Assessment of sensorimotor and cognitive function plays a crucial role in all facets of patient care, from diagnosing the specific disease or injury, to management and monitoring of rehabilitation strategies to ameliorate dysfunction. Most assessment scales for sensorimotor function are subjective in nature with relatively coarse rating systems, reflecting that it is difficult for even experienced observers to discriminate consistently small changes in performance using only the naked eye. Our general hypothesis is that robotic technologies can provide an objective approach to quantify sensory, motor and cognitive impairments. I will discuss the development and use of a number of behavioural tasks to quantify brain dysfunction in subjects with stroke. Several key features are emerging from this work. First, the unaffected limb often displays impairments in motor function particularly for subjects with strokes in the right hemisphere. Second, impairments in proprioception (position sense) are independent of impairments in motor function, and yet, both sensory and motor functions both correlate with abilities to perform daily activities. Third, vision does not always improve position sense, and in fact, can lead to greater impairments suggesting subjects with stroke can often have problems with multi-sensory integration. This work highlights the potential of robot-based systems to provide an objective approach to quantify sensory, motor and cognitive impairments in subjects with neurological disorders.