

Team: **S.H.I.E.L.D.**

Members: Brian Patterson, Eric Dutan, Benjamin Bellenchia

Team Assignment #2

Problem Statement(Concise):

A person needs a product to protect several packages for extended periods of time while traveling away from home. Visible and unattended packages are vulnerable to theft.

Problem Description(Detailed):

Porch piracy is a problem that impacts the provider, consumer, and the environment. When a package gets stolen from a consumer, the responsibility for the package depends on the provider's size. A large corporation like Amazon won't have trouble replacing something "small" like \$80 in order to keep a customer. However, a company that isn't as big would be financially strained. According to security.org, "Porch pirates stole \$12 billion in packages in the past year," which shows the impact of recurring theft for packages of any price. On top of that, the article also stated, "...as many as 58 million Americans have become victims in the last 12 months," which goes to show the magnitude of Americans that are being impacted. This magnitude of victims strikes fear as their belongings are stolen. Especially in a time where people are very dependent on deliveries. Security.org also stated, "Nine in 10 Americans are worried about stolen holiday packages, and more than a quarter are "very" or "extremely" concerned." Moreover, the package has the potential to be irreplaceable. As mentioned in *Huston Law Review* a package has the potential to be vital medication or a loved one's ashes. Having porch piracy be such a large problem causes great concern for packages like these as they are not able to be replaced. Also, when a package gets replaced, the driver has to once again take the driver to the consumer's residence. This action doubles the amount of emissions that the driver exposes to the environment. Lastly, Criminal Justice Studies stated that unattended packages in the open are more likely to be stolen as they seem like an easy target. This problem impacts all parts of the system of delivering packages; the provider, the consumer, and the transporter.

Works Cited:

"Annual Report 2024." *Security.org*, 2024, <https://www.security.org/package-theft/annual-report/>.

Penner, Tiffany. "Lawyers in Schools: Navigating the Risks and Rewards of School-Based Medical-Legal Partnerships." *Houston Law Review*, vol. 59, no. 2, Fall 2021, pp. 479-512. HeinOnline, <https://heinonline.org/HOL/P?h=hein.journals/hulr59&i=491>.

Stickle, Ben. "Porch Pirates: Examining Unattended Package Theft Through Crime Script Analysis." *ResearchGate*, https://www.researchgate.net/profile/Ben-Stickle/publication/338243786_Porch_pirates_examining_unattended_package_theft_through_crime_script_analysis/links/5f711e57a6fdcc0086434031/Porch-pirates-examining-unattended-package-theft-through-crime-script-analysis.pdf.

Commercial products:

- **Product 1: Ring Battery Doorbell**

- Source Information: https://ring.com/products/battery-doorbell?srsId=AfmBOooGoiCpJAJOhXpTWwv-lps2-f4tT5Ex_YZWxKoaoyotfEF-0T0M
- Description of the Solution: The Ring Battery Doorbell allows you to see, hear, and speak to visitors remotely with head-to toe video, motion detection, and customizable motion zones. It features a built-in rechargeable battery and enables two-way communication for added security. This enables a user to have eyes and ears at home as long as they have access to their cellular device

- **Product 2: Blink Outdoor 4**

- Source Information: <https://shorturl.at/fW1AB>
- Description of the Solution: The Blink Outdoor 4 is a weather-resistant security camera with two-way audio, enhanced motion detection, and facial recognition for improved monitoring.

- **Product 3: VentriSafe Large Anti-theft Package Delivery Box**

- Source Information: <https://www.amazon.com/VentriSafe-Anti-theft-Delivery-Packages-Galvanized/dp/B0CNCHV7Q1?source=ps-sl-shoppingads-lpcontext&ref=fplfs&psc=1&smid=A3B5OGQ584J3RH>

- Description of the Solution: Can hold 19 gallons of items (odd metric) or 20 in x 11.5 in x 19 in, requires combination lock that is safe from bolt cutters, provides shelter and has a manner to anchor to the door.
- **Product 4: Smart Parcel Receiver Box**
 - Source Information:
<https://publisher.uthm.edu.my/periodicals/index.php/peat/article/view/1448>
 - Description of the Solution: A product created to allow users to have authorized users open and place packages inside of a box, and will prevent unauthorized users(i.e. thieves) to steal their unattended packages. Has a few design prototypes which allow users to scan a QR-code to get access to the package(s).
- **Product 5: Lightweight Delivery Detection on Doorbell Cameras**
 - Source Information:
https://openaccess.thecvf.com/content/WACV2024/papers/Khorramshahi_Lightweight_Delivery_Detection_on_Doorbell_Cameras_WACV_2024_paper.pdf
 - Description of the Solution: The article's goal is to produce a lightweight software to detect when a package has been delivered through the household's doorbell camera. It also provides a mobile-friendly way to receive the information that a package has indeed been delivered. The only difference between this product and normalized Ring doorbell cameras is this one is less computationally-intensive and takes less sophisticated hardware systems.

Patents:

1. Lock box system for depositing and retrieving objects
 - a. Link:
[https://patents.google.com/patent/US20120326840A1/en?q=\(parcel+locker\)&oq=parcel+locker](https://patents.google.com/patent/US20120326840A1/en?q=(parcel+locker)&oq=parcel+locker)
 - b. Description: A lock box system designed to hold multiple different sized packages, and a module to confirm your package location and open the locker with an authorization code.
2. Individual Parcel Box
 - a. Link:
[https://patents.google.com/patent/US10817824B2/en?q=\(personal+parcel+container\)&oq=personal+parcel+container](https://patents.google.com/patent/US10817824B2/en?q=(personal+parcel+container)&oq=personal+parcel+container)

- b. Description: A personal-use lock box that protects a parcel from theft and weather conditions. Includes a temperature control system to make sure the housing does not overheat or freeze.

DIY (Youtube Videos)

- <https://www.youtube.com/watch?v=fT36h7mc8R8>
 - Citation (MLA): "*Build Your Own Porch Pirate Package Protector! | Impossible Science at Home*" YouTube, uploaded by Impossible Science, 3 August 2021, <https://www.youtube.com/watch?v=fT36h7mc8R8>.
 - Description: This product secures the package and hides it at the same time. A key advantage of this is that it isn't costly. It uses a four-pillar table, hinges, and a mirror. It uses the mirror in order to create the illusion that there is nothing underneath the table. Although this is where the package is located. The only limitation is that the table needs to be placed in a corner. This is necessary for the mirror to work and be unnoticeable.
- <https://www.youtube.com/watch?v=zRth6qthulE>
 - Citation (MLA): "*Anti-Porch-Pirate Device Debuts At The State Fair*" YouTube, uploaded by WFMY News 2, 4 Oct 2019, <https://www.youtube.com/watch?v=zRth6qthulE>.
 - Description: A refrigeration container is used as an insulated storage container for packages, with a keypad on the front that allows the delivery-person to type the code in and place the package in the locked box. A camera can be installed inside of the box that allows for recording of the package delivery. This is mainly good if you know your local delivery driver, which is only likely in lower-population locations.

Categorization of Solutions:

Low Tech	High Tech
<u>Description:</u> Products that require minimal processing power and cheaper microcontrollers/computers	<u>Description:</u> Products that require higher processing power and more expensive microcontrollers/computers
<u>Products:</u> <ul style="list-style-type: none">• VentriSafe Large Anti-theft Package Delivery Box• DIY Mirror table• DIY Refrigeration container parcel lock box	<u>Products:</u> <ul style="list-style-type: none">• Ring Battery Doorbell• Blink Outdoor 4• Smart Parcel Receiver Box• Lightweight Delivery Detection on Doorbell Cameras• Lock box system for depositing and retrieving objects• Parcel Box