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AbuSniff: An Automated Social Network Abuse Detection System*

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In our research, we sought to develop an automated social network abuse detection system which is able to reduce the attack surface of its users, by reducing the number of, or isolating friends predicted to be perceived as potential attack vectors. This presents a substantial challenge as adversaries leverage social network friend relationships to collect sensitive data from users and target them with abuse that includes profile cloning, stalking, identity theft, fake news, cyberbullying, malware, and propaganda. We leverage these findings to develop AbuSniff (Abuse from Social Network Friends), a system that evaluates, predicts and protects users against perceived friend abuse by suggesting several personalized defensive actions for such friends. We began by developing the first ever mobile app questionnaire, that can detect perceived strangers and friend abusers. To replace the questionnaire, we then introduced mutual Facebook activity features that have statistically significant overall association with the AbuSniff decision and showed that they can train supervised learning algorithms to predict questionnaire responses using 10- fold cross validation. We trained our system with several supervised learning algorithms, including Random Forest (RF), Decision Trees (DT), SVM, PART, SimpleLogistic, MultiClassClassifier, K-Nearest Neighbors (KNN) and Naive Bayes and chose the best performing algorithm for predicting each of the questionnaire questions. Our approach provides a method to evaluate AbuSniff system through online experiments with participants recruited from the crowdsourcing site from 25 countries across 6 continents. Results showed that the predictive version of AbuSniff was highly accurate (F-Measure up-to 97.3%) in predicting strangers or abusive friends and participants agreed to take the AbuSniff suggested ac-

tions in 78% of the cases. When compared to a control app, AbuSniff significantly increased the participant self-reported willingness to reject invitations from strangers and abusers, their awareness of friend abuse implications and their perceived protection from friend abuse.