**Requirement #:** 1
**Use Case:** N/A
**Date:** June 15th, 2018
**Introduction:** Obtain Utility Bill Data and Implement into Database
**Rationale:** Information is needed to feed our machine learning system in order for it to function properly.
**Author:** Walktime Error
**Input:** Public Utility Usage Data
**Requirement Description:** Using public data of utility usage of specific buildings and businesses, the information fed to the system will allow precise and accurate predictions for optimal to suboptimal utility usage and spending.
**Outputs:** Functional Machine Learning System that is Precise and Accurate
**Related Requirements:** 2, 8

**Requirement #:** 2
**Use Case:** Database Functionality
**Date:** June 15th, 2018
**Introduction:** Create/Configure Server to be Database
**Rationale:** A Database needs to be created in order to implement machine learning algorithms, as well as a User Registry.
**Author:** Walktime Error
**Input:** User inputted Utility Data, Profile information
**Requirement Description:** Server access needs to be obtained to create a Database. This database will serve as the hub for our machine learning process, as well as our user registry. It will contain user profile information, as well as user inputted utility data.
**Outputs:** Machine Learning Data Visualization, User Registry, Email Alert System
**Related Requirements:** 1, 3, 4, 6, 8

**Requirement #:** 3
**Use Case:** Register New User, User Login, Database Functionality, Smartbulb API Functionality
**Date:** June 15th, 2018
**Introduction:** Develop Client Registry Parameters and Definition
**Rationale:** User needs to be able to register a profile in order to limit access to Utility Administrators, and to submit information to be analyzed and produce visualized data, such as charts, graphs, and graphics.

**Author:** Walktime Error
**Input:** Username, Password, Building Layout Schematics, Utility Admin Email, Utility Provider, Utility Bill Budget Target
**Requirement Description:** User submits Username and Password, which then leads to submitting Utility data and Building Layout Schematics, and registering of smart devices.
**Outputs:** Profile information is saved into Database, which allows future login to access website dashboard.
**Related Requirements:** 2, 4, 5, 7

**Requirement #:** 4
**Use Case:** Register New User, User Login, Dashboard Display Functionality, Database Functionality, Smartbulb API Functionality, Machine Learning Functionality
**Date:** June 15th, 2018
**Introduction:** Website Design Functionality
**Rationale:** Create a website that allows users to submit information in order to receive data analytics and control over smart devices to decrease utility spending.
**Author:** Walktime Error
**Input:** Database Information (Profile information + Utility information), Smart Device API functions
**Requirement Description:** Website should have the following functions:

- User Profile Registration
- User Login
- Remote Smart Device Control
- Access to Data Analytics
- User Logout
- Backend integration of Database

**Outputs:** A website with working buttons that lead to their corresponding functions.
**Related Requirements:** 2, 3, 5, 7, 8

**Requirement #:** 5
**Use Case:** Dashboard Display Functionality
**Date:** June 15th, 2018
**Introduction:** Website Aesthetics / Dashboard
**Rationale:** Along with integration of website functionality, the website must look simple and easy to use, and not confusing to user.
**Author:** Walktime Error
**Input:** Website Functions

**Requirement Description:** All backend functions should be tied to frontend functions, including the use of sliders, buttons, and aesthetic animations for smoothness of use.
**Outputs:** An aesthetically pleasing, easy to use website.
**Related Requirements:** 3, 4, 7

**Requirement #:** 6
**Use Case:** Database Display Functionality, Smart Bulb API Functionality, Machine Learning Functionality
**Date:** June 15th, 2018
**Introduction:** Implement Machine Learning Algorithms
**Rationale:** Using this allows our system to be intelligent and provide accurate utility predictions to better optimize utility efficiency
**Author:** Walktime Error
**Input:** Utility Data from Database
**Requirement Description:** Using public Machine Learning packages and algorithms, the system will use client provided utility data to analyze and identify inefficient utility use per building and send out an email whenever inefficiency is identified. Inefficiency is defined through the mathematics behind the machine learning algorithms.
**Outputs:** Alert Email , Machine Learning Predictions, Data visualizations
**Related Requirements:** 2, 7, 8

**Requirement #:** 7
**Use Case:** Register New User, Dashboard Display Functionality, Smart Bulb API Functionality
**Date:** June 15th, 2018
**Introduction:** Configure/Integrate Smart Bulb API Features
**Rationale:** Using the Phillips Hue Smart Bulb API, integrate the smart devices functions with website functions to have more utility control, as well as easier access, as all needed functions will be provided in a single area.
**Author:** Walktime Error
**Input:** Smart Bulb API Functions
**Requirement Description:**
**Outputs:** Remote Control of Lighting, Grouping/Clustering of Individual Lights, Timed toggles, Integration within Website Features
**Related Requirements:** 3, 4, 5, 6

**Requirement #:** 8
**Use Case:** Dashboard Display Functionality, Smart Bulb API Functionality, Machine Learning Functionality
**Date:** June 15th, 2018
**Introduction:** Integrate Data Visualization
**Rationale:** Integration of Data Visualization will allow easier to understand information and data analytics, as it will take information from the machine learning system and incorporate visual data such as graphs, charts, and graphics.
**Author:** Walktime Error
**Input:** Database Information Pertaining to Utilities
**Requirement Description:** Using user submitted information about utility usage, and getting outputs from the machine learning system, the integration will provide visual data to help improve utility spending and efficiency.
**Outputs:** Charts, Graphs, and Graphics
**Related Requirements:** 1, 2, 4, 5, 6