Project Title

Price Tracker

Software Requirements Specification Report

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Abstract

A price tracker is a tool to track, compare, and analyze prices from different websites. Now a days, most of the customers do their shopping online. For a particular product, the price is not same in different e-commerce websites. Before buying any product, the customers did not visit all websites for comparing the best price and they buy that product at a high price. The goal of every customer is to get the best product in cheapest price. Comparing the cheapest price of the product at different e-commerce sites is a difficult task for anyone. An automated system will be created and finding products at the cheapest price will become easier for the customers who want to buy. The web application contains the browser extension and a Price Tracker website. Additionally, a price history of the products from every e-commerce sites will be shown in the Price Tracker website. If a customer search for any products at any e-commerce sites, they can easily identity whether they are getting the cheapest price or not for the product. The advantage of customers will be saving their valuable time and money.

Chapter 1: Introduction

1.1 Background

Customers look for e-commerce sites in order to purchase products of their needs. Maximum of them love to buy those products at the best reasonable price. Buying a product at the hopeful price relies on the website they are using for buying that product and when they are buying (Offer or sale period may minimize the price of various products). Letting a customer buying product at cheaper price help improving customer satisfaction with the whole buying process. Moreover, it is useful in saving money too.

1.2 Purpose

The Price Tracker extension will help customers save money in e-commerce shopping and also help them achieve that in a user-friendly way by comparing product prices from different e-commerce shopping websites. The goal of every customer is to get the products in a cheap rate. This project will to build an automated system for finding products at the cheapest price.

1.3 Scope of the Project

The Price Tracker project will demonstrate the design of the web extension and the website that I will create. In my project there will be two parts in total. The first one is the website and the second one is the web extension. The main deliverables of my project will be the high-fidelity prototype of the website and web extension. The assisting deliverables of my project will be the class diagram of the web application, entity-relationship diagram required for the website and sample flow chart of the working model for web extension.

1.4 Aims and Objectives

The price tracker project, as it's operational goals, always informs the customers as if they can get the best market price when they use an e-commerce site during buying products. It does inform customers about possible upcoming price changes of any product based on comparing previous

price changing history. It also saves customers precious time by research working on behalf of them. It does solve problems without overwhelming the customer with unnecessary quirks.

Now, what should be noted, that in order to make the above stated objectives precise and clear the objectives must be **Specific, Measurable, Achievable, Relevant and Time-Bound.**

Specific

Being a virtual shopping assistant, my web application suite should help customers get the best price for products they intend to buy from an e-commerce site, and what should be my duty for accomplishment.

The importance of the goal is nothing but customers can save huge amounts of money getting the best deal each time while they purchase products.

In this whole process, only the customers of e-commerce sites are involved and the main beneficiary of my project.

The location of it where the website will be hosted in a web hosting platform like Hostinger and the browser extension will reside inside the browser of the user.

As the joint involvement of resources or limits, the server has some limitations on the amount of users it can handle simultaneously. Moreover, there are limitations on the number of e-commerce sites among which the web application can compare prices against.

Measurable

After at least 20 purchases, the target is to save at least 5% of money for the user.

Achievable

This web solution is totally free. So, it is able to reach thousands of customers. It compares prices against all popular websites. Some of them give sales very often. So, hardly there exists a price gap too. That is the reason why the target is so achievable.

Relevant

This project is very relevant to the contemporary socio-economic environment. More people are using e-commerce sites than ever before. So, the user base is huge and it will grow larger only in future.

Time-Bound

The web site and the extension require a month to make the production ready. Before that, the design needs to be completed which is done in this project.

1.5 Automating the collection of Price Data

We need to organize an automatic system that helps us integrating datas of prices of products at different e-commerce sites. There exist a large number of online retailers. Most of them update their demanded prices very frequently. So, it should be time-consuming and very difficult to compare product prices manually for e-shoppers as well as online merchants. E-shoppers will try to get the best possible price whereas retailers may want to know only about the price of their competitors. Huge numbers of products are out there and prices are always updated, modified once a day or even more frequently. An automated system is really needed for identification, collection and comparisons of price data. Behind all automated systems, there is a software or computer program that runs the whole process.

In this circumstance, a software tool is much necessary for e-shoppers and online retailers for the purpose of monitoring and comparing the prices of competitive e-shops.

1.6 Price Tempering

For the kind information, some e-commerce sites have a tendency of tampering prices based on some parameters. Some of the largest e-commerce sites occasionally conduct experiments with prices of products. For example, amazon has a long history of experimenting with prices of various products. For the same DVD movies, they have charged different charges to different customers. [Wall St. J., Sept. 7, 2000, at B190]. This is called dynamic pricing.

The “Dynamic pricing” is defined in different ways. According to price-intelligently website, the dynamic pricing means changing prices of goods or services for specific customer preferences. I follow this definition in my report. In a dynamic pricing system, in accordance with the customer's intentions to pay, different companies adjust prices of identical goods. [Online Dynamic Pricing: Efficiency, Equity and the Future of E-commerce].

In August, 1999, Economist article stated “Fierce competition has forced web companies to slashprices.” [The Economist, August 21, 1999.].

We can easily detect the abnormality of product price at a certain e-commerce site after comparing prices of that product at other sites by visiting there. But this manual process requires a lot of efforts and time, what can cause boredom.

1.7 The Law of One Price

If each store or e-commerce site starts selling the same product at the same price, customers don’t need to make efforts and money in finding the best price for a specific product.

The law of a price is basically an economic theory. It states that the price of a unique commodity, asset or security traded anywhere should have the same price independent of the location after taking currency exchange rate in consideration. [https://www.investopedia.com/terms/l/law-one-price.asp].

For e-commerce sites, “The Law of One Price” is much desired by the consumers. But surely there are some factors that come into play when deciding the price of a product.

Chapter 2: Pros and Cons of Price Tracker Extension

2.1 Pros of Price Tracker Extension

i. It allows user to compare price between different e-commerce websites.
ii. Users did not need to visit multiple websites.
iii. It enhances user experience and it is user friendly.
iv. Users can focus or target on doing their shopping
v. Users don't have to bear the hassle of moving to different site just to see the price comparison.

2.2 Cons of Price Tracker Extension

i. The extension only works on desktop computers but now on smartphones.
ii. The extension can't be used on Firefox, Edge, Safari, Opera etc. Browsers but only works on Chrome Browser.

The use of extension over only web site or web application-based solution comes from the fact that web extension is user friendly and lets users interact with the main website without the hassle of moving from one website to another.

Chapter 3: Project Requirement

3.1 Software Requirement

Database: Oracle Database 10g or MySQL or SQLite
Programming Language: Python, JavaScript (Microsoft Visual Studio / Anaconda 3 / repl.it)
Backend Framework: Django
Frontend: HTML, CSS, Bootstrap Framework (Microsoft Visual Studio / repl.it)
Browser Extension: HTML, CSS, json (manifest file), JavaScript (Microsoft Visual Studio / repl.it)

3.2 Functional Requirement

The functional requirements are:

i. There will be a login or signup system for the customers.

ii. When a customer enters a website for buying a product from an e-commerce site, the prices of that product will be fetched from different e-commerce sites and displayed with the help of the Price Tracker browser extension.

iii. The prices of the product that the customer wants to buy will be compared from different e-commerce sites with the price of the e-commerce site. An alert warning message and link of the sites will be shown if they want to buy that product at a lower price from other sites.

iv. The history of the product price will be shown in the Price Tracker website. A link will be created by Price Tracker browser extension before checkout of the product. The full price history of any products will be connected with the Price Tracker website where price history of that specific product at that specific e-commerce site will be shown.

v. The Price Tracker database will store the prices of the products from several e-commerce sites. If any customer enters in a page of the product then prices of that product from that e-commerce site will be updated in the Price Tracker database if Price Tracker browser extension is installed in the customer computer browser.

3.3 Non-Functional Requirement

The non-functional requirements are:

i. The database of Price Tracker website needs to store product prices at a particular e-commerce site at various points of time. For each product item, the database will collect the price for that product every 24 hour.

ii. Price Tracker database must store price history for each product for the last year.
iii. The web browser extension will not support Firefox or Opera browser.
iv. All passwords in the database must be hashed for security purposes.
v. Price tracker will update prices of products every day.

Chapter 4: Diagrams

4.1 Entity-Relationship Diagram

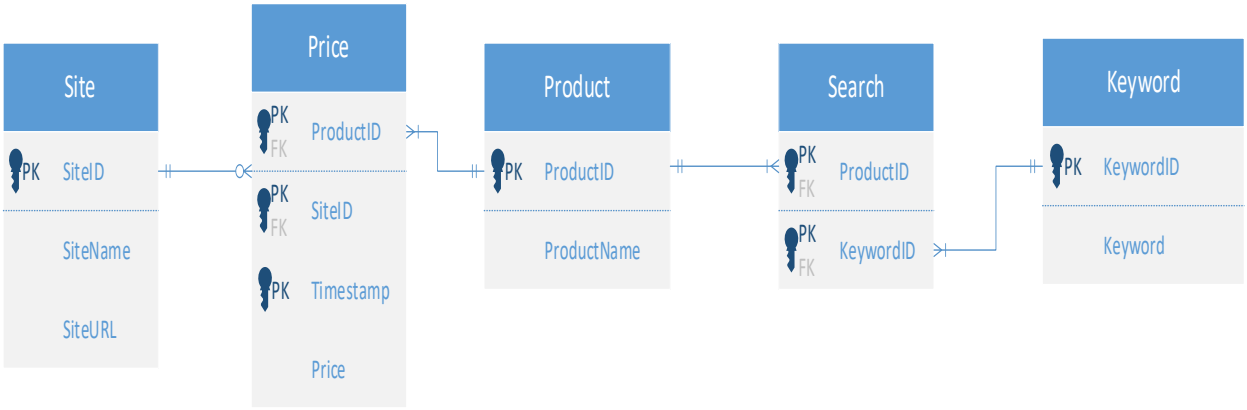

Figure 1: Entity-Relationship Diagram

Product table will store product information for each product. Each product can be sold at multiple e-commerce sites. Prices will vary at each e-commerce site depending on the date. It seems, there exists many to many relationships between ***Sites*** table and ***Product*** table. To solve many-to-many relationships and accommodate time information ***Price*** table is created. On the other hand, for storing keywords, a ***Keyword*** table is created. Each product can have multiple keywords. Each keyword can be related to multiple ***Product***. So, ***Product*** table and ***Keyword*** table is related by many-to-many relationship. To resolve that, ***Search*** table is created with foreign key from both ***Product*** and ***Keyword*** table. For these reasons, the relationships are as follows:

i. ***Site*** table is related to ***Price*** table by one-to-many relationship.
ii. ***Price*** table is related to ***Product*** table by many-to-one relationship.
iii. ***Product*** table is related to ***Search*** table by one-to-many relationship.
iv. ***Search*** table is related to ***Keyword*** table by many-to-one relationship.

4.2 System Architecture Diagram

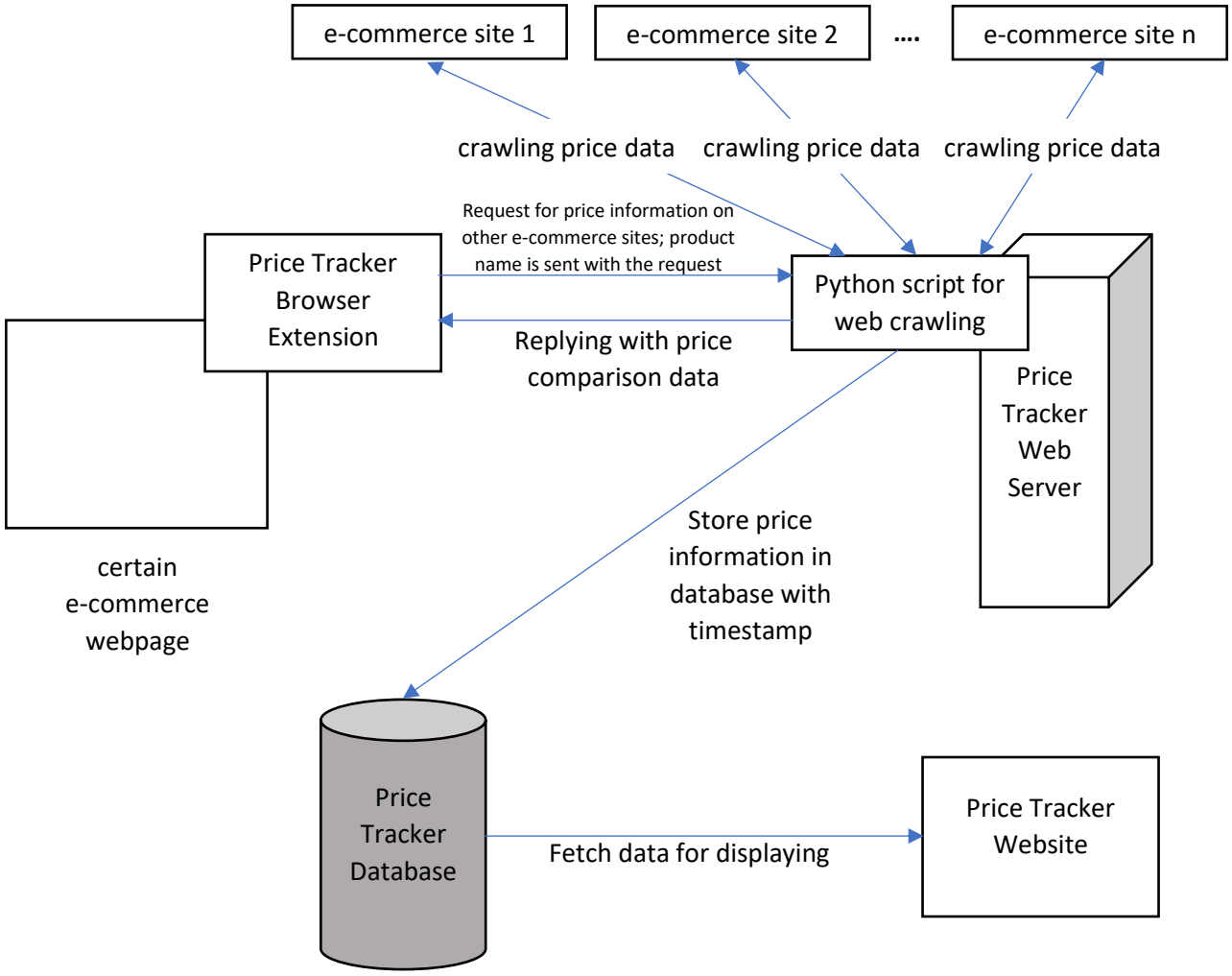

Figure 2: *System Architecture Diagram*

The above system architecture diagram of my project demonstrates that whenever a user visits a certain e-commerce webpage of any product, the Price Tracker browser extension will request (using **XMLHttpRequest** with the help of JavaScript) for a python script to run (Price Tracker extension will send the product name along with the request). The script will then search for that product at other e-commerce websites and return price information at each of those websites. Then the extension will receive those prices information and display accordingly. While sending price information to the user's browser, the script will also store price information in the database. If price information for that product at that particular site at that particular date was stored already, then the information will not be stored. Otherwise, the price information will be stored in the database.

Chapter 5: Workplan

5.1 Full Task Table

Task	Start Date	End Date	Duration
Feasibility Analysis Report	9-Nov	12-Nov	4
Data collection about various e-commerce sites. Develop ER diagram	13-Nov	22-Nov	10
Implementation of database system using MySQL. Connection with Django	23-Nov	5-Dec	13
Basic extension development, connection of extension with database	6-Dec	15-Dec	10
Website development, price of particular products showing	16-Dec	31-Dec	16
Price comparison of different sites in extension	1-Jan	6-Jan	6
Complete Extension interface. Showing price history of all products	7-Jan	13-Jan	7

5.2 Gantt Chart

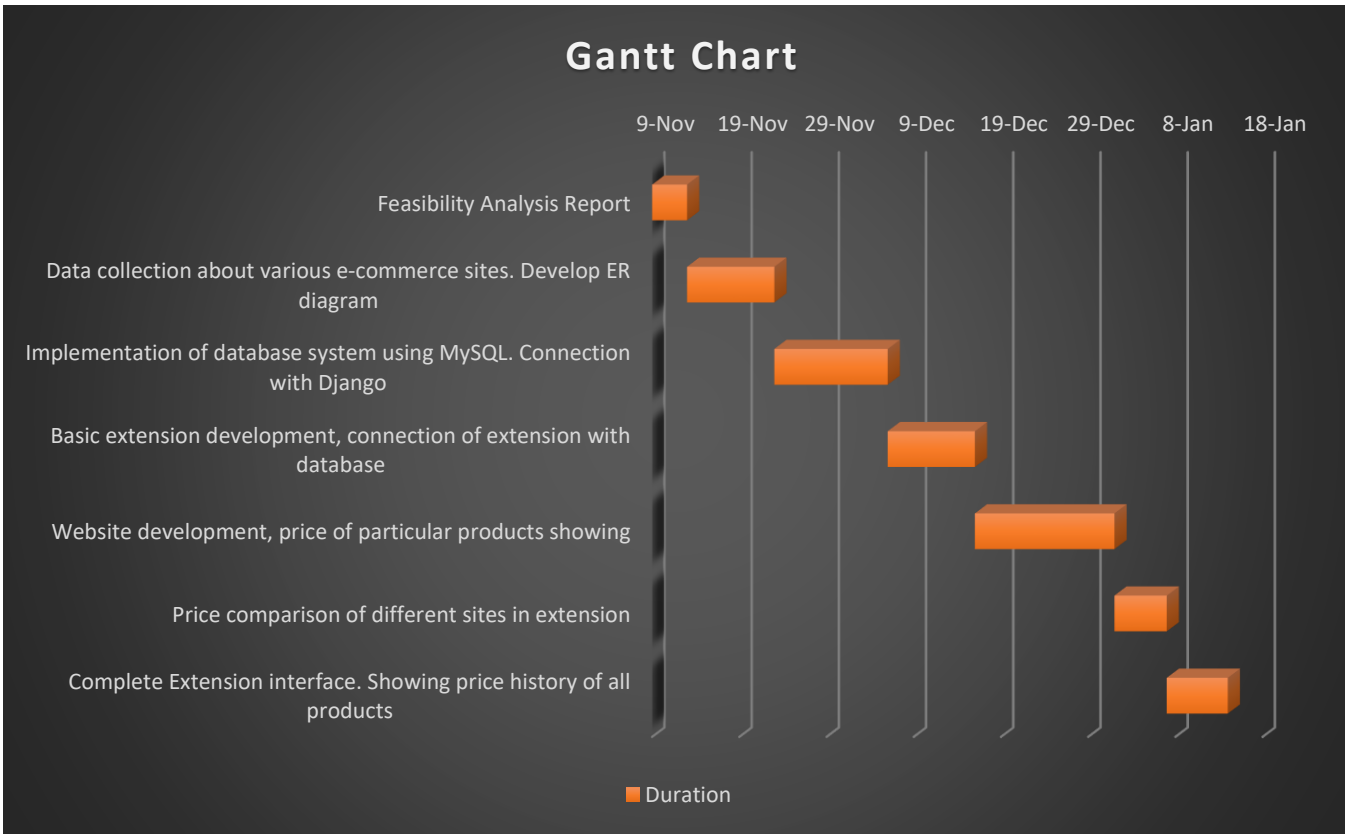

Figure 3: *Gantt Chart*

Chapter 6: Conclusion

The Price Tracker browser extension will be helpful for customers to save their valuable money while shopping from e-commerce sites. It will create a user-friendly small interface. To me, this project will be feasible because the requirements of thousands of e-commerce customers in Bangladesh will be solved easily. But the customer will not get the price history of the products information by the help of Price Tracker browser extension. I will try to show a link to Price Tracker extension which will show price history information of the products as a pop-up. If any customer visits an e-commerce website then they will see the price history information from the site by clicking on the Price Tracker browser extension.