Non-Invasive Blood Glucose Counter using Machine Learning/Statistical Modelling

We are developing a new non-invasive glucose monitor that will help you take control of your life.

NIR Laser has been reflected on human skin passed through the Raman spectrometer to detect the molecular footprint captured in the form of vibrational spectral data. Statistical models have been developed using the photon count and wave number data pairs. Predictive modelling has been performed in two phases, a) continuous data forecasting and b) discrete data forecasting. Logistic regression has been used to address the classification problems. Multiple other algorithms have been used, that includes but not limited to SVM and Random Forest. The project has been performed for US based company where spectral data of the subject/patient has been provided along with vitals as well as blood glucose measured using instant blood checking systems, such as, instant glucometer.Data processing has been performed using 7-Step to clean up the noise obtained in the Raman signal. The steps start from wavelength calibration through system calibration (NIST Raman Standard) as well as fluorescence (background) corrections. Multiple model approach have been taken up in the iteration process. A few are bivariate regression, anova, multi-colinearity, multiple type of variable transformations (square, cube, exponential, inverse of exponential etc.). Multi level classification approach has been taken from low blood glucose content to high to very high blood glucose content. After multiple iterations, and model refinement, the current level of accuracy has been reached to 89% with the accepted sensitivity of device used to generate spectral data points. Results are not very promising at the low and very high glucose content level. However, this is yielding 89% accuracy anything between 90 and 240 mg/dL blood glucose level. The results are always compared with the available golden data.