

Neighborhood Alarm Network Initiative: Project Plan

Objective

To secure sponsorship from the Councilmember for the pilot program of the Neighborhood Alarm Network initiative, aiming to connect 16 household alarm systems simultaneously in a grid. If successful, the model will be replicated across the neighborhood to ensure all residents feel safe in their community.

Project Overview

Project Name: Neighborhood Alarm Network Pilot Program

Scope:

- Connect 16 households on Slopeview from Ashworth Way to Creekmore Way in a grid with alarm systems.
 - Establish a network infrastructure for the alarm systems.
 - Ensure legal compliance and community engagement.
 - Potential expansion if the pilot is successful.
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Fundamental Design and Features of the System

Purpose: The Neighborhood Alarm Network is designed to minimize damage and increase community safety and security, particularly in response to the rising trend of vehicle break-ins and potential home invasions also to reduce the risk of criminal activity and attacks on residents when discovered. The system also generates reports for the authorities to assist in crime statistics and future planning and actions.

How It Works:

- When an intruder illegally crosses a household's property boundary, **the system triggers a series of alarm sirens from surrounding households simultaneously in a grid.**
- This coordinated alarm **aims to scare off the criminal and alert neighbors to the intrusion.**
- Simultaneously, cameras from participating households will record images of the intruder, their accomplices, and any vehicles involved. These recordings can be provided to the police for investigation and crime statistics.

Technology:

- **Home Assistant:** This free, open-source home automation software emphasizes local control and privacy. Developed by a California-based company, Home Assistant is independent of any specific Internet of Things (IoT) ecosystem and provides a flexible, user-friendly interface accessible via mobile or web.

Information about Home Assistant: https://en.wikipedia.org/wiki/Home_Assistant

- Each household can customize their interface to fit their lifestyle, including:
 - Proactively turning the system on and off.
 - Setting specific time frames for automatic activation.
 - Selecting which households to link with for alarm coordination.
 - Manually turning off the alarm if accidentally triggered.
 - Manually activating the alarm in case of an emergency.

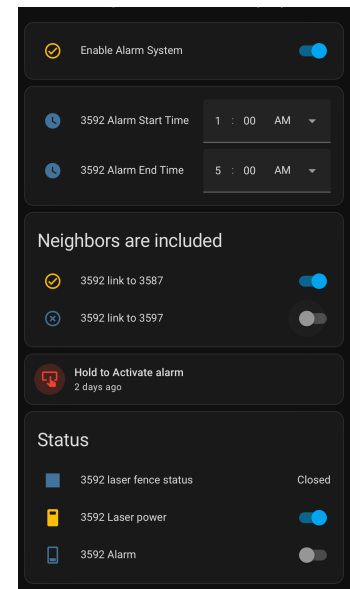


Figure 1: Household control dashboard

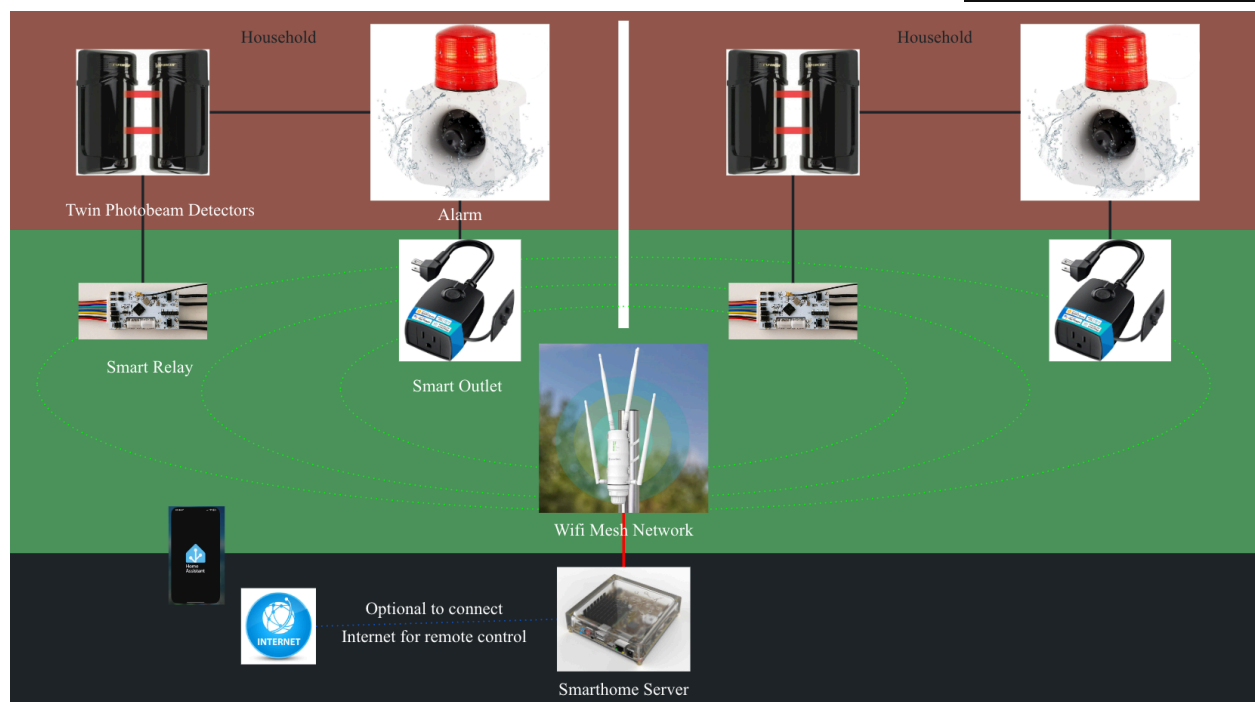


Figure 2: Network topology

Elements of the Project

1. Network Infrastructure:

- **Mesh WiFi Network Outdoor Access Points (4 units)**

Function: Create a mesh WiFi network to connect devices at households.

Design: An outdoor mesh WiFi network for a 16-household neighborhood layout two sides of a street 1000 feet long with clear Line-of-Sight, the optimal of 200 feet for reliable coverage



Figure 2: Wifi Mesh Nodes for the pilot neighborhood

- **Powerful Home Assistant Server**

Function: Allows users to create custom routines that automatically respond to events. In this project, the automation will activate the alarm at surrounding houses when someone crosses over the laser fence to the center house.

- **Internet Connectivity, Router and Home Assistant Remote Access Subscription**

Function: Allows households to connect and control the alarm remotely.

2. Household Alarm Equipment (to be purchased by families):

- **Twin Photobeam Detectors**

Function: Installed a few feet offset from the household property line, the alarm is triggered only if both the upper and lower beams are simultaneously interrupted. Twin infrared beams provide reliable perimeter security, minimizing false alarms from falling leaves, birds, etc.

It's recommended to use the device that has the tamper output, it will trigger if the cover is detached or the power goes down.

- **Solar Power Bank or Wired Power**

Function: Provides power for the Photobeam Detectors.

Note: In case of using Solar Power Bank, ensure that the size of the power bank is enough to power the Photobeam Detectors for at least 72 hours to avoid the alarm triggered when the power goes down.

Example:

- Photobeam Detectors Current Draw: 70 mA at 12V
- Energy Consumption Calculation: $\text{Power (W)} = 12 \text{ V} \times 0.07 \text{ A} = 0.84 \text{ W}$
- Energy Consumption over 72 Hours: $\text{Energy (Wh)} = 0.84 \text{ W} \times 72 \text{ h} = 60.48 \text{ Wh}$
- Battery Capacity Calculation: $\text{Capacity (Ah)} = 60.48 \text{ Wh} / 12 \text{ V} = 5.04 \text{ Ah}$

So the Solar Power Bank has at least 5.04 Ah

- **Smart Relay**

Function: Integrates with Home Assistant as the trigger, allowing the automation to activate the alarms linked to the house.

- **Smart Outlet**

Function: When the alarm is triggered, the automation turns on this smart outlet to power the siren and light.

- **Outdoor Alarm Siren (120dB Security Siren)**

Function: A loud outdoor siren that ensures everyone on the premises is aware of the alarm, intending to scare the criminal away.

Plan of Action

1. Secure Sponsorship and Resources from Councilmember:

- Obtain commitment for funding the network elements.
- Seek legal support and assistance in community engagement.

2. Community Engagement:

- Develop a comprehensive communication plan to inform and engage residents.
- Utilize the Councilmember's team to go door-to-door for recruitment and participation.
- Organize informational sessions to educate residents on the benefits and usage of the alarm network.

3. Implementation Timeline:

Month 1: Planning and Preparation

- Finalize sponsorship details with the Councilmember.
- Purchase and set up the network infrastructure components.
- Develop promotional materials and outreach strategies.

Month 2: Community Engagement and Recruitment

- Launch door-to-door campaign with the Councilmember's team.
- Hold informational meetings and workshops.
- Secure commitments from 16 households.

Month 3: Installation and Testing

- Install network infrastructure and household alarm systems.
- Conduct testing and ensure proper functioning of the network.
- Provide training and support to participating households.

Ongoing: Monitoring and Evaluation

- Regularly monitor the performance of the alarm network.
- Collect feedback from participating households.
- Prepare a report on the pilot program's success and areas for improvement.

Expansion:

- If the pilot is successful, plan for scaling the network to include more households.
 - Secure additional funding and resources for expansion.
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