HBKU Thematic Research Grant 3rd Cycle– Project Highlight

Project Title

AI-Driven Healthcare Surveillance and Proactive Care Recommendation in Smart Environments

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Executive Summary (limit to 200 words)

Qatar's rapid socioeconomic development, urbanization, and changing lifestyle patterns have led to an increase in chronic diseases, sedentary behaviors, and healthcare expenditures. Current healthcare systems, which largely focus on reactive treatment after symptoms appear, are no longer sufficient to meet the nation's growing health challenges. In alignment with Qatar National Vision 2030's emphasis on sustainable and preventative healthcare, this project proposes an AI-driven healthcare surveillance and proactive care recommendation platform designed for smart environments such as homes, workplaces, and community spaces. The platform seeks to shift the healthcare paradigm from reactive to predictive and preventative care by enabling continuous health monitoring, early detection of risks, and timely interventions. It will integrate multimodal data from wearable sensors, IoT-enabled devices, electronic health records, and environmental sensors into a unified framework. Advanced AI models—including deep learning, graph neural networks, and reinforcement learning—will analyze these data to predict health trajectories, simulate individual health scenarios, and provide personalized recommendations for lifestyle modification and medical guidance. Furthermore, a robust governance and policy framework will be developed to ensure ethical integrity, data privacy, and public trust. The system will undergo validation through pilot studies in real-world smart settings to demonstrate its potential to improve population health outcomes and reduce long-term healthcare costs.

Expected Outcome (limit to 100 words)

The project will deliver a **working prototype** of an AI-driven healthcare surveillance and proactive care recommendation platform integrated within smart environments. It will include **validated AI models** for health risk prediction and simulation, along with a **personalized recommendation engine** for proactive lifestyle and medical guidance. Additionally, a **feasibility study** and **national draft guidelines** on privacy, ethics, and policy for AI in healthcare will be produced. Collectively, these outcomes will lay the foundation for **invention disclosure** and future large-scale deployment of sustainable, technology-enabled preventive healthcare solutions in Qatar.

Collaborating HBKU entities:

Photos – please insert photos, schematics, graphs…etc. relevant to the project