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## Determination of Near Fault Velocity Pulses with Multivariate Naïve Bayes Method

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Near fault ground motions may contain impulse behavior on velocity records. Such signals have a particular indicator which makes it possible to distinguish them from non-impulsive signals. Impulsive signals have significant effects on structures; therefore, they have been investigated for more than 20 years. Due to its severe effect on structures, it is vital to predict its occurrence during an earthquake. To calculate the probability of occurrence, a large dataset is collected from various national data providers and NGA-West 2 database. The dataset only contains crustal earthquakes. Created dataset has a large number of parameters which carry information on the earthquake physics, ruptured faults, ground motion parameters, distance between the station and several parts of the ruptured fault. Relation between the parameters and impulsive signals are calculated. It is found that fault type, moment magnitude, distance and azimuth between a site of interest and the surface projection of the ruptured fault are correlated with the impulsiveness of the signals. These parameters are given as inputs to multivariate naïve Bayes classifier. Naïve Bayes classifier allowed us to have the probability of observing impulsive signals. Two separate models are created for strike slip and non-strike slip fault types. It is found that strike slip and non-strike slip models have an accuracy rate of 98%. These models are able to predict the probability of observing an impulsive signal for a site of interest with high accuracy rates.