

Watt-Watch

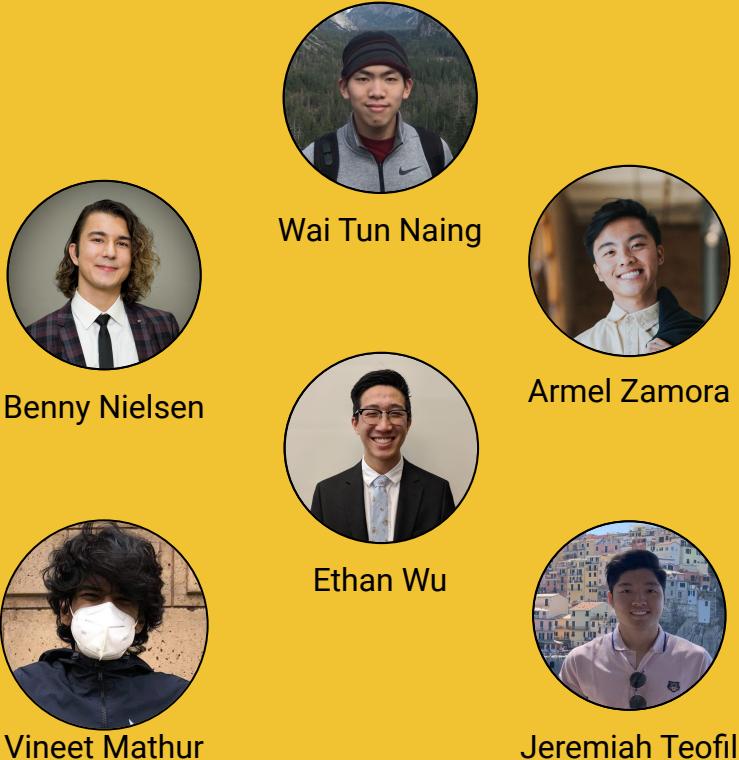
Smart Energy Monitoring and Control System

Group 1
ME 110 Summer 2020



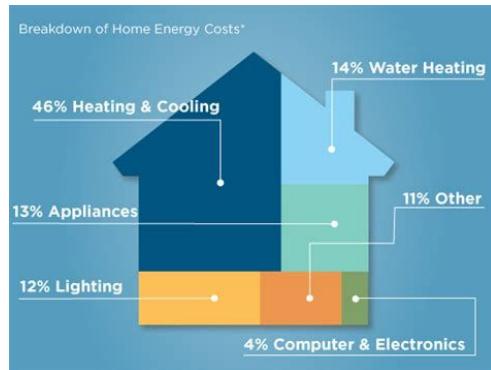
Meet the Team

Team Watt-Watch



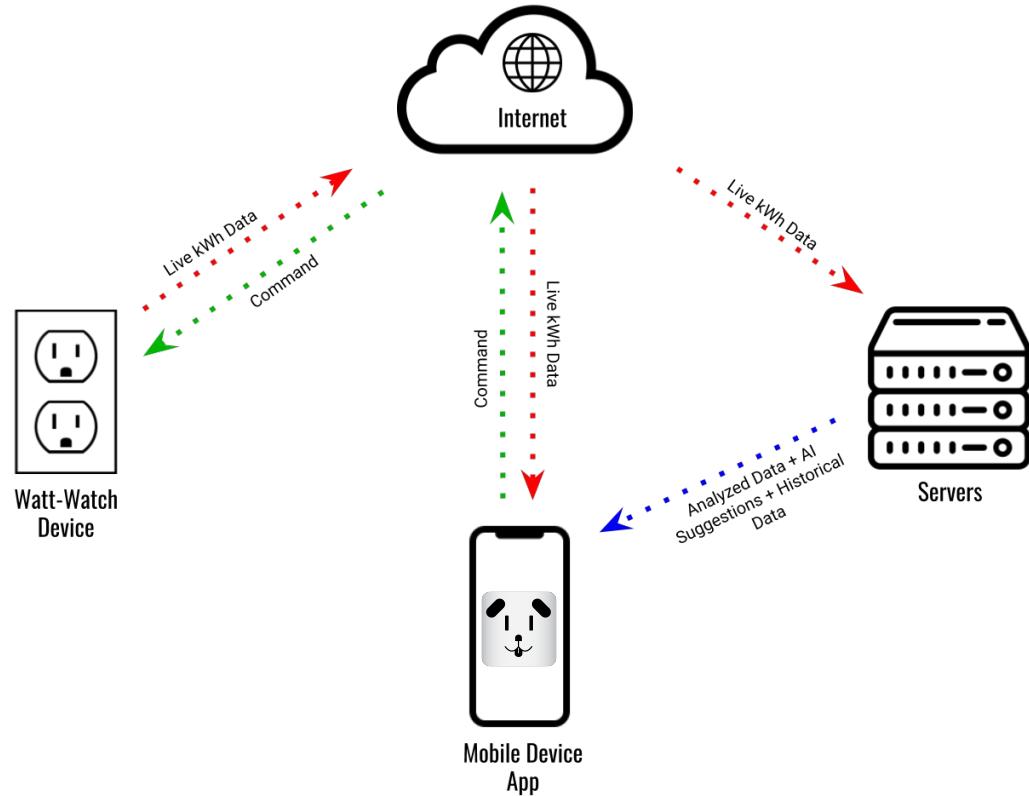
Identifying the Problem

- Increased energy use over all hours of the day during COVID
- Lack of transparency as a consumer of device specific energy use
- Increased energy cost during peak demand hours

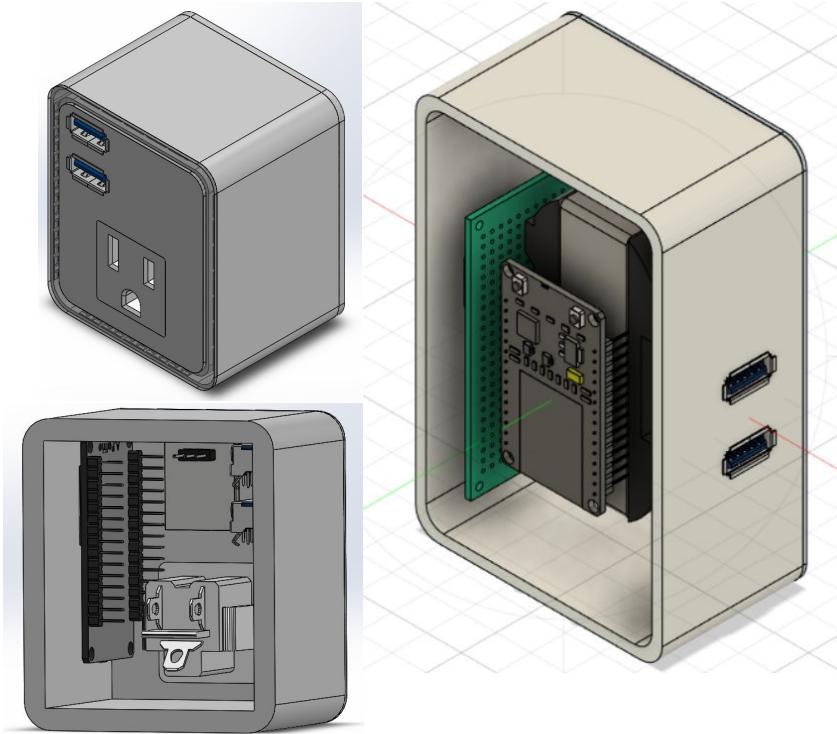
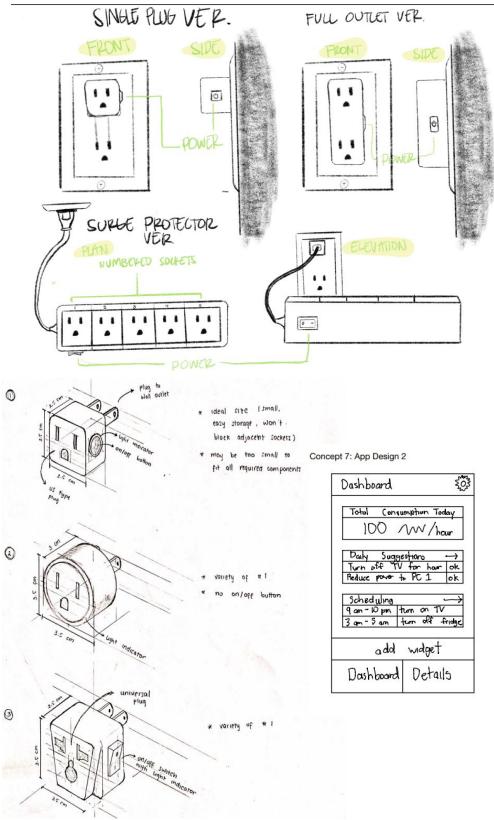


Product Overview

- Easy to use cyber-physical system of measuring energy usage at the plug and monitoring and controlling using an app interface
- Utilizes servers to free up processing and storage from the app as well as adds ability for advanced analysis such as AI capabilities



Concept Development





Smart Outlet Device

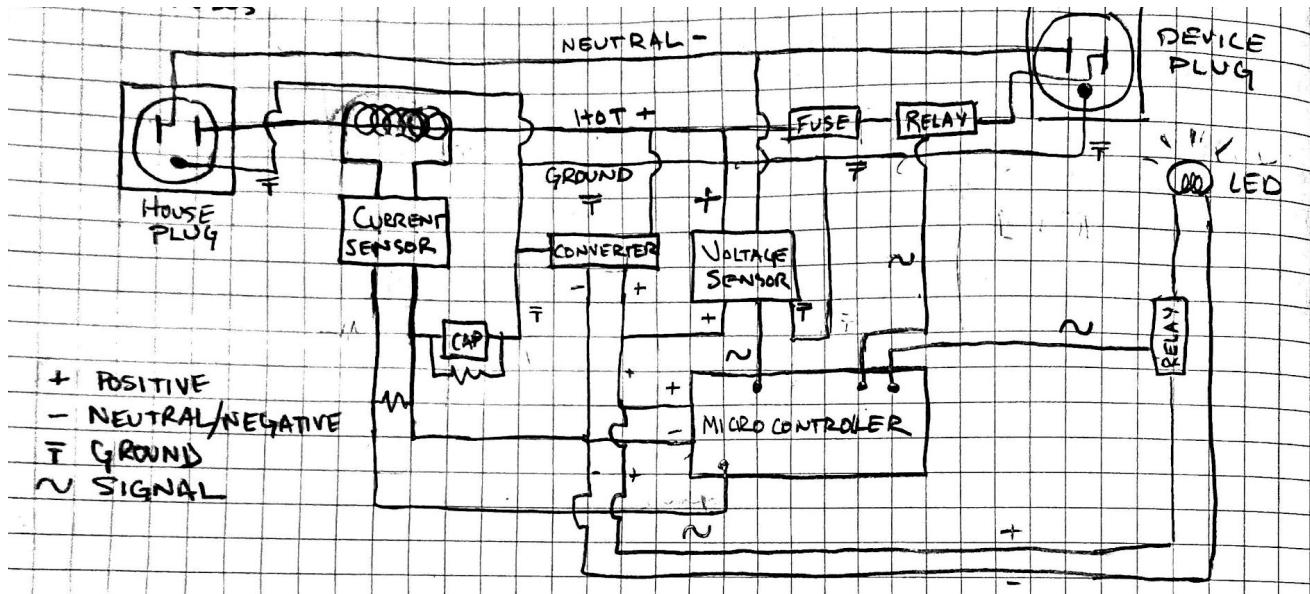
Single Outlet
Double Outlet

Components

- ESP32 Microcontroller
- Outlet plug (male and female)
- Non-invasive current sensor
- AC Voltage Sensor
- Breadboard
- USB Ports
- Capacitive touch switch
- LED indicators
- Resistors
- Relays
- Fuse/breaker
- Capacitors
- 110 to 5v converter
- Online server platform to store data



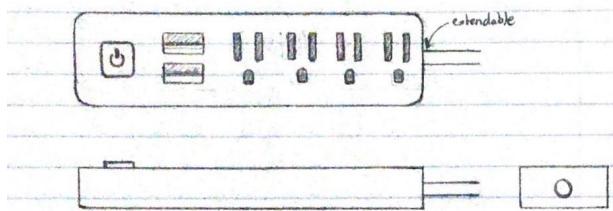
Circuit Diagram



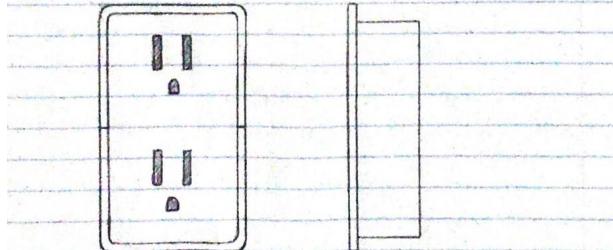
- Single plug
- Double plug
- Double plug deluxe
- Power strip
- In-wall outlet
- Breaker panel hookup
- 240v plug
- Lighting screw-in

Device Family

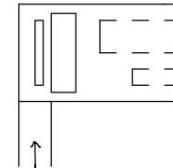
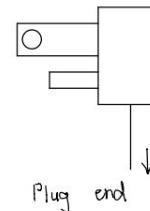
Power Strip



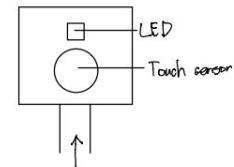
In-wall Outlet



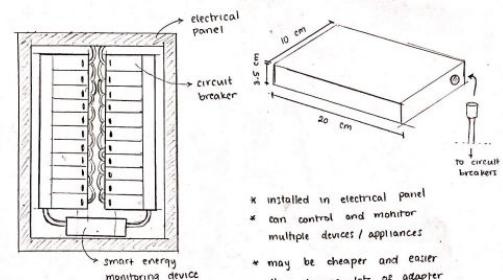
Concept 9: Extension Cable



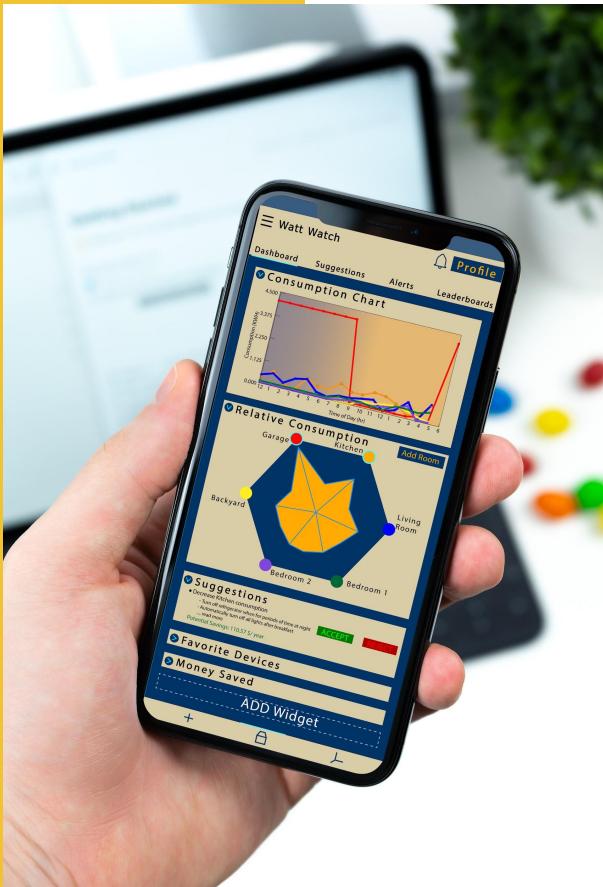
Receiver End



- Receiver end contains microcontroller etc.
- extend up to 10/20 ft.



- * installed in electrical panel
- * can control and monitor multiple devices / appliances
- * may be cheaper and easier than buying lots of adapter



The Watt-Watch Device-Companion Mobile Application



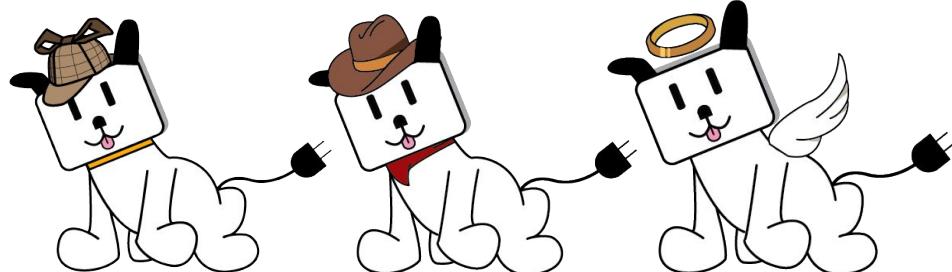
Meet Watt-son, your personal energy saving helper

Watt-son is your new virtual assistant and your in-pocket Energy Usage Advisor.

Watt-son will “**fetch**” data and “**retrieve**” suggestions for you.

Leaderboards page: Compete to see who can save the most energy!

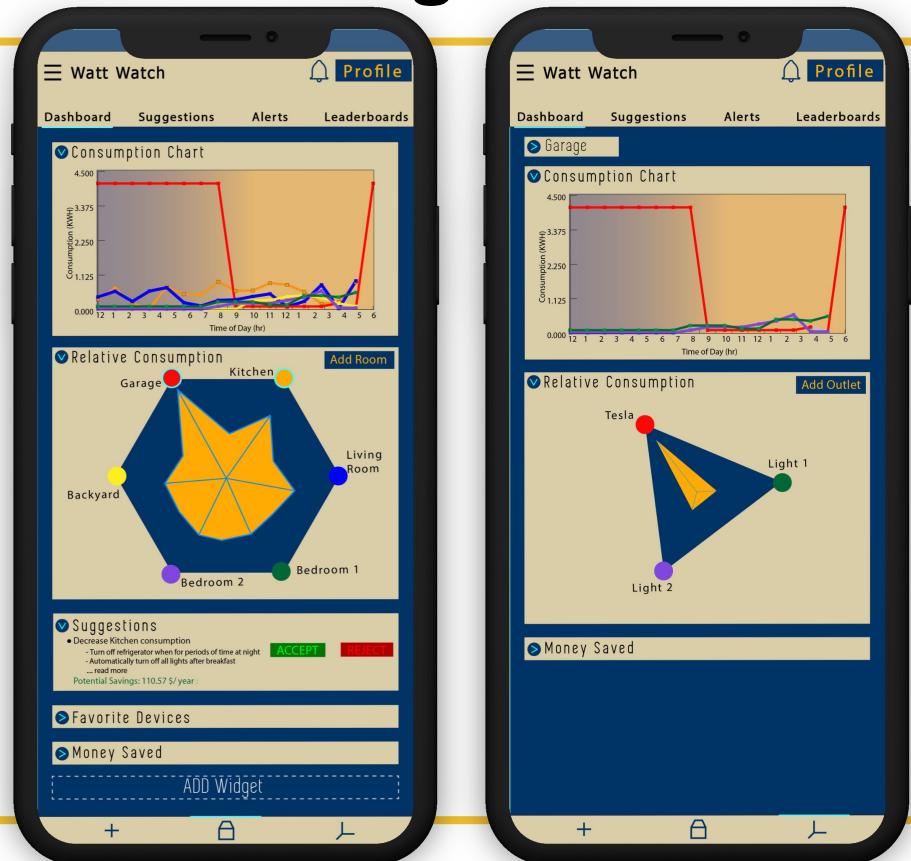
Save energy to earn points that can go towards Watt-son customizations, gift cards, and even free energy-saving devices.



Main Features/Pages

Features/Pages:

- Dashboard
 - Widgets
- Device Management by Room
- Data Monitor
 - Weekly Report
- Suggestions
- Game
 - Leaderboards



Watt-son AI



Server-side AI

- Unsupervised machine learning algorithm located at the server that takes in all incoming data and learns trends, looks for anomalies, and finds patterns in energy use
- Is applied for every device's incoming data
- Generates suggestions based on learned data and programmed suggestion types

AI Powered Suggestions:

- Ex. Schedule refrigerator to turn off for a one hour interval to save X power consumption
- Ex. Schedule living room lights to turn off overnight to save X power consumption
- Ex. Schedule all lights and chargers to turn off when away from home

Business Model



Subscription Service

Free Version

- Device Management
- Energy Usage Data Monitoring
- Weekly Report
- Scheduling
- Watt-son Customization

Pro Version

- ★ Curated Suggestions
- ★ Unlimited Scheduling
- ★ More Cosmetics for Watt-son
- ★ Improved Weekly Report
- ★ Unlocks Game System

Marketing + User Retention

Target Markets

- Upper class large households
 - Keep track of energy sinks and control energy use remotely over large property
- Middle class eco-minded households
 - Want to save energy and has enough money to buy product family + subscription
- Shared dwellings (apartments, houses, duplexes)
 - Keep track of individual energy use for bill-sharing
- Low-income households
 - Use free-version and entry devices to save energy/money

Customer Engagement

- Energy budgeting game
 - Get rewards by saving energy
- Leaderboards
 - Compete with users around the world or the home in energy saving
- Notifications
 - Suggestions
 - Excessive usage notification
- Mascot motivation
 - Cheers from Watt-son on your “great jobs”
 - Customization for Watt-son

Cost Savings Analysis

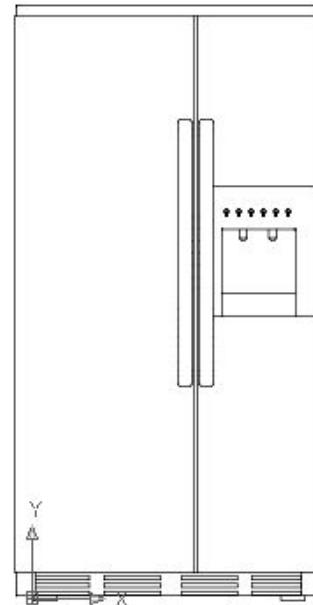
Refrigerator (on for 24 hrs a day normally, 20 hrs scheduled with our plug)

- Power consumption: Min: 100W, Max: 250W 9
- Assumed for rough estimation: 200W
- Price of electricity: \$0.24/kWh 10

Annual cost before: ~\$420.48

Annual cost after: ~\$280.32

Annual Savings: \$140.16



“ Questions?

