Project Name: Lightsaver, An Energy Star light fixtures application

Abstract

Renewable energy has always been an area of interest for both investors and inventors. It is a rapidly growing field, though it has not yet surpassed non-renewable energy. Although it is expensive to implement, it imposes no harm on the environment and is potentially the path that technology will take in the near future. However in the meantime, it is best to utilize equipment and appliances, specifically light sources that require less power to operate. Energy Star certified products are very adequate for this cause. This project will take advantage of a data set, containing over thirteen-thousand certified light fixtures that can operate on natural non-exhaustible energy sources. This aids in saving the environment from further damage, along with a noticeable amount of money to its users.

Project Name: Tracker

Abstract

Trackr is a music recommendation desktop application. It plays a brief musical clip to the user and has them rank how they feel about certain factors of the song. These factors hold weights based on how the user responds. If the user enjoys the tempo of a song, tempo receives a higher weight and the system will begin to recommend songs based upon this criteria. Once the user finishes the questions another clip is played for them and the process repeats. This continues until the program has an accurate profile of the user's tastes, then a song is recommended to them. If the questions are answered accurately, a song that has characteristics similar to what the user ranks favourably will be played for them.

Trackr knows nothing about the user's previous tastes at the outset. This lack of knowledge makes it unique from any current music recommendation service which begins by asking the user for their favourite genre or band. Asking for this information results in recommendations that do not venture out of familiar territory. Trackr's approach makes it ideal for any music lover looking to expand their taste outside of acquainted genres or artists.

Project Name: patentRank

Abstract

Renewable energy has always been an area of interest for both investors and inventors. The patent system has been a legal framework of utmost significance. New inventions are created all the time, and they need to be protected by their rightful owners. While it has helped in protecting those new inventions, at the same time not every invention is useful and not ever patent is valuable. Therefore, patent valuation methods have become extremely important to save time and resources in for businesses.

patentRank has been conceptualized and designed with the goal of serving as the definitive patent valuation method.

The goal of this project was to create an application that is highly effective in its function but has a simplified valuation process that would provide valuable insight on an individual patent to the user.

The biggest requirement for the application to truly set itself apart and act as a successful solution was to give the user a proper understanding on the quality of the patent. To serve this function a score is constructed as well as graphical properties of patent citations are utilized to ensure that the user is given a clean indication on the quality of the patent.

To achieve the functionality of these features of the application there are various technical aspects that has needed to be worked, and that has been looked at in more detail down below.

Project Name: Food Finder: Fresh Farm Foods for Fun

Abstract

The American organic food industry is a rapidly growing market, experiencing double digit growth every year for the past decade. It has grown from a $1 billion market in 1990, to over $20 billion today. Despite the rapid growth, there has been a lack of applications that connect consumers to their local farms. Food Finders addresses this by connecting over 300 million Americans to farms where they can buy fresh, organic foods. Food Finders is designed to be robust, accurate, timely, and scalable. Through extensive black box and white box testing, Food Finders is guaranteed to operate correctly, to the level of the specifications, under normal operating conditions on multiple platforms. All algorithms used in Food Finders are deterministic: the same results are produced every time. Furthermore, Food Finders is designed to be timely and scalable: through mathematical analysis of all available algorithms, the algorithms with the lowest time and space complexity were chosen to allow for the application to produce timely results. Furthermore, choosing algorithms with a smaller space complexity allowed for Food Finders to be more scalable. Therefore, Food Finders is a robust, accurate, timely, and scalable application that connects over 300 million Americans and their local farmers.

Project Name: Danger Zone

Abstract

Danger Zone brings a whole new dimension to navigation. This software works just as a normal navigation application, where the user inputs their departure location as well as their desired destination, but instead of just mapping out the quickest journey, it adds a brand new feature that can prevent thousands crimes annually.
There are hundreds of thousands of assault crimes being committed in the United States every year and most of these crimes take place in areas that are less crowded, areas where an individual might be walking through late at night. Our application maps out the safest and quickest route available, avoiding these risky regions, and allowing the user a safe trip home.
As of right now, we are extracting data from an open data set of crime records in Chicago and using that information, paired with the Google Maps API, we weigh the risks of many possible routes and flag any regions that could potentially be considered a “ danger zone ”. We then plot way points through safer intersections and find the quickest path for our users to their targeted location.

Project Name: Alchemist

Abstract

Resource allocation is a very large problem, it is a very difficult problem and it is present in hierarchies across society because it is the consequence of economy and markets.

The Alchemist toolset is an attempt at solving a very particular portion of the problem of resource allocation which is projection or forecasting within the context of the financing of scientific research in Canada. The toolset uses the NSERC (Natural Sciences and Engineering Research Council) grant datasets from 1991 to 2014 to forecast the financial size of a field of research up to five years into the future.

The NSERC is the largest institution funding research in Canada and frequently partners with industry to finance research in University and research institutions across the nation. The dataset is over 0.5 million nodes in size and contains a record of every grant awarded to a scientist working within a Canadian institution.

The toolset provides forecasting, data visualization and searching services through a web based app that can be accessed by any modern browser running Javascript and HTML. The toolset contextualizes all queries through geographic graph data and visualizing other metrics to allow the user to visually experience the result of the query.

Project Name: True Review

Abstract

True Review sets out to tackle an immense problem in the e-commerce industry, user reviews. Although these reviews can be very productive and help consumers find the right products they can also be very detrimental to industry and consumers alike. Among the masses of personal reviews submitted every second some tend to be inappropriate, inaccurate or unproductive.

True Review aims to identify accurate and well written reviews. It is able to perform this feat by processing large amounts reviews and comes to understand strong reviewers based on predetermined heuristics. After the processing is complete a user is able to find the most accurate reviews for a product and reviewer. Finally True Review is able to take in new reviews and calculate an accuracy rating based on the reviewer and review content.

True Review is a clear solution to one of the largest problems e-commerce has faced since its conception. It allows users to receive productive and accurate reviews from other consumers, while also ensuring that the reviews are in fact True.

Project Name: BlueLines

Abstract

An investigative data analytics project into the scope of socioeconomic circumstances which affect crime within the City of Chicago. The project examines a data set of all report crimes since 2001 along with demographic data to both analyze and visualize socioeconomic correlations and crime trends by year and neighbourhood. Data points were initially grouped, then plotted or clustered for visual and numerical analysis. Results from the analysis verified the hypothesis that crime rate trends were positively correlated with economic factors within the city of Chicago. The report concludes that the targeted analysis of a large dataset can definitively assert beyond a reasonable doubt correlation implies causation.

Project Name: Runwayt

Abstract

This project's goal is to determine how different factors affect airline delays, with the goal of being able to accurately predict how much delay a scheduled flight can expect and perform an analysis of available flight delay data. This will enable travellers to be aware of expected delays when choosing an airline or destination. It can also be used to help industry players identify where they can improve turnaround time. The dataset that will be used is Airline On-Time Performance and Causes of Flight Delays: On Time Data" as is provided by the US Department of Transportation. The prediction of flight delays will take into account airline, origin airport, destination airport, date and time.

Project Name: GRID

Abstract

With international rise in energy demands many governments, public and private companies must look towards sustainable energy sources such as solar panels and wind turbines. Grid was conceived to help these parties, such as Government municipalities and small companies with planning placement of sustainable power sources. Using specifications of the power generation tool given by the user, Grid uses mathematical formulas and data obtained from the NASA datasets to generate and compare different sources of power for the user making it easier for the user to decide which power source or location will be better for them.

Project Name: Amazon Book List Recommendations

Abstract

The goal of this project was the creation of an application that recommends products to the user based on one or multiple user inputs. The application makes use of the Amazon Co-purchase Network Metadata Dataset to create a directed graph represented by a HashMap. Quicksort, binary search, and breadth first search algorithms are used to find similar products, and a weighting system was developed to rank them. The topped ranked similar products are returned to the user as a list.

Project Name: ReRoute

Abstract

ReRoute is an application which encompasses the subject matter of: *traffic redistribution based route guidance*; the application provides a unique approach to promote the mitigation of traffic congestion on major roads by helping distribute traffic proportionately over a larger allocation of the network. The dataset utilized by ReRoute is: *City of Seattle Intersections*, which not only comprises of the two street names, the latitude and longitude, which are significant to the application, but various additional characteristics of each intersection.

ReRoute enables the user to enter any two intersections from the city of Seattle, and using the processed graph in the user interface and the generated traffic data, the application displays the optimal path for a user. *R eRoute* utilizes three main algorithms in the aforementioned process: *Dijkstra's Shortest Path Algorithm* to display the optimal path, *Merge Sort* to display the street search results in alphabetical order, and *Binary Search* to search for the intersection.

ReRoute is unique in the sense that, since only intersections are provided in the dataset, an exclusive edge-building algorithm has been devised in order to determine which intersections were connected via each road.