


Threat modeling of Internet of Things health devices

Adebayo Omotosho^a , Benjamin Ayemlo Haruna^a, and Olayemi Mikail Olaniyi^b

^aDepartment of Computer Science, Landmark University, Omu-Aran, Nigeria; ^bDepartment of Computer Engineering, Federal University of Technology, Minna, Nigeria

ABSTRACT

For a number of health conditions, the number of Internet of Things (IoT) devices available for self and remote monitoring are growing rapidly, and users are also increasing. In the same vein, cyber criminals are putting lots of effort into making these devices unsafe for users, and this has generated growing privacy concerns for both users and manufacturers. In this article, a threat model is designed for selected IoT health devices. Based on the device assets and access points, device threats were identified using the STRIDE model and ranked using a threat-risk ranking model called DREAD. Some countermeasures to mitigate each of the identified threats in the selected devices were also proposed. A Web system that presents the model was created and enables the users of devices, manufacturers, and professionals to view possible threats and severity based on the devices' risk scores. This model will benefit both the designers and users of health IoT devices in improving products' security and understanding devices' privacy risk, respectively.

KEYWORDS

Internet of Things; health; STRIDE; DREAD; modeling

Introduction and background

Electronic health is one of the most prominent application areas for the Internet of Things (IoT). There are already very many healthcare devices that are developed based on IoT. IoT gives healthcare devices the ability to monitor, record, and transmit patients' data to whoever the data may concern, like the patient's doctor, nurse or a family member. Some of these devices transmit the data over wireless networks to the hospital server from remote areas like the patient's home. This process makes it easier for the doctors and nurses to be able to respond quickly to patients' emergencies that could have otherwise resulted in death. Basically, IoT is applied to healthcare areas like health monitoring, fitness programs, chronic diseases, and elder care (Islam, Kwak, Kabir, Hossain, & Kwak, 2015).