A Low-Cost Artificial Pancreas System With Integrated Machine Inference

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Insulin pumps on the market today are expensive and are computationally limited in calculating and providing accurate dose regimens for type 1 diabetics. In this work, four academic disciplines--Biology, Mechanical Engineering, Electronic Engineering, and Computer Science--are integrated to demonstrate a low cost, open source solution that solves the fundamental problems of today's devices, and does so in a way that can mimic the functions of a biological pancreas. The integration and use of these four academic disciplines are essential in creating the mechanical pumping system, the integration to the human circulatory system, control electronics for the hardware, as well as a neural network computational model to optimize battery usage and to efficiently predict when blood glucose levels will rise. This work shows a functioning prototype as well as a predictive computational model derived from a simulated patient dataset.

Awards Won:

Drexel University: Full tuition scholarship