OUTSIDE THE BOX – THE "TAP" BOX

AN ANALYSIS OF CYBERSECURITY IN THE AGE OF IOT

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SOCIOTECHNICAL SYNTHESIS

The Internet of Things (IoT) is a rapidly growing sector in the connectivity of electronic devices, which serves to simplify and digitize our daily lives. An increase in connectedness, however, comes with the tradeoff of physical security and cybersecurity requirements that are now of concern, which is a facet of IoT that has yet to be fully developed. The technical topic, the design and manufacture of the "Tap Box", a secure and inconspicuous knock-activated lockbox, serves as a model IoT device that could hypothetically be commercialized at scale. Its purpose is to store small valuables in a secret manner, as well as integrate Internet connectivity to make usage as seamless as possible for its owner. The STS topic focuses more on the characterization of IoT's growing impact and its problems and solutions that revolve around cybersecurity implementation. Evidence from in-depth literature review is presented to support the claims made and guide the discussion of the technology's social connection. The technical and STS topics, as described, are tightly coupled, as the device which was designed and built is classified as an IoT device, and therefore, exhibits all the qualities that any other IoT device would possess. Regarding the technology in this way allows for a direct connection and analysis of its potential impact.

The immediate rationale and motivation for the technical project entailed devising a unique, creative, yet secure device to store small valuables, specifically in a home or work setting. A major requirement was that it was to be inconspicuous, which serves as a first line of defense, accomplished by disguising the entire project as a wooden tissue box. This narrowly focused problem connects to the bigger issue of constructing a secure yet connected device in the first place.

Since IoT devices involve both hardware and software integration, the design was tackled through thoughtful printed circuit board (PCB) layout, effective locking mechanism electronics and sensors, and exceptional building of the physical, discreet enclosure. The entire process, of course, was iterative, and resulted in many design modifications and shifts that had to be accounted for during the journey. At the conclusion, a Wi-Fi connected device which unlocked its door upon a correct secret knock password was formulated, signifying the transformation of an initial idea to a physical reality.

Following the technical report, a detailed analysis of how cybersecurity in IoT devices connects with society was carried out. This report delves into the description of the rapid growth of IoT in recent years, and what that means for cybersecurity concerns. With more devices to potentially exploit, hackers have an unfortunate upper hand in the matter, and devices in this relatively new front for cybersecurity battle must be adequately armed. Manufacturers, lawmakers, and end-users are among some of the major players in this realm, which is best represented visually by the Social Construction of Technology (SCOT) model, emphasizing the fact that IoT devices cannot be manufactured in a black box.

Insightful conclusions were drawn from the research conducted, most notably, the fact that IoT devices aren't being manufactured with cybersecurity defense mechanisms due to manufacturers desiring minimal costs and the general immaturity of the technology. As more awareness is brought to the monumental impact this issue will have if left unattended, more devices will be secured, and information kept safe.

As new IoT devices, such as the "Tap Box" are developed, it is paramount for the precedent of cybersecurity implementation to be set. The technical solutions already developed should be the baseline for manufacturers to integrate and can only improve in the future.

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