis; plantarflexion; dorsiflexion; Dynamic Ankle-Foot-Orthosis (DAFO); rehabilitation