Chris Kaulia (kaulichr) & Allen Liu (allenliu)
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CSE 403
Project Proposal

Energy-Save

Vision

In the past decade, energy has become one of the main worldwide issues that people are trying to solve. From the reduction of pollution to combat global warming to the rising cost of a gallon of gas, to the development of alternative energy solutions, energy consumption is now on the minds of more Americans than at other any point in time. Also, with the recession hitting Americans in the wallet, more people are looking for ways to save money, a trend that would seem to continue even as the economy boosts back in the next few years.

Our product is a desktop application that creates estimates on a user's energy consumption and the price of that energy. The user inputs into the program their monthly energy bill and the amount of energy that was used in their residence. From there, they answer questions on what they are using around the house and how long they are usually on for, from light bulbs and televisions to refrigerators and Wi-Fi routers. Then, our Energy-Save application will suggest ways of saving on a person's energy costs, or how much they are likely to save over time by switching from incandescent light bulbs to fluorescent ones, for example.

In this type of economy, people are looking for ways to save in any way they can, and our program can help them see this change. For example, a 150W light bulb will cost around $105 a year to run continuously, based on estimates for the price of a kilowatt hour of energy from Puget Sound Energy. A 42W fluorescent bulb that produces the same amount of light as a 150W bulb will save over $75 dollars in energy costs if they both run for a year continuously. Although light bulbs are not run continuously, these types of price differences are things that ordinary people do not realize they could be saving.

This type of application is a benefit for all parties involved. The user is able to save on their monthly electric bills, while the energy companies do not need to produce as much power, and in turn spend less on infrastructure, or sell their excess energy to other companies in need. All the while, our application can cut down on pollution and help sustain our planet for generations to come.

There are competitors that we have found that do similar things to our idea, but the difference is that we look at every item in the house, allow for custom input or the input of specific items (instead of just a refrigerator in general), and show the difference between competing items in the home. No program or website we found was able to put all these pieces together.

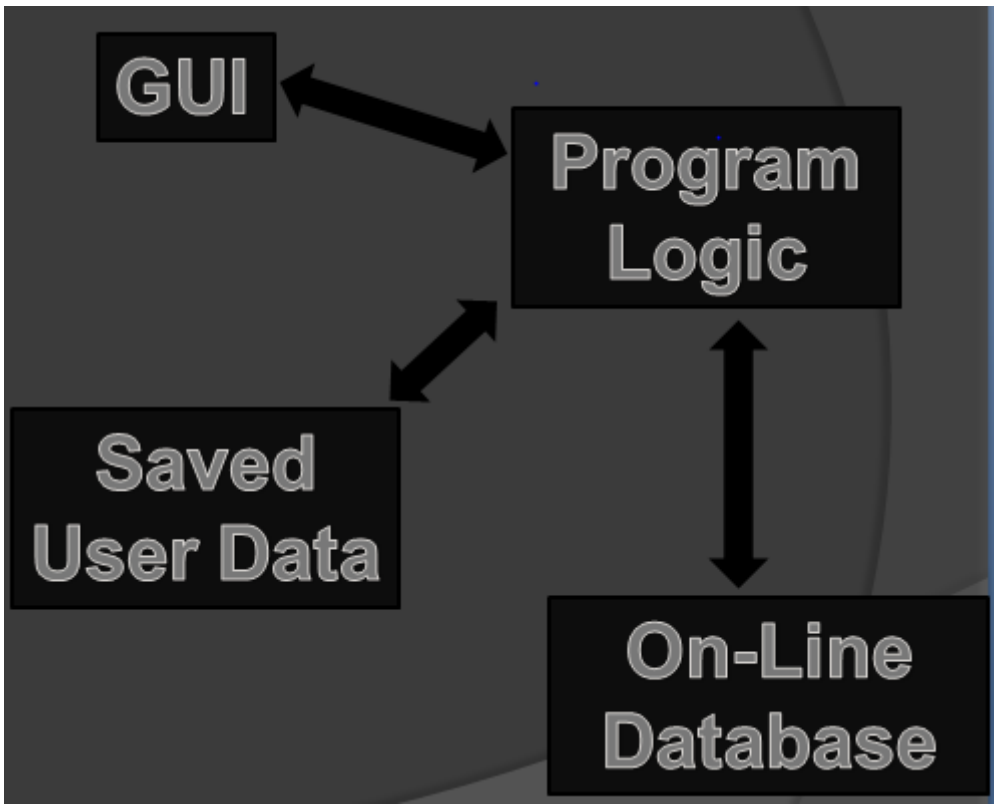
Software Architecture

To build this application effectively, we must utilize existing frameworks and toolkits to get basic functionality down so that more attention can be paid to designing the user interface and adding useful features. Our first choice for a language is Java so that our application can be cross-platform and easily ported to mobile devices such as Android, in the future, if desired. Java Swing is an appropriate framework for the basic GUI elements, but graphical libraries such as JFreeChart or JOpenChart will be very useful to render charts, graphs, and other visualizations of data.

The software architecture is a client-server model. The desktop client will handle user inputs, send queries to a database server, analyze data from all its sources, generate appropriate graphs and

charts, and save persistent user information in a client-side database. The server will answer queries based on information in the database, and accept new data from users for appliances for which it has no records.

Interesting technical challenges that this application presents include effectively implementing queries to the online database. These will ideally be asynchronous so that the client side program does not stall, and the server-side application must be able to gracefully handle queries that are misspelled or incorrect by returning close or next-best answers. From a security standpoint, both the client application and server must prevent against malicious user input such as sql-injections. Additionally, there must be a way to validate new data provided by users. Invalid or bogus data would make this application useless.



Challenges/Risks

The biggest problem with the development of the application is the gathering of data. While we were able to find a database of power usage by different televisions, gaming consoles, routers, etc., it is difficult to find energy usage numbers for appliances such as refrigerators, where wattage numbers are not the entire story when it comes to power consumption. However, through significant searching of the internet, we are confident we can come up with good estimations for many different things people use in their homes, as well as adding a custom input for users where they can put in unique items that may not be covered by our application.

Another one of the risks that must be addressed is the ability to create a working application in only 10 weeks, working with a large group of people for the first time. Our energy application helps us solve this problem because we can create a working base of calculating the amount of energy consumed by certain products, and then add features to that base as time allows.