
Departmental Seminar

Seminar Title	: Artificial Intelligence based Glucose Forecasting and Data Augmentation for Personalised Advanced Diabetes Management
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Venue	: BM Department Seminar Room
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Abstract	: Diabetes, a chronic condition affecting millions globally, requires continuous glucose monitoring and precise insulin dosing. The development of the artificial pancreas (AP) can automate glucose regulation, but widespread adoption remains limited due to several challenges, lack of automated physical activity integration, manual meal recording and declaration, continuous glucose monitoring sensor errors such as missing data points, high costs of CGM sensors and insulin pumps. These limitations underscore the need for a more intelligent, accessible, and affordable diabetes management system. CGM sensors track the glucose levels in interstitial fluid (ISF) using electrochemical methods. These sensors provide real-time glucose data and alerts but are limited by the physiological delay between blood glucose and ISF glucose levels, leading to delayed insulin administration. Inaccurate or untimely insulin dosing can result in hyperglycemia or hypoglycemia, posing severe health risks. Furthermore, the absence of multimodal data, including physical activity and precise meal intake information, reduces forecasting accuracy, limiting the effectiveness of decision support systems and closed-loop insulin delivery. This research develops a series of AI-driven models for glucose forecasting, which integrates content-based attention mechanisms to enhance prediction accuracy even with limited training data. Additionally, GAN-based generative AI was employed to address data scarcity in CGM sensor systems by synthesizing realistic glucose, physical activity, and meal data. This augmentation technique, validated across multiple datasets, significantly enhances prediction accuracy by leveraging both real and synthetic data. Keywords: Generative AI, Diabetes Management, Glucose Forecasting ALL ARE CORDIALLY INVITED