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EBAY INTEGRATED SYSTEM FOR IMAGE SERVICES (ISIS)

A Major Qualifying Project Report

submitted to the Faculty of

WORCESTER POLYTECHNIC INSTITUTE

in partial fulfillment of the requirements for the

Degree of Bachelor of Science

by

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Approved:

Professor David Finkel, Major Advisor

ABSTRACT

In this project we designed and implemented an API which connects developers to various image services currently in use within the eBay Research Lab. These image services include image comparison and Optical Character Recognition (OCR), which allows for text and barcode extraction. In addition, we created a prototype system which works with the API to demonstrate dynamic email-based content for the end user. This prototype system allows users to send images for comparison and receive HTML responses via email.

EXECUTIVE SUMMARY

The eBay company provides its users with a forum for buying and selling goods and services on the Internet. In order to provide its users with the best experience possible, eBay has developed many features for its users which can aid them in the buying and selling of goods and services. Among the features that eBay provides their user is the ability to use images to help both buyers and sellers to identify items. The use of images is essential because it allows users to see the actual item they are looking to purchase from the seller.

The goal of our project was to create a system that demonstrates the benefits that advanced image services would bring to eBay and its users. During the course of our nine weeks at eBay, we created an API (Application Programming Interface) that provides an interface to various image services. In addition, we created content generating services to be used by end users. The API allows any service to connect to the image services through HTTP GET and POST calls, and receive an XML response. The content generating system that we created handles the reception and sending of emails which allows a user to send an email to the system with an attached image and receive a response back from the server after their requested service has been completed. The name of our system is the Integrated System for Image Services (ISIS).

The final design of ISIS is divided into three distinct layers. These layers include the User Layer, the System Layer, and the API Layer. The user layer of the system is any end-user application that uses an application from the System Layer, or directly communicates with the API Layer. The main components of the User Layer that we created during the course of the project include an email interface and a Web interface

using a standard web browser. The System Layer contains applications which connect the user to the API Layer. These applications receive the XML response from the API Layer, parse the data and format it in a way that can be viewed by the User Layer. The API Layer connects the User or System Layer to the various image services. The API Layer is accessed through HTTP requests and responds through XML. One of the main reasons that the ISIS system was designed in layers was to ensure that it could be easily expanded upon in the future. During the initial design of the system, this was one of the aspects of the system that the Image Analysis team was most interested in.

In its current state ISIS is a prototype system that only works with a pre-processed set of images for the image comparison searches. We considered the feasibility of expanding the system to work with live auction listings. If eBay chooses to invest more resources in this project, it may be possible to tweak the underlying algorithms to decrease the time it takes to analyze images and design a simple network of machines that would process every single image that is attached to every eBay listing.

We have successfully developed a highly extensible system to interact with various types of image services. The current system is a prototype which demonstrates the possible applications that the image services can bring to eBay users. The eBay Research Lab and Image Analysis team will be able to expand the system by adding image services and functionality. Enough work has been completed to allow for a decision to be made regarding the feasibility of production use. This decision will be up to various departments throughout eBay to determine how the system can best be implemented for use by eBay end users.