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## **Secure House: A Home Security System Based on Smartphone Sensors**

Several new smart phones are released every year. Many people upgrade to new phones, and their old phones are not put to any further use. In this paper, we explore the feasibility of using such retired smart phones and their on-board sensors to build a home security system. We observe that door-related events such as opening and closing have unique vibration signatures when compared to many types of environmental vibration noise, which can be captured by the accelerometer of a smart phone when the phone is mounted on a wall near the door. The rotation of a door can also be captured by the magnetometer of a smart phone when the phone is mounted on a door. We design machine learning and threshold-based methods to detect door opening events based on accelerometer and magnetometer data, and build a prototype home security system that can detect door openings and notify the homeowner via email, SMS and phone calls upon break-in detection. Experiments in a residential home show that the accelerometer-based detection can detect door open events with an accuracy higher than 98%, and magnetometer-based detection has 100% accuracy.