Machine learning as an enabler of medical technology

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Driven by advancements in digital computing, data storage, and the availability of large datasets from digitized healthcare workflows and telemedicine, machine learning is swiftly becoming integral to the most diverse aspects of medical technology. It's not merely about optimizing complex clinical tasks; it's also about fostering innovative applications such as large-scale image screening, data inference, and automatic diagnostics. Indeed, machine learning is a prerequisite for a radically new approach to these tasks, transcending the re-implementation of established technologies. This special issue spotlights papers where machine learning is an essential constituent of medical technology innovation.

At system and planning level, Hajati et al. use machine learning for mental health services analysis, and Jiao et al. enhance radiotherapy plans for nasopharyngeal cancer. Machine learning's role in early disease identification is highlighted by Nesaragi et al. for coronary disease, by Din et al. for cerebral haemorrhages and by Kuluozturk et al. for diagnosing Covid-19, heart failure, and acute asthma. In radiology, Kramer et al. utilize machine learning on femur scans to estimate missing bone geometry and Asvadi et al. reconstruct the femur shape from partial data, opening new perspectives for bone repair and lower limb therapy and rehabilitation. In interventional procedures, Lamassoure et al. showcase a machine learning-assisted instrument for rhinoplasty and Agarwal et al. propose machine learning to predict temperature rise during bone drilling. In rehabilitation, Bamdad et al. employ machine learning to estimate the knee's mechanical properties, enhancing rehabilitation therapy and informing the design of active orthoses.

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