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TECH-TOYS

Acquire digital biomarkers in infancy with sensorized TOYS for early detection and monitoring of neurodevelopmental disorders

Neurodevelopmental disorders are a group of frequent (1/10 children) sensori-motor, cognitive, communication, learning, behavioural disorders of multifactorial aetiology, with onset early in life but with life-long consequences. Despite advances in our understanding of aetiology, diagnosis and start of intervention are often late (many months after onset of first clinical signs) and not based on quantitative data. TECH-TOYS aims to develop a new technological home interactive play setting (i.e. a gym equipped with a sensorised mat, a set of sensorised toys, wearable inertial movement units and cameras) to provide easy-to-handle quantitative digital biomarkers of infant's neurodevelopment and infant-caregiver interaction. Previously acquired big data and new data collected prospectively on motor behaviours, together with gaze activities and social competence in infant-caregiver interaction, will provide an Explainable Artificial Intelligent Precision Model for early detection of atypical features. Ethical, Legal, Social aspects (ELSA) and Health Technology Assessment (HTA) will provide key factors in decision-making process and cost effectiveness analysis. Moreover, parents' organisations will have a strong involvement in the project activities and in the Ethics Monitoring Board and will contribute to the design of platform and of the Personalised Precision Model. The results will open new frontiers for early, timely, personalised, home based, quantitative detection of neurodevelopment in the first months of life.

