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Building a Data Pipeline for a Real World Machine Learning Application

Predicting hypertension among individuals using historical blood pressure (BP) readings has been the focus of recent studies in Artificial Intelligence in health. This has been occasioned by the growing prevalence of hypertension in the general population as well as individuals' desire to manage their health. The BP data used for predictions is collected during clinical visits and does not capture fluctuations in between clinic visits. Additionally, current prediction approaches rely solely on the BP readings without regard for the individual's lifestyle and activities, which are known to affect individuals' BP. This study developed and tested a system for regular collection of BP and related activity data for use in monitoring and prediction of an individual's BP. The system developed comprised of (i) a smartwatch with a Photolethysmography (PPG) heart rate sensor for detecting the BP and (ii) a mobile phone application for receiving the BP readings and to collect data on participants age, weight, height and other health conditions. Activities at the time of BP reading (sleep, exercise, chores) are also recorded. An alert was sent to the participant if the BP reading was high. The pilot unearthed the following challenges: inability of the smartwatch to take readings on dark-skinned persons, short time interval (30 mins) duration caused inconveniences, missing of readings during device charging, lack of complete integration between smartwatch and mobile application for the automatic transmission and recording of readings, inability to take readings in some locations due to security concerns for devices, inability to take readings at night because the smartwatch required light to function and cases of forgetfulness by the participants in wearing smartwatch and/or entering the data. An increase time interval for readings will make it convenient for data collection. Additionally smartwatches that use infrared and electrocardiogram heart rate sensors need to be identified.

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