Population characteristics associated with higher prevalence of insulin pump occlusions in Type 1 Diabetes

Background: Diabetes Type 1 is a chronic autoimmune condition characterized by the destruction of insulin-producing beta cells in the pancreas, leading to lifelong dependency on insulin therapy for blood sugar regulation. A possibility to manage their condition effectively, individuals with Type 1 Diabetes utilize an insulin pump for insulin delivery. One of the challenges in insulin pump therapy is the occurrence of occlusions, which can disrupt insulin delivery and lead to fluctuations in blood glucose levels. In this project, we investigate if there are population characteristics that are associated with a higher prevalence of the number of occlusions that are experienced.

Aim: In this project, the student will analyze real-world data to potentially find characteristics, that are associated with a higher occlusion prevalence.

Materials and Methods: The student will work on a real-world data set from people with Type 1 Diabetes using an insulin pump. They will start with statistically analyzing the data and determine suiting method(s) to answer the question if there are higher prevalence of occlusions in certain subpopulations. Can the number of occlusions be predicted from user data? If yes: what are the features that predict the number of occlusions? The student will work in a research group focused on machine learning in medicine, where we have a strong expertise in deep learning for biomedical data analysis.

Nature of the Thesis:
Literature review: 10%
Data exploration: 30%
Model development: 40%
Results analysis: 20%

Requirements:
Solid machine learning knowledge
Programming experience (Python, ideally Pytorch)
Strong written and verbal communication skills

Supervisor(s):
Prof. Dr. Lisa Koch

Institutes:
Lab for Machine Learning in Medicine

Sponsor:
Ypsomed Diabetes Care

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Please attach your transcripts when you reach out. We look forward to hearing from you!