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PROVISIONAL APPLICATION FOR PATENT COVER SHEET
This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

INVENTOR(S)

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☐ Additional inventors are being named on the __ separately numbered sheets attached hereto

TITLE OF THE INVENTION (280 characters max)

TARGET IDENTIFICATION AND IMAGE-BASED INFORMATION LINKING

CORRESPONDENCE ADDRESS

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[X] Customer Number 24046

OR

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ENCLOSED APPLICATION PARTS (check all that apply)

[X] Specification Number of Pages _____
☐ Drawing(s) Number of Sheets _____
☐ Application Data Sheet See 37 CFR 1.76

☐ CD(s) Number _____
☐ Other (specify) _____

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT

[X] Applicant claims small entity status See 37 CFR 1.27
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[X] No.
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Respectfully submitted,

SIGNATURE _____

TYPED or PRINTED NAME GEORGE W. FINCH

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Date 11/06/00

REGISTRATION NO (if appropriate) 25,113

Docket Number BONC-0001

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

This collection of information is required by 37 CFR 1.51. The information is used by the public to file (and by the PTO to process) a provisional application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the complete provisional application to the PTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO Box Provisional Application, Assistant Commissioner for Patents, Washington, D.C. 20231

Attorney's Docket No. <u>BONC-0001</u>   PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: BONCYK ET AL

Application No. TBD

Filing Date: 6 November 2000

Title: TARGET IDENTIFICATION AND IMAGE-BASED INFORMATION LINKING

Box PATENT APPLICATION
Assistant Commissioner for Patents
Washington, D.C. 20231

CERTIFICATE OF EXPRESS MAILING UNDER 37 CFR 1.10

I hereby certify that the provisional patent application referred to as enclosed therein are being deposited with the United States Postal Service on 6 November 2000, in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number EF107195763US, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

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Target Identification
and
Image-Based Information Linking

Wayne Boncyk
Ronald H. Cohen

October 30, 2000

Background

General

A process is presented by which information, such as
Internet content, can be presented to a User based on
remotely linking to physical objects. No additional
information is encoded in the linked object, nor is any
device, radio or otherwise, embedded in or affixed to the
object. The only modification to the object is the addition
of a logo "Tag," for objects linked via pure image linking,
or a bar code, for objects linked via bar code. Image-
linked objects are identified via digital image processing
and the address of pertinent information is returned to the
device performing the link. Bar-code linked objects are
linked by reading the bar code, using the same sensor used
for the image linking, and similarly returning the
appropriate information address.

Image Processing

Numerous image processing techniques exist in the current
art to perform specific "corrections" to raw input imagery.
These include techniques for digital image rectification by
resampling, as well as various color processing techniques
designed to transform raw imagery into "corrected" images
that appear normal to the human eye. However, machine
image classification based upon the unique chroma content
of an entire image has not been practiced successfully
except in a narrow range of applications. It currently
only exists in applications where either the image incident
illumination is spectrally well known or where the subset
of possible input targets is reasonably small and well-
defined, allowing assumptions about the changes in target

response to varying illumination intensities or spectral characteristics to be made as part of the process. Further, the current art is generally confined to either human vision-like processing designed to adjust input imagery to look more "pleasing" to the eye, or in feature extraction to be used to recognize specific objects in the input image space for machine target recognition. The presented method removes the first-order effect of illumination variability. The presented method further utilizes the spatial chroma content of an entire image to classify or ID unique targets from a database of desired target images.

Definitions

"Target"

A "Target" is herein defined as an object or image which we desire to identify via machine algorithm, and in many cases for which we wish to subsequently access or provide related information to the person or machine which observes the target. A Target may a physical object, such as a building, a vehicle, or a consumer product. It may also be an image in printed or digital media, such as in a magazine, on a billboard, or on a computer screen.

"Tag"

A "Tag" is herein defined as a symbol which serves as a reference for identifying the position and orientation of an image area of interest. The Tag is generally a small (relative to the Target) logo with features sufficient to uniquely define its position, orientiation, and chromatic response to incident illumination. The Tag is affixed, printed, or otherwise embedded in or on the target so as to be clearly visible.

"User"

A "User" is herein defined as a human being or machine process which initiates the process of obtaining information pertinent to the Target.

Process

The following is a summary of the process by which objects are linked to information.

1. PREPARATION

1.1 A Tag is included in the Target, as follows. If the Target is a graphic image, such as one to appear in print media, then the Tag is included in the image. If Target is a physical object such a building, then a Tag is made visible on the target, by affixing a Tag to the target, in the form of a sign or adhesive sticker, or by building the Tag into the Target, or by any convenient means which result in the Tag being clearly visible.

1.2 A Target Reference Image is prepared as follows. A digital image of the Target is first created in an aspect ratio which is common among other reference images. If the Target is inherently an image, such as an magazine advertisement or poster, then the Reference Image may be extracted directly from the Target if the Target exists in digital format. If the Target is a physical object such as an automobile or storefront, then a digital photograph is made of the Target and the Reference Image is extracted from the photograph in digital form. The Reference Image is prepared in such a manner so as to insure that the Tag appears in a specific location, orientation, and size relative to the overall Reference Image, and that the overall Reference Image has a standard aspect ratio in common with other Reference Images. Some References Images do not include Tags. In such cases, the Tag is visible in or on the Target object but it is adjacent to the Reference Image.

1.3 The Reference Image is then subsampled to a relatively low resolution and the resulting data values for each pixel are stored in a computer system, hereafter referred to as the "Directory."

2. IMAGE CAPTURE

2.1 The User utilizes a computer, mobile telephone, personal digital assistant, or other similar device, equipped with an image sensor (such as a CCD or CMOS digital camera). This device is hereafter termed the "Digital Device."

2.2 The User aligns the sensor of the Digital Device with the Tag on the Target of interest. The linking process is then initiated by the User pressing a button on the

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