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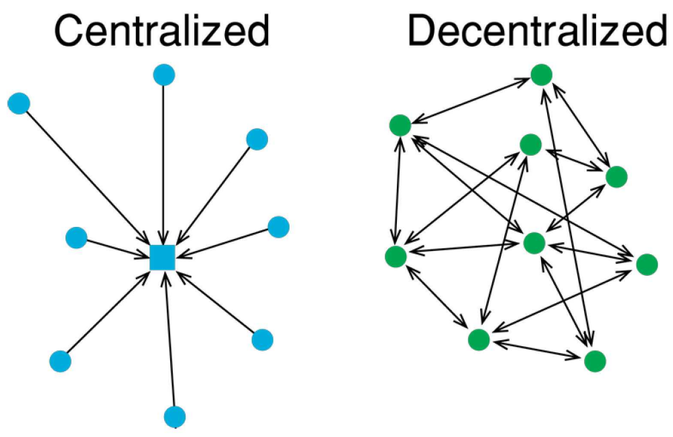

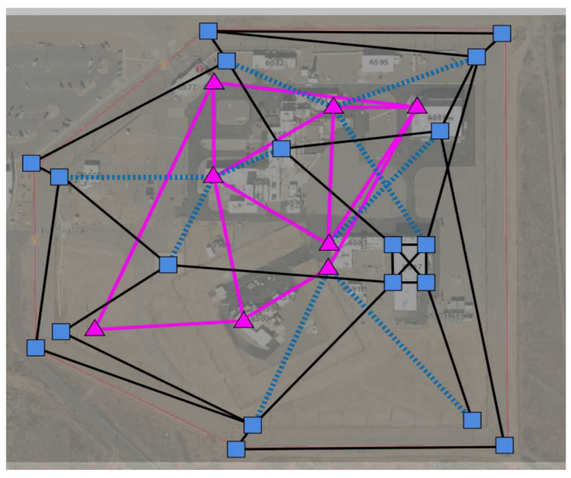

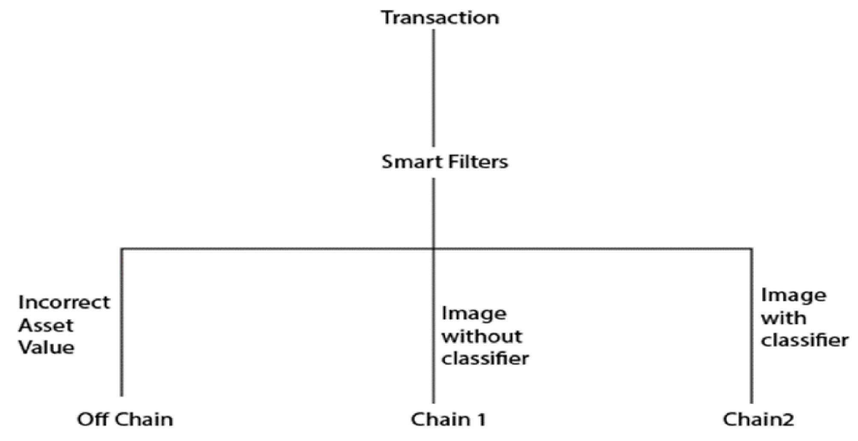

Designing a Physical Security System Using Blockchain

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Abstract

This objective of this project is to design a physical security system using blockchain as the communication network. This project tested the native tamper detection of MultiChain, created programs to detect tampering with the blockchain, and created programs to prioritize data. The results of this project show that it is feasible to continue designing a physical security system using blockchain as the communication network.

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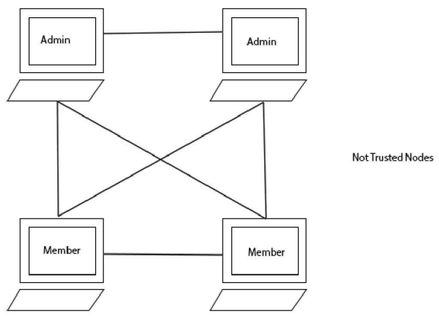
Designing a Physical Security System Using Blockchain



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Introduction

In security it is important to be able to detect when a device has been tampered with. It is also important to have decentralized elements in a security system to defend against a single point of failure. The goal of this project is to show whether it is feasible to create a physical security system using blockchain as the communication network that can detect tampering.

Methods

The blockchain implementation used for this project was MultiChain. The network was set up with two admin nodes and two member nodes. The first thing tested in this project was whether the blockchain could detect tampers. This test was performed by shutting down admin nodes and seeing if the network remained stable. After that code was written to detect other forms of tampering using assets on the blockchain. Finally code was written to add and prioritize data to the blockchain using camera data and YOLO outputs for machine learning.

Results

This project showed that MultiChain's admin nodes can be taken off the network and the network will remain stable as long as one admin node remains. This project also showed that a blockchain is capable of adding and prioritizing data in a physical security system.

Discussion

The results from this project indicate that more research should be done on these capabilities. The future work this project will focus on is adding more types of data from other sensors; microwaves, omnitrax, Infrared, etc. Once these are added the system will need to be moved to a physical testbed and tested for cyber resiliency. This will allow for a full comparison to current physical security models.

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