I-CUBE FACE RECOGNITION SYSTEM USER GUIDE

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SYSTEM REQUIREMENTS

The software is compatible with Windows 2000 and XP. The minimum system configuration requires a Sound Blaster compatible sound card and a video capture card compatible with DirectX 8.0, in addition to the standard PC hardware. Minimum hardware requirements are listed below:

512 M Byte RAM
4.200 GHz Pentium Processor
5 G Byte HD
CD ROM
2 COM ports / 2 USB ports
Audio card compatible with 16 bit SoundBlaster
Video capture card or USB video converter compatible with WDM
(DirectX 8.0)

The Veraport system requires a Wiegand to Serial Interface circuit board and a Digital I/O with relay circuit board which I have mentioned in the previous email.
Both devices are as follows:

- **Stand alone circuit boards**
- **Not PC bus devices, i.e. Not PCI, Not ISA, Not AGP**
- **Roughly 100 mm square**
- **Require 12 VDC power from some external supply**
- **Communicate to the host PC via RS 232 Serial port (Host PC must have 2 serial ports or some adaptor which can facilitate this.*)**
- **Employ unique communications protocol**
- **Use terminal blocks for *most* electrical connections. (Digital I/O is done directly off of circuit board traces and pads.)**

SERVER:

· Microsoft® Windows® 2000 Professional (Service Pack 3 or higher) or Microsoft® Windows® XP Professional (SP 1a)

· 1.6 GHz Pentium 4 Processor

· 512 MB RAM

· 40 GB HDD

· CD-ROM Drive

· 2 RS-232C Ports

· 16-bit SoundBlaster (or compatible) audio adapter

· WDM – compatible video capture device

CLIENT:

· Microsoft® Windows® 2000 Professional (Service Pack 3 or higher) or Microsoft® Windows® XP Professional (SP 1a)

· 1000 MHz Pentium 4 Processor

· 256 MB RAM

· 10 GB HDD

· CD-ROM Drive

· 2 RS-232C Ports

· 16-bit SoundBlaster (or compatible) audio adapter

· WDM – compatible video capture device

Network configuration: workgroup or domain (more secure).

DEMONSTRATION PROGRAM

This illustrates the functionality of LODGE facial recognition technology in a variety of practical applications. These being:

i)   Facial recognition in classification mode (one-to-many identification)
ii)   Facial recognition in verification mode (one-to-one identification)
iii)   Facial verification combined with proximity card
iv)   Facial verification combined with finger print recognition (dual biometric)
v)   Facial verification combined with finger print recognition and proximity card.
vi)   Operation of R410/R810 relay controller (i.e. for opening door, controlling signs, etc.)

In addition to the above, the user has the ability to modify text strings that permit customization of computer-generated speech when the system is operating in classification mode.

INSTALLATION

To install the LODGE Discovery System insert the LODGE installation CD into the CD ROM drive. The installation will proceed automatically, or click on "setup.exe" in the main CD directory. Prior to installation, please uninstall any previous versions of LODGE facial recognition programs. For first time installs a series of standard installation screens will appear requiring input of user name, environment setting, and installation target directory. Following this the screen (shown below) will appear.

By default the following components are installed:
i)   LODGE facial recognition demonstration program
ii)   LODGE facial recognition OCX control for stand-alone applications
iii)   Visual Basic sample programs
iv)   Documentation/Help files
v)   Video capture driver for Belkin USB VideoBus II
vi)   Extensions for optional speech synthesis and overlay text displays
vii)   Controller extension for R810/R410 relay card
viii)   PerfectMatch Fingerprint Reader
ix)   PcProx proximity card reader

This LODGE face recognition program contains soft lock protection. Following the initial installation you will encounter the following screen when running the demonstration program or using the OCX control. Please follow the instructions indicated on this screen BUT E-Mail the code to images@I-Cube.co.za. Once the NDA and license agreement have been signed and received, your code will be e-mailed back to you.

The locking code returned to you must be entered into the text box located at the bottom of the screen.
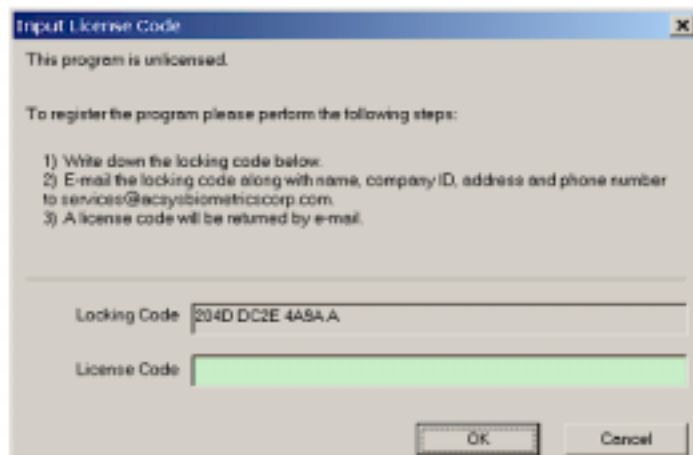
NORMAL OPERATION

Select the FRS Demo from the desktop or from the start menue.
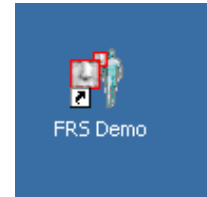
The main screen of the LODGE face recognition demonstration
program is shown below. The control pushbuttons on the left side of the screen allow
the user to run the program in the various modes (i.e. track only, classify, verify) as
well as adjust operational settings.

Functions provided by the control pushbuttons are described below:
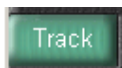
Enables facial tracking. Both the demonstration program and OCX
control are able to track up to four faces simultaneously. Classify and Verify
operations must be enabled separately by clicking on pushbuttons located below
"Track".
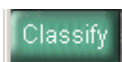
Enables the classify operation (one-to-many identification). If tracking
is not currently enabled, operation of this pushbutton will enable both "Track" and
"Classify". Both the demonstration program and OCX control are able to perform
classification in real time, with up to several hundred people enrolled within the data
base. If the voice greeting extension has been installed, the program will speak the
individuals name followed by a randomly selected phrase.

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Verify Enables the Verify operation (one-to-one identification). If tracking is not currently enabled, operation of this pushbutton will enable both "Track" and "Verify". Verification requires input of the users ID number. Both the demonstration program and OCX control are able to verify from a database of several thousand people. If the voice greeting extension has been installed the program will speak the individuals name followed by a randomly selected phrase.

Extensions have been provided which combine the verify operation with a proximity card reader (pcProx), finger print verification (PerfectMatch) and a D/O controller for door operation (810/410 relay controller). In the event that the pcProx extension has been loaded, the verify operation is initiated automatically when the user activates the proximity card. In the event that the PerfectMatch fingerprint extension has been loaded, the system will request that the user place their finger on the fingerprint reader for additional verification (dual biometric). In the event that the digital output (D/O) extension is installed and activated, the D/O controller closes the relay contact for N seconds following a successful verify or classify operation.
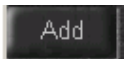
Add This pushbutton starts the enrolment process for an existing or new user. The following form is shown when this pushbutton is activated.

The user must type in their first and last name. Entering a user ID number is optional.
In the event that the pcProx card extension is installed this number corresponds to the
card ID number. In addition, an ID number must be entered in order for the verify
operation to work. Once data has been entered click on the OK pushbutton and the
system performs the enrolment procedure.

During enrolment a
series of vocal
commands are issued
instructing the subject
to look left and right.
Only one person should
be in view of the
camera during
enrolment. An
individual may be
enrolled more than once
(this increases the
number of images used
in training and increases
recognition accuracy),
however take care to
ensure the same name is entered on each enrolment. During one enrolment procedure
the system will capture 100 images (default) and place these in the facial database.
These images are used to train a neural assembly to differentiate between the enrolled
user and other individuals.

Following capture of the
facial images, the following
screen will be displayed
providing the option to delete
images from the collection.

Images are removed by
clicking on an image which
highlights the selected image
using a red boarder, and then
clicking on the "Remove
Image" pushbutton.

Option This allows the user to modify the default settings used in the facial
recognition program. The options screen is shown below and described in the
following section..
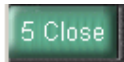
5 Close The normal display shown on the right side of the video area is a picture clip of the identified individual. When this pushbutton is enabled the system will display the pictures and names of the five closest matches, along with the associated recognition confidence values. The range of the confidence value is from -1 (low recognition confidence) to +1 (high recognition confidence).
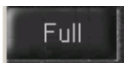
Full This enables full screen mode for the video display. All other controls normally shown in the default display mode will become hidden. The full screen display mode is shown below:

The pushbutton controls may be displayed while in full screen mode by moving the mouse to the top left side of the display screen.
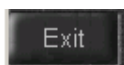
Exit Terminates the program.

DATABASE

The "Database" menu allows the user to edit the facial database, as well as add or remove individuals from the active list of users.   Selecting the 'Edit Database' menu item will bring up the screen shown below. The 'Clear & Retrain All' menu item clears cortical memory for the classification assemblies (i.e. clears the face recognition templates) and initiates the "New Registrant" training procedure over all users enrolled within the system. The "Show Training Status" menu item displays the

name and training progress for the continuous training operation.
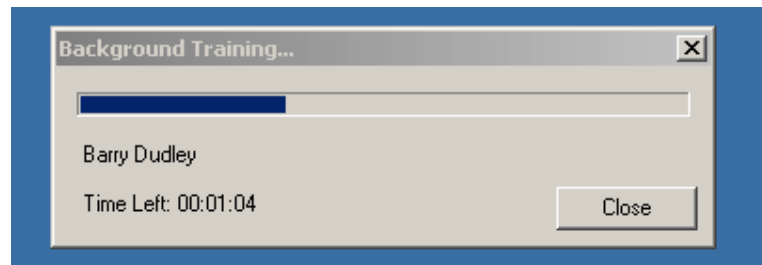
This above "Edit Database" screen allows one to add or delete individuals from the active list. Adding an individual to the active list is performed by enabling the check box located to the left of the name. The user names are listed in the selection box located on the lower left side of the form. Specific images recorded for an individual user may be removed by clicking on the image located at the right side of the form, and subsequently clicking the 'Remove Image' pushbutton located at the lower left. Removing an individual from the database is performed by highlighting the name in the main list box and clicking on the 'Remove Person' pushbutton.

User data located in the "Personal Information" panel may be edited by entering new values within the associated text boxes and clicking the "Update" pushbutton.

FACE RECOGNITION OPTIONS

The "View" menu allows the user to modify various display options for the program, and change video settings. The 'Zoom' menu item allows one to adjust the size of the video display area. The "Show Masks" menu item allows the user to display the various masks, eliminating from tracking regions of low variance, low movement and non-skin color from the tracking region.

'Classify Status Bars' changes the visible status of the display bar located at the bottom of the main screen associated with classification. The 'Tracking Status Bars' changes the visible status of the display located at the lower left of the main screen associated with tracking "knowbots". Up to four knowbots may be placed on each image frame and the status bars display the detection level for facial images. The final menu item allows one to adjust the video capture settings. Operation of this menu item will bring up the following screen.

The installed video drivers are shown in the list box. The appropriate driver is selected by clicking on the driver label and clicking OK. Pushbuttons "Source" and "Format" bring up the appropriate driver settings form, and "Select Input" is used by certain drivers for selecting either S-video or Composite input.
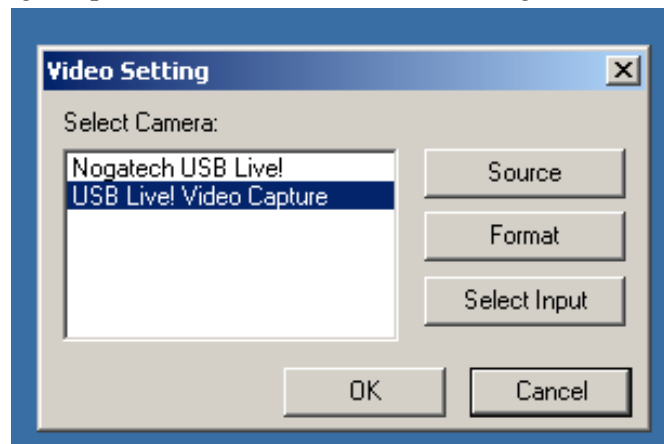
LOGGING UNTILITY

The LODGE Discovery System includes a basic logging utility for recording statistics on the various activities performed by the system. Recording of the activity log is enabled or disabled through the Options form as described in the previous section. The log entries may be viewed or printed to text file using the LogView.exe program located on the main directory of the LODGE FRS Discovery System. The activity log viewer program is shown below:

The following four categories of activities are logged by the face recognition program:

· 		**Enrollment**

· 		**Classify**

· 		**Verify Success**

· 		**Verify Failure**

Statistics that are recorded along with the activity type are:

· 		**Computer Name**

· 		**Time**

· 		**Date**

· 		**User ID Number**

· 		**User Name**

· 		**Head Position (X, Y, Size)**

· 		**Facial Image**

The above statistics are displayed in the log viewer, captured images are referenced by file name. The user may view the captured image by doubled clicking on the corresponding row, or selecting the "View Image" button on the toolbar.