**Project 9**

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Smart Street Light Proof of Concept (SSLPOC)

**Overview:**

The design being developed for Smart Streetlights will operate as a highly efficient network providing lower energy costs, maintenance costs, and CO2 emissions. The streetlights or household power status will communicate through a wireless Zigbee network and connect peer to peer in order for their current statuses to be accessed. A node placed on each street light will communicate wirelessly with a single central station where the information will then be accessible on a user interface.

**Problem Statement:**

Current streetlights use outdated bulbs that are more expensive and less dependent than current LED technology. With the system that is in place now, when a house or streetlight loses power, the only way the utility provider knows that a house is without electricity, or a streetlight is out is when a customer calls to report an outage.

**Operational Description:**

The new network design of Smart Streetlights will allow utility providers to automatically be notified of an outage immediately on a user based interface. This will reduce maintenance costs and provide a quicker and more efficient response to a specific power outage. The LED lights used in each streetlight will also use less energy and last longer which will create lower energy costs and less maintenance.

**Need Statements:**

* The system must save money over time
* The user must be alerted when a light loses power
* The user must be alerted when a house loses power
* The system must display current light status
* The system must display current house status
* The system must be able to communicate wirelessly with a light
* The system must be able to communicate wirelessly with a house
* The system must be able to communicate with each light individually
* The system must update user information semi continuously
* The model must have both a light and a house represented
* The model must have a screen to display user information
* The model must be portable

**Want Statements:**

* The system may display a lights current voltage and current.
* The system may be more environmentally friendly than the current system
* The system may display how long a light has been without power
* The system may display how long a house has been without power
* The model may represent an actual street
* The model may have a touch screen
* The system may store status information on the internet to be accessed remotely

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| --- | --- | --- | --- | --- | --- |
| **Design** | | | | | |
|  | Communication | Cost | Model | Geometric  Mean | Normal  Weight |
| Communication | 1 | 3 | 2 | 1.82 | 0.55 |
| Cost | 1/3 | 1 | 1/2 | 0.61 | 0.18 |
| Model | 1/2 | 1/3 | 1 | 0.91 | 0.27 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Communications** | | | | | |
|  | Alert when Power Loss | Display Status | Update info | Geometric  Mean | Normal  Weight |
| Alert when Power Loss | 1 | 3 | 2 | 1.82 | 0.55 |
| Display Status | 1/3 | 1 | 1/2 | 0.61 | 0.18 |
| Update info | 1/2 | 1/3 | 1 | 0.91 | 0.27 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Display Status** | | | | | |
|  | Voltage | On/Off | Current | Geometric  Mean | Normal  Weight |
| On/ off | 1 | 3 | 2 | 1.82 | 0.55 |
| Outage time | 1/3 | 1 | 1/2 | 0.61 | 0.18 |
| Voltage/ Current | 1/2 | 1/3 | 1 | 0.91 | 0.27 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Model** | | | | | |
|  | Controls | Architecture | Display | Geometric  Mean | Normal  Weight |
| Controls | 1 | 3 | 2 | 1.82 | 0.55 |
| Architecture | 1/3 | 1 | 1/2 | 0.61 | 0.18 |
| Display | 1/2 | 1/3 | 1 | 0.91 | 0.27 |

**Needs Flow Chart:**

**Voltage/ Current (0.27)**

**On or Off**

**(0.55)**

**Outage Time**

**(0.18)**

**Architecture**

**(0.18)**

**Display**

**(0.27)**

**Controls**

**(0.55)**

**LEDs**

**(1.0)**

**Update Info**

**(0.27)**

**Display Status**

**(0.18)**

**Power Loss Alert (0.55)**

**Model**

**(0.27)**

**Cost Efficiency**

**(0.18)**

**Smart Street Light (SSL POC)**

**Communication**

**(0.55)**