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(57) Abstract :
An interpretable prototype-driven health risk assessment and personalized lifestyle intervention system (100) is disclosed. The system includes a health data ingestion module (110) with multi-source connectors (111), normalization engine (112), and feature extraction unit (113). A prototype-based learning engine (120) uses a tangent distance computation accelerator (121) with dedicated hardware and a continuous risk scoring module (122). A digital twin simulation engine (130) employs a prototype-local autoencoder bank (131) and twin generation controller (132) to model health outcomes. An adaptive lifestyle intervention planner (140) provides real-time feedback (141) and multi-objective optimization (142). The system also includes an edge-cloud processing module (150) with encrypted communication (151) and workload distribution (152), and a predictive analytics module (160) for temporal trend analysis (161) and proactive alerts (162). It reduces computation latency by forty percent and enables personalized preventive healthcare through digital twin simulation.

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