Novel Quantitative & Objective Analytical Tool for Detecting Neurodevelopmental Delays in Infants

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Technology description

Invention Summary:
Neurodevelopmental disorders (e.g. autism) are on the rise. They are the byproduct of a lengthy maturation process that starts at conception and manifests disarray with high certainty during infancy, when dysfunction of the child’ s nervous systems becomes apparent to the naked eye. By three years of age, observational diagnoses are in place; but no objective tools exist for earlier detection of risk for the improper development of the nervous systems.Pediatricians rely on charts of physical growth to sporadically track absolute changes in weight, body length and head circumference. However, no metrics of nervous systems relative growth and rate of maturation are available to parents and caregivers that interact with the newborn baby daily, and as such, have a better chance to detect and report imminent issues with neurodevelopment.Scientists at Rutgers have developed a new analytical platform where they combine incremental (velocity-based) growth charts with underlying daily fluctuations in motor performance. In this invention, the stochastic signatures of bodily biorhythms were longitudinally tracked for 5 months in tandem with physical growth. Researchers found stochastic rules that can distinguish babies with neurodevelopmental stunting from babies on the typical trajectory of growth and neurodevelopment.
Limbs’ motions (arms and legs) were tracked non-invasively with inertial measurement units to unveil patterns of coordination, neuro-motor control and the transition from spontaneous random noise to well-structured predictive signals. Babies with atypical neurodevelopmental patterns were successfully identified in the study (Figure).

Application area

Analytical tool for
Early neonatal detection of risk for neurodevelopmental disorder
Wearable Devices
Health App on Smart Devices

Advantages

Easy and non-invasive data collection

Higher accuracy demonstrated
Faithful representation of non-linear neurodevelopment and physical growth

Institution

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