USB Scanner Application

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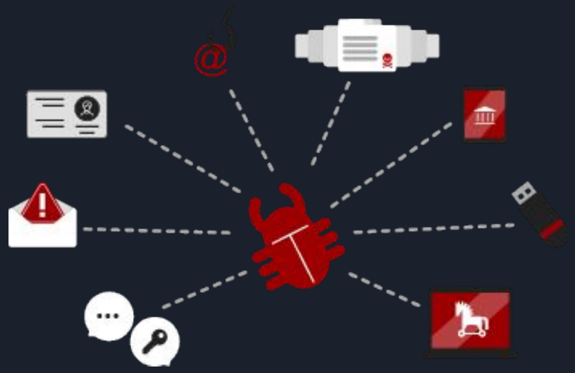
Project Aim

Project Aim

- To create a USB scanner application that can identify malware, protect against data theft, and prevent against system damage
- Scan and detect all files within the USB to quickly eliminate the possibility of any threats of transferring to the users device
- Detect all infected files and move them to a separate directory to isolate them from the rest of the files
- The user should be able to safely use the USB



Project Features

Project Features

- Detects that a USB has been plugged into the machine
- Using ClamAV, the application effectively detects and sorts corrupted files
- Feedback report of results
- Quick scanning process

Project Implementation

Project Implementation

To implement our project we utilized various tools such as:

- Linux :

  Is open source software, which offer more flexibility and has high security

- Python:

  Works very well in cyber security because of it analysis capabilities, and has a vast library

- Clamav-daemon:

  Is an antivirus engine capable of discovering, viruses, malware, trojans and many other threats to our devices

- Pyclamd:

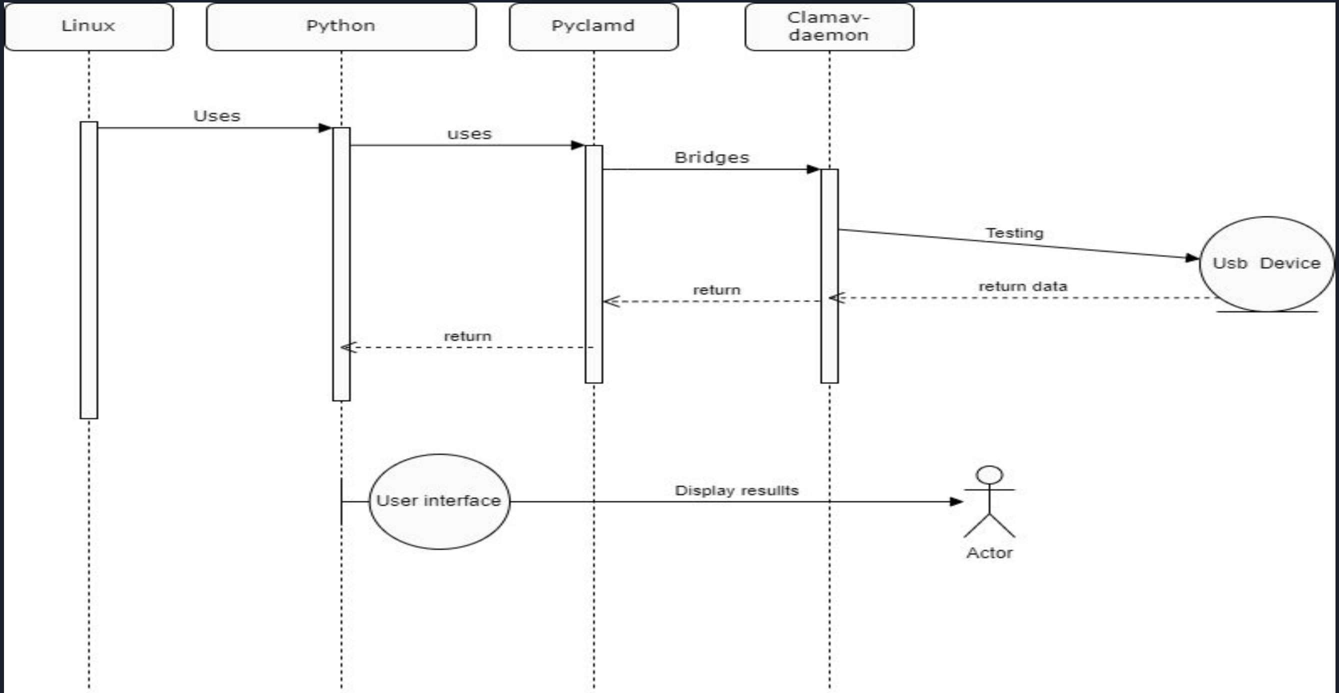
  Acts as a bridge between python and clamav-daemon, increase the overall efficiency.

- EICAR test:

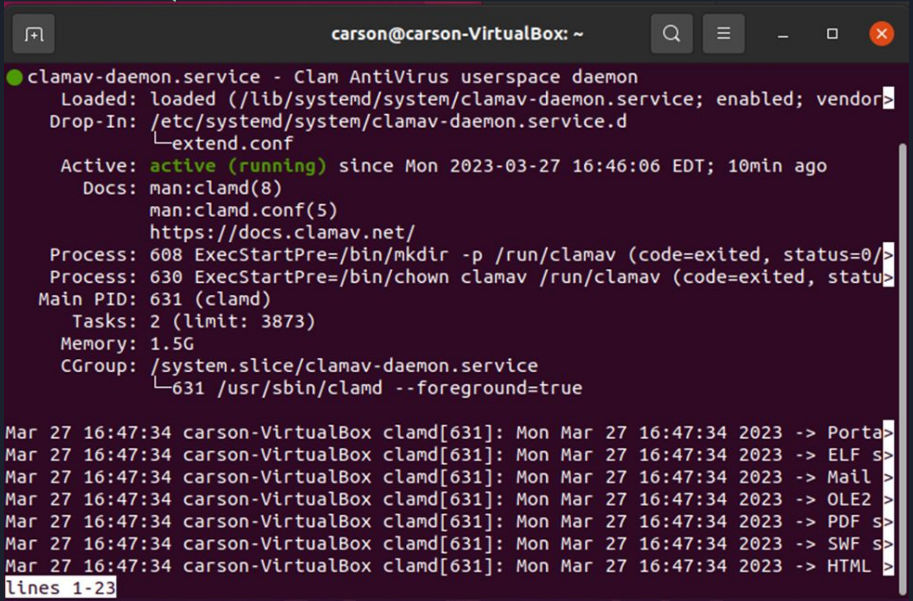
  A standard test file used to verify if antivirus software is working properly

Physical Overview Of The Project

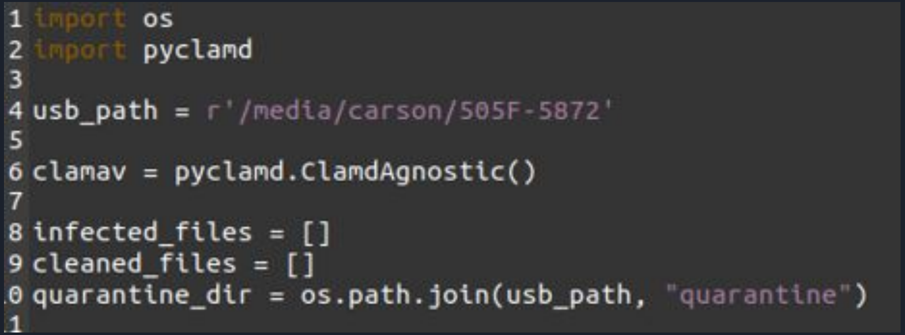
Physical Overview Of The Project



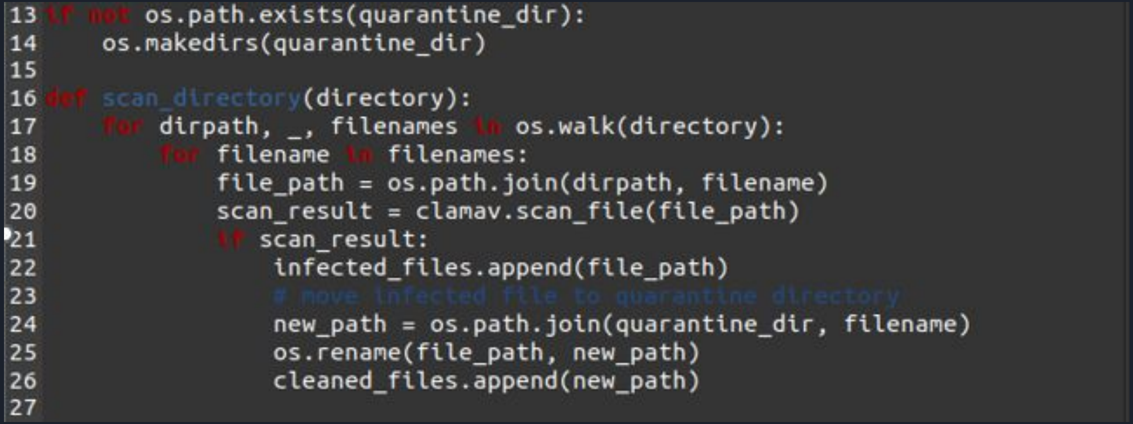
Testing and Results



```
● clamav-daemon.service - Clam AntiVirus userspace daemon
     Loaded: loaded (/lib/systemd/system/clamav-daemon.service; enabled; vendor>
    Drop-In: /etc/systemd/system/clamav-daemon.service.d
             └─extend.conf
     Active: active (running) since Mon 2023-03-27 16:46:06 EDT; 10min ago
       Docs: man:clamd(8)
             man:clamd.conf(5)
             https://docs.clamav.net/
    Process: 608 ExecStartPre=/bin/mkdir -p /run/clamav (code=exited, status=0/>
    Process: 630 ExecStartPre=/bin/chown clamav /run/clamav (code=exited, statu>
   Main PID: 631 (clamd)
      Tasks: 2 (limit: 3873)
     Memory: 1.5G
     CGroup: /system.slice/clamav-daemon.service
             └─631 /usr/sbin/clamd --foreground=true

Mar 27 16:47:34 carson-VirtualBox clamd[631]: Mon Mar 27 16:47:34 2023 -> Porta>
Mar 27 16:47:34 carson-VirtualBox clamd[631]: Mon Mar 27 16:47:34 2023 -> ELF s>
Mar 27 16:47:34 carson-VirtualBox clamd[631]: Mon Mar 27 16:47:34 2023 -> Mail >
Mar 27 16:47:34 carson-VirtualBox clamd[631]: Mon Mar 27 16:47:34 2023 -> OLE2 >
Mar 27 16:47:34 carson-VirtualBox clamd[631]: Mon Mar 27 16:47:34 2023 -> PDF s>
Mar 27 16:47:34 carson-VirtualBox clamd[631]: Mon Mar 27 16:47:34 2023 -> SWF s>
Mar 27 16:47:34 carson-VirtualBox clamd[631]: Mon Mar 27 16:47:34 2023 -> HTML >
lines 1-23
```



```python
import os
import pyclamd

usb_path = r'/media/carson/505F-5872'

clamav = pyclamd.ClamdAgnostic()

infected_files = []
cleaned_files = []
quarantine_dir = os.path.join(usb_path, "quarantine")

```



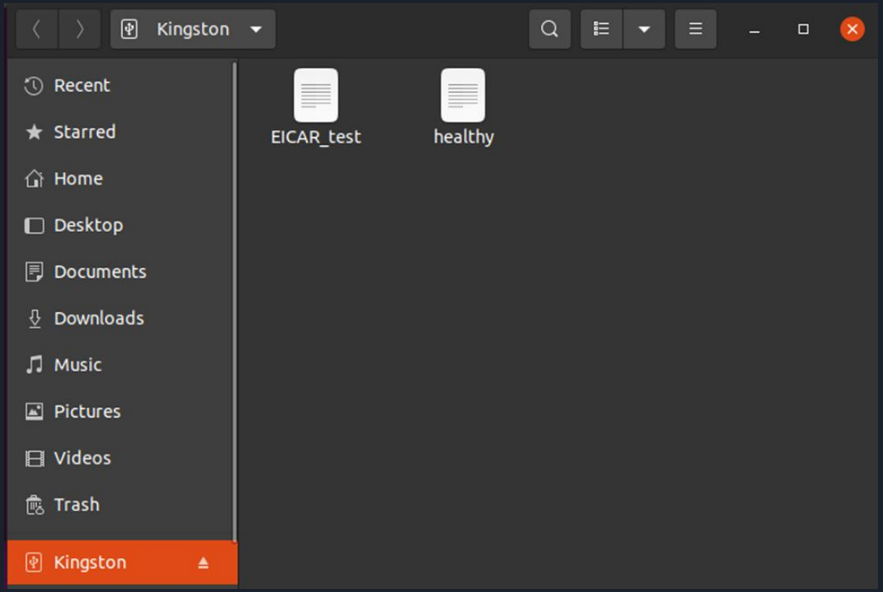
```python
if not os.path.exists(quarantine_dir):
    os.makedirs(quarantine_dir)

def scan_directory(directory):
    for dirpath, _, filenames in os.walk(directory):
        for filename in filenames:
            file_path = os.path.join(dirpath, filename)
            scan_result = clamav.scan_file(file_path)
            if scan_result:
                infected_files.append(file_path)
                # move infected file to quarantine directory
                new_path = os.path.join(quarantine_dir, filename)
                os.rename(file_path, new_path)
                cleaned_files.append(new_path)

```

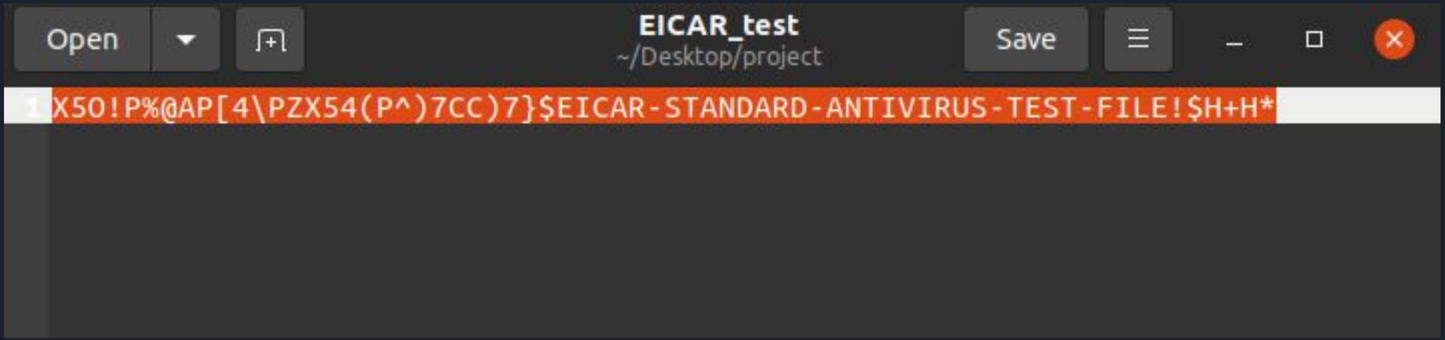
1. Signature-based Detection

   - comparing a file's digital signature to a database of known malware signatures.

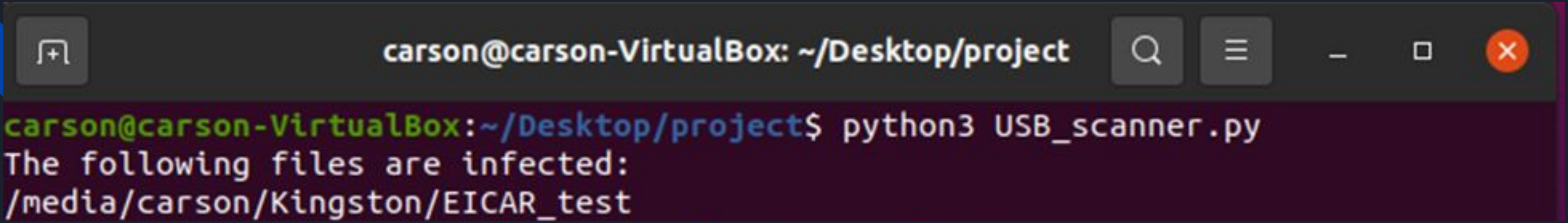
2. Heuristic Analysis

   - detect malware based on the behavior of a file, rather than relying on a known signature.

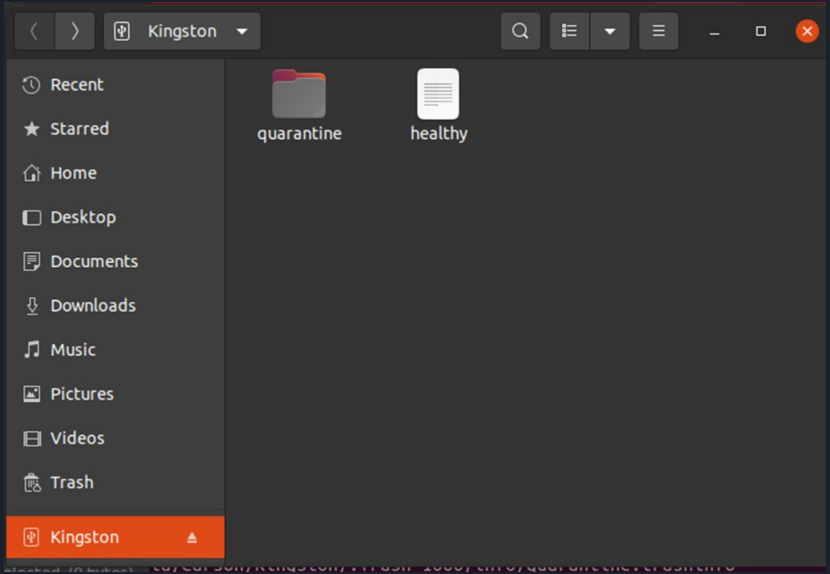


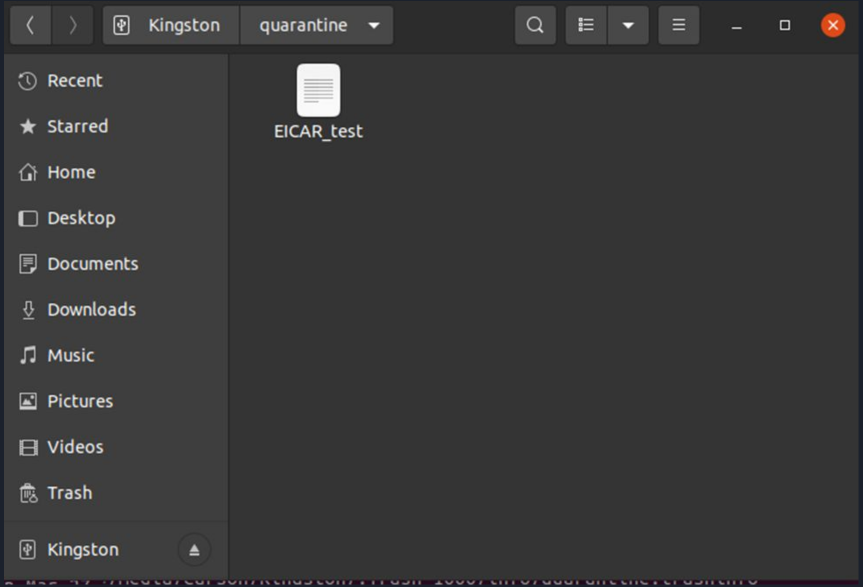


```
X5O!P%@AP[4\PZX54(P^)7CC)7}$EICAR-STANDARD-ANTIVIRUS-TEST-FILE!$H+H*
```



```
carson@carson-VirtualBox:~/Desktop/project$ python3 USB_scanner.py
The following files are infected:
/media/carson/Kingston/EICAR_test
```





Project Limitations

Project Limitations

- **Malicious bypass attacks on the application**

  - Update the application regularly when in use

- **File Format limitations**

  - Increase scalability in file formats

- USB security risks

  - Encryption and other security measure can be used to limit risks

Conclusion

Conclusion

- Implement the necessary guide to detecting potential malware and protection against data theft or system damage.
- The code can be improved by adding error handling and continuously updating the scanner application
- Another feature could be added to provide education on USB security best practices
- The project highlights the importance of cybersecurity and implementing security concepts to protect against threats and breaches to personal data