

Online Trading System with Reverse Image Search

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ABSTRACT

Online Trading System with Reverse Image Search is designed for people to post their items up for trade. Compared to the bartering and trading system in different social media platforms, this system assures traders that all registered individuals have a valid identity, which may avoid bogus transactions. A one-stop shop for people to post items of any kind; thanks to the categorization feature, unlike other platforms with many different groups for many different kinds of products, it is a hassle to find the product being searched. The researchers integrated an Image Tagging API into the system to handle the image search function, wherein traders use images to search for related products. The system sends that image to the Tagging API, then generates tags to be returned to the system to match other tags to have related items as a result.

Keywords: *Online Trading, Reverse Image Search, Trade, Image Tagging API, Categorization.*

1. INTRODUCTION

Information and communication technology (ICT) has long been regarded as a vital driver of productivity growth and an essential tool for innovation. Trade liberalization can play a role in encouraging ICT adoption by fostering competition and by reducing ICT prices [1].

Modern information and communication technology have enabled a "global village" in which people from all over the world can interact as if they were living next door. As a result, ICT is frequently studied concerning how modern communication technologies impact society—supporting the trend nowadays in consumers doing barter in the online market.

Bartering stuff is an old process of trading in the olden times without the use of money. During the pandemic, trading is useful. People started to look for ways to provide for their families, so they looked towards their pre-loved items and exchanged them for their necessities.

The researchers developed a web-based application that provides a solution for traders to securely barter their items from one another. The web-based application improves user's experience in trading online through product organization. It also has a category feature that sorts items in the system. It also suggests items related to uploaded images through product tagging. The

application is integrated with a rating system and has a chat feature for easy barter transactions.

This system helps trading be simpler and more efficient; images in the system provide the best results in matching tags through reverse image search via Image Tagging API. In the technology mentioned, where the trader takes a photo, the algorithm generates tags and matches them with related tags from related images that provide suggestions to the trader.

Image Recognition Platform-as-a-Service allows developers and organizations to create scalable, image-intensive cloud apps using Image Tagging APIs. The technology automates the process of categorizing photographs with keywords or domain-specific categories. The solution is horizontally scalable and capable of analyzing and annotating the load of images. It can adapt to the needs of customers through customized training or a feedback loop. In just a few hours, it can be put into production if it's wrapped in an easy-to-integrate API in the cloud or on a customer's premises [2].

The success of the designed web-based application leads to a safer and secure transaction and contributes to the following: (1) Product Owner. The system aid the product owner in tailoring more suitable choices for the client based on their given criteria/preference. And (2) Client. The system provides the client with a more convenient and secure trading experience.

2. RELATED STUDIES

Barter as an alternative trading and financing tool and its importance for Businesses in times of economic crisis

Today, growing commercial and financial integration between countries with globalization leads to intense competition and global economic crises. Due to these developments, the companies have difficulties carrying on their business and managing the crises with traditional marketing and financing techniques. So they are turning to alternative methods. One of them is a barter system meaning buying and selling goods and services without using money. Barter is an innovative form of exchange system used as a trading method since the early ages. This research examines barter from a trade and financial standpoint and looks into the use of barter in businesses as a means of coping with economic crises [3].

2.1 Search by Image New Search Engine Service Model

The "Search by image" is based on the use of computer vision algorithms. The success of such a search is based on the use of informative invariant rapidly computed features and effective image classifiers. Therefore, an effective search by the image should be based on the data mining approach of a lexical description of image context, which is called "Search by Keywords," image metadata, and calculated image features [4]. The study above is about reverse image search, an effective search engine towards scanning and recognizing objects and using the informative invariant rapidly computed features.

2.2 An Evaluation of Reverse Image Search Performance of Google

The reverse image search performance of Google, in terms of Average Precisions (APs) at various cut-off points, on finding out similar images by using new Image Queries (IQs) from the five categories "Fashion," "Computer," "Home," "Sports," and "Toys," to have an insight about reverse image search performance of Google. And then motivate the researchers and inform the users. Five fresh IQs with different main concepts were created for each of the five categories. These 25 IQs were run on the search engine, and for each, the first 100 images retrieved were evaluated with binary relevance judgment. It seems that the reverse image search performance of Google needs to be improved [5]. This study helped the researchers calculate the responsiveness of reverse image search toward five fresh IQs. It can increase in the future and gives optimal precision in identifying various objects based on categories.

3. METHODOLOGY

3.1 Software Model Used

The researchers used an iterative model in the development of the system. Iterative emphasizes the completion of one task before moving to the next. Every phase stands with different processes or procedures needed to execute the project development.

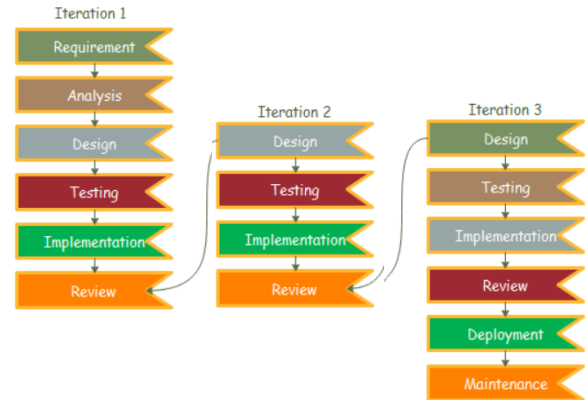


Figure 1 Iterative Model.

Figure 1 shows the model used by the researchers, which has the following phases:

- Requirement, in where the needed information for software development is established.
- Analysis, where the gathered software requirements are planned to develop a system that meets the software requirements.
- Design, in this phase, the researchers strategically develop an idea of how the software solution meets along with the software design. The researchers have designed a Context Flow Diagram, Data Flow Diagram, and Use Case Diagram to show the scope of the system better.

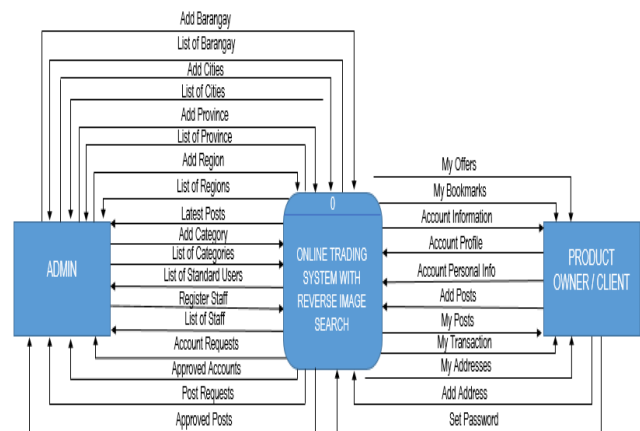


Figure 2 Context Flow Diagram.

The above diagram presents the system in consideration as a single high-level process, followed by the system's relationship with other external entities.

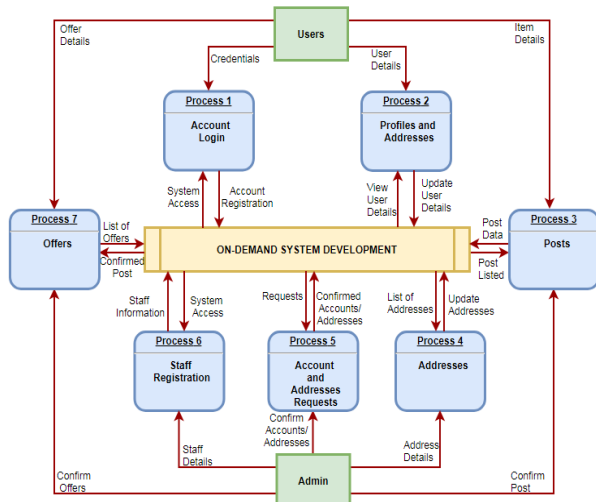


Figure 3 Data Flow Diagram.

Figure 3 is the Data Flow Diagram of the system; according to Warren, it is defined as organized software analysis, design method, and a decomposition of the data flow and a process model of the system. It is a graphical representation of a system requirement's information flows, operation sequence, and functions [6].

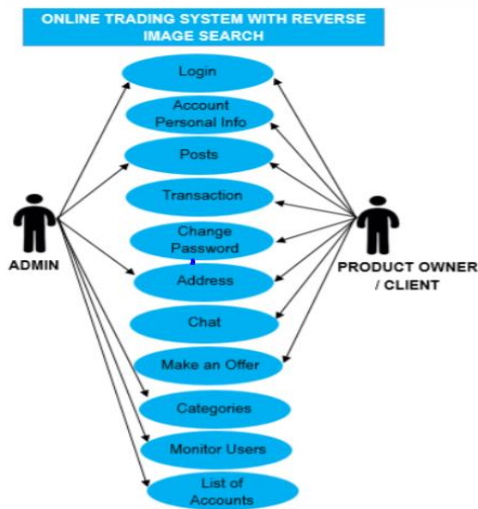


Figure 4 Use Case Diagram.

The figure above shows the Use Case Diagram of the system. This is a graphical illustration of the interactions among the elements of the system. The actors were identified with their specific roles. The Admin, Product Owner, and Client users are the actors of the system.

- d. Implementation, the researcher created the codes, and the user interface is built.
- e. Testing, after completing the coding phase, the researchers modified the expected input and output

on the development of the system, and software testing started too.

- f. Deployment, in this phase, the researchers pass each testing where the developed system is ready to use.
- g. Review. After the software deployment, a review phase was performed to examine the system software's functioning accurately. The researchers start from the requirement gathering process again if any error is found in the system.
- h. And lastly, Maintenance, after deployment of the software, the researchers debugged errors. At the same time, while the system is being used in the working environment, updates or enhancements are done in the system, if necessary.

3.2 Details of The Software Used

The required software, hardware, and program tools of the system must be met to ensure the functionality of the development of the Online Trading System with Reverse Image Search.

The researchers used the following software in developing the system, which are essential tools in accomplishing the Online Trading System with Reverse Image Search. The operating system is Microsoft Windows 7. The framework is angular 6 and ionic 5.2.9. The database software used is firebase-database 19.2.1. For browser Specification, Google Chrome Ver. 70.0.35.38, Mozilla Firefox Ver. 54.0 (32 bit), Internet Explorer or Internet Explorer is recommended wherein the client can use the system. JavaScript ES7 and TypeScript 3.2 as the programming language.

3.3 How the System Works

An Input-Process-Output model is used to analyze the system's transformation process. It shows the system's inputs and its process, and the generated outputs.

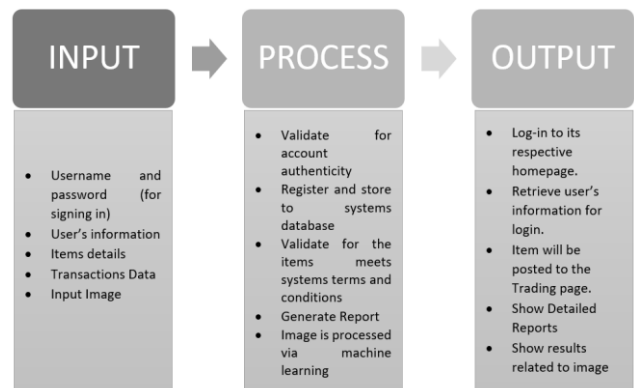


Figure 5 Input-Output-Process (IPO) Model.

The above diagram shows that the user's information is an input for registering and is added to the system's database. The user needs to input the username and password to log in, and the system validates the account. Suppose the process is successful; the user now can view the homepage or respective dashboard. In that case, it can access the website, where the trader can navigate the bartering systems' primary functions.

Requirements Modeling. This data depicts the system's flow and movement of the developed system.

Input. These are the data entered into the system to achieve an output. The Admin, Product Owner, and Client users need to log in to access the system. The following are the inputs of the system:

- User Login
- Register Account
- Account Personal Info
- Posts
- Categories
- Staff
- Change Password
- Address

Process. Transformation of input information into output data takes place. All input was processed and saved to the database.

Admin can:

- Log in and log out to the system
- Add and Update Categories
- Update Users
- Add and Update Staff
- Approved / Disapproved Accounts
- Approved / Disapproved Posts
- Add Addresses

Product Owner / Client can:

- Validate Credential Account
- Confirmation Account
- Update Account to the Database
- List of Created Posts to the Homepage
- Update New Password
- Update or Add Address
- Notify the Product Owner of the Pending Offers
- Transmit Chat Messages Between Client and Product Owner

Output. These are the visuals after processing the input.

Admin can:

- Display Home Page

- View List of Staff
- View List of Standard Users
- View the List of Categories
- List of Account Requests
- List of Approved Account
- List of Pending Posts
- List of Approved Posts
- List of Addresses

Product Owner / Client can:

- Display Home Page
- Redirect to Login
- View Updated Account Info
- Client Make an Offer to the Post
- Users can log in with the New Password
- View the list of Available Addresses
- View list of Pending Offer
- Display Chat Threads

Performance. The system directly shows the test results. The system is accessible to the admin and all the product owners and clients of the system. The system secures its end users in safekeeping its personal information and providing fast and convenient transactions with the help of its features and functions.

- a. The system generates auto-tags and suggests an item through the image search feature.
- b. The system is accessed and works by having internet connectivity.

Control. The users control the system with different access levels. The admin controls adding categories, adding staff, approving posts, the user's accounts, and adding addresses. The Product Owner controls their post and manages transactions with the client. The client controls its transactions and offerings with the product owner.

4. RESULTS AND DISCUSSION

This research has demonstrated the development of an online system and had been conducted to achieve the five main objectives:

4.1 To be Able to Improve The User's Experience in Trading Online Through Product Organization

The developed web-based system is a one-stop shop for traders in the community. Unlike with existing systems where each category of items is separated into different groups, it is a hassle if a trader is looking to trade a specific item.

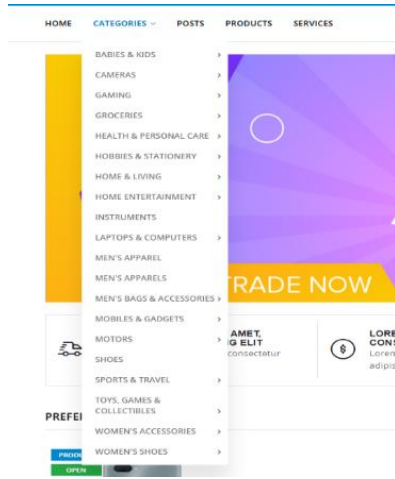


Figure 6 Categories.

4.2 To Implement a Category Feature That Helps Lessen The Time to Look for a Related Product

The researchers added a category feature wherein the trader selects a category that describes an item that the trader posts. After uploading a post, the trader is given an option to look for an item using the category tab. By selecting a tab, a drop-down menu appears, and the trader can select which category they want based on what item they are looking for. The figure below shows how categorization works.

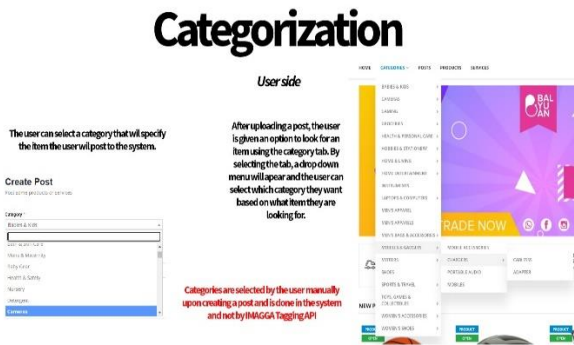


Figure 7 Category (User Side).

Only the admin can create categories that the trader can later use when a trader creates a post.

4.3 To Make Suggestions for You Based on Uploaded Images Through Product Tagging

The developed system makes suggestions through the image search feature. The system sends the image to the Image Tagging API. Then the Tagging API returns the generated tags to the system. When trader 1 creates a post, the auto-generated tags from the Image Tagging API are saved in the system's database. These are used to search a post from other registered traders in the system (for example, tags related to the wall clock).

When trader 2 searches a post to trade, the auto-generated tags from Imagga, the Image Tagging API integrated into the system, are being matched to existing posts in the system.

Categorization

Admin side

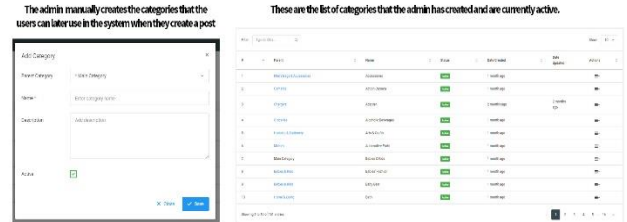


Figure 8 Category (Admin Side).

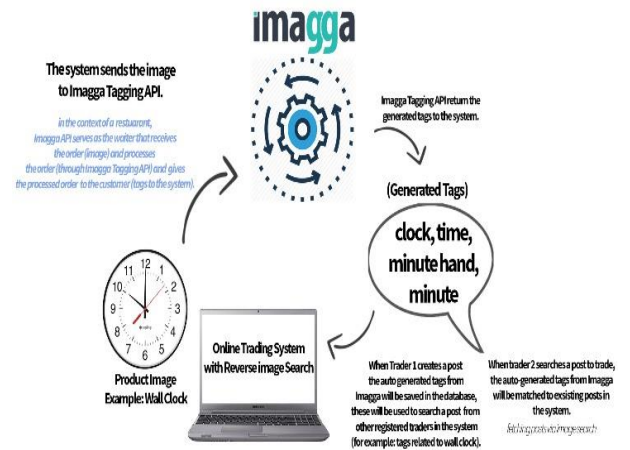


Figure 9 Imagga Tagging API Process.

4.4 To Improve Communication Between Traders Through a Chat Feature

The researchers implemented a chat feature where two traders can have a conversation about the items that are up for trade. The chat feature comes in after the two traders decide to make a deal. This resulted in a more secure agreement and have both parties satisfied or they can change their minds before actually meeting up. The figure below shows a conversation between two traders.

4.5 To Integrate a Rating System Used to Rate Online Traders on Their Transactions

The designed system includes a rating system that allows traders to rate other dealers with whom they have conducted deals. With this feature, the system can filter the traders based on their ratings. Traders with good ratings are more likely to display their items on the homepage, where more people can see their posts. Traders who had terrible ratings from previous

transactions are less likely to be prioritized by the system so that other traders are also less likely to have transactions with them. The figure below is an interface to rate an item in the system.

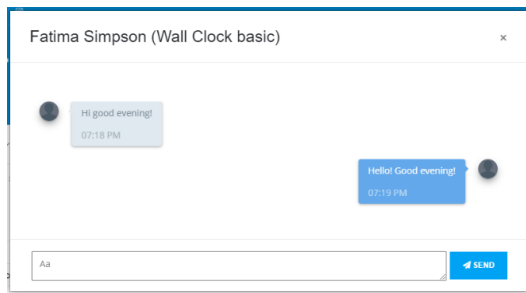


Figure 10 Chat Feature.

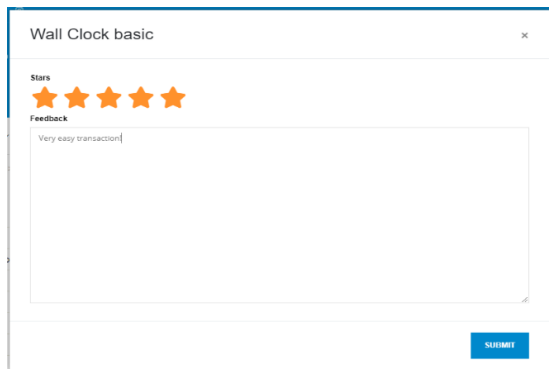


Figure 11 Rating System.

5. CONCLUSION AND FUTURE WORKS

The researchers conducted this research for an accessible and efficient bartering for traders by providing them a secure platform to trade products. A system can hold and post items that can be traded online by creating the product list with correct and accurate information of the items or products to be posted. And then, the trader or other dealer can make reasonable offers based on the item's value that can improve the user's experience in trading online. The whole transaction can only be done inside the platform to completely record and provide security to both product owners and clients by keeping all the transaction details in the dashboard of the users and making it a reference if the user wishes to review previous transactions.

This research has achieved its objectives and was successfully built into a web-based platform, and it provided a better method for the users to trade in a regulated manner. The researchers have identified that this study is feasible and visible to be implemented.

During the deployment, the system is tested to ensure that all objectives were met and significant issues would not surface. All testing plans are successful and marked well based on the executed functions. It is concluded that the system's objectives have been observed and implemented and are ready for deployment.

The following are the recommendations for future researchers:

- a. It can be regulated and monitored by the national authorities to ensure the system's integrity and have highly secured servers in securing the users' way of trading and improve the overall system's security.
- b. Partnerships with couriers can be made to have made transactions more convenient.
- c. It supports QR code functionality that can hide sensitive data of the products and for added security to the users' information when trading.

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