The proper classification of major eye movements – saccades, fixations, and smooth pursuits – remains essential to utilizing eye-tracking data. There has been difficulty separating out smooth pursuits from the other behavior types [cite], in particular smooth pursuits from fixations. This paper proposes a new algorithm, NAME, for ternary classification of eye movements. The proposed algorithm combines the simplicity of foundational algorithms like I-VT and I-DT, the proposed I-VDT in [cite], with the predictive power of Hidden Markov Models (HMMs), in particular the Viterbi algorithm. We evaluate the fitness across a dataset of XXXX, with a comparison to the current state-of-the-art, I-BDT. The proposed algorithm demonstrates better performance than I-BDT in a variety of situations, particularly when YYYY and ZZZZ.