

The logo for iSee, featuring the lowercase letters 'iSee' in a white, sans-serif font. The 'i' is smaller and positioned to the left of the 'S', which is larger and more prominent. The 'e' is also lowercase and follows the 'S'. The logo is set against a light green background that is part of a horizontal bar.

FACIAL SEARCH ENGINE

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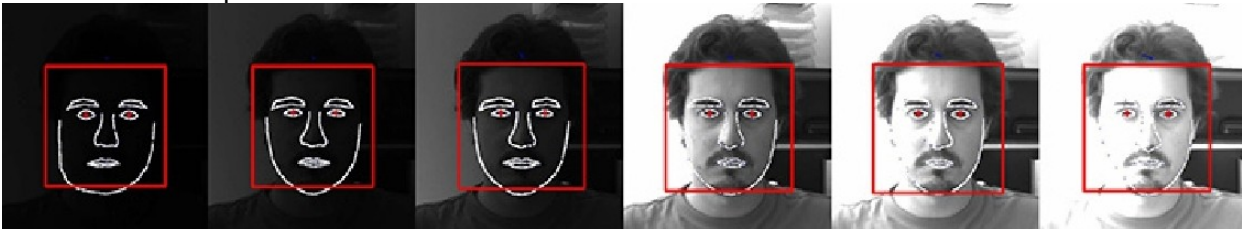
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iSee is a facial search engine to analyse huge digital photo collections. Looking for an identity, getting statistics related to facial features (gender, age distribution and ethnicity), automatic clustering and custom photo gallery creation, are just some examples of iSee capabilities.

Technologies

Face Finder

- ✓ Frontal pose localization (± 20 degrees)
- ✓ Accurate detection of facial features (eyes, nose, mouth, eyebrows etc.)
- ✓ Robust against unfavourable illumination conditions
- ✓ Robust against occlusions (dark sunglasses, scarves, etc.)
- ✓ Tuned for medium-to-low facial image resolution (70-35 px eye-to-eye distance)
- ✓ Tuned for uncontrolled facial image
- ✓ 3D pose: pose of the person's head expressed with the three angles roll, pitch and yaw
- ✓ Face detection quality: numeric value that gives an estimate of the accuracy of the detected face points



Face Recognition

- ✓ Identity enrolment: biometric template creation from human face
 - ✓ Identity verification: one-to-one matching
 - ✓ Identity recognition: one-to-many matching
 - ✓ Fast template generation: 10 biometric templates per seconds (*)
 - ✓ Fast similarity score generation: 500.000 templates per second (*)
- * CPU entry level Core 2 Duo 1.86 GHz, digital camera resolution 1024x768 pixels



Face Analysis

- ✓ Gender (male, female)
- ✓ Age group (child, young, adult, senior)
- ✓ Ethnicity (Caucasian, African Asian)



Features

- ✓ Delivery: standalone application or interoperable service to work with any pre-existing system
- ✓ Host: PC or website
- ✓ Valid input: image and video files
- ✓ Data storage: SQL database
- ✓ Indexing/clustering procedures
- ✓ Task scheduling and background workers
- ✓ User feedback handling
- ✓ Scalability: adding hardware resources increases throughput
- ✓ Concurrency: multiple requests handling
- ✓ Flexibility: API designed to meet wide range of customer needs
- ✓ Fine parameters tuning for different scenarios (e.g. facial photos taken in controlled/uncontrolled environments)

Available extensions

- ✓ Virtual Face 3D
- ✓ Detection and analysis of face with wide pose (± 90 degrees)
- ✓ Best face selection
- ✓ Face quality evaluation according to ICAO standard
- ✓ Face lighting evaluation
- ✓ Full face points coordinates for fine editing (e.g. photo-retouch or photo-montage)
- ✓ Allucination for small faces



Minimum hardware and system requirements

- ✓ Intel® Core™ i5 processor or equivalent.
- ✓ At least 2 gigabytes (GB) of RAM.
- ✓ At least 500 megabytes (MB) of available space on the hard disk.
- ✓ Supported OS: Microsoft® Windows XP, Microsoft® Windows 7.
- ✓ Supported platform: x86, x64.

Case study: custom photo album creation

Customer



Famous cruise line company have internally compared both end-user products (Picasa, iPhoto, etc.) and many biometric SDKs. iSee solution was chosen due to its big accuracy advantage and wide flexibility for customization

Business opportunities

Increase the selling of the digital photos taken by professional photographers during the cruise

Critical task

The great amount of time each guest must spend to look for the photo of interest

Solution

Automatic selection of the photos in which a target guest appears (or its fellow passengers)

Benefits

- ✓ Photo research is faster and easier for each guest
- ✓ Photographers can increase the number of photo taken during the cruise without repercussions on the searching procedure
- ✓ Saving on photo printing: custom galleries are shown through digital monitors instead of affixing large number of photos on appropriate showcases

Project details



Size of the photo set:

- ✓ more than 20.000 images updated by photographers
- ✓ more than 40.000 faces detected by the iSee system inside the set

Central server hosting iSee engine

Interactive totems running iSee client application

Acceptable inputs for custom photo gallery creation:

- ✓ reference picture for each guest taken by crew members
- ✓ live acquisition through a digital camera integrated inside the totem

Additional features:

- ✓ custom gallery refinement according to user feedback
- ✓ collection of statistical data related to totem users: gender, age group, ethnicity
- ✓ collection of statistical data related to top seller photos: landscape/portrait, single/group shot...
- ✓ digital signage according to the totem user
- ✓ funny photo-montages



iSee usage screenshots

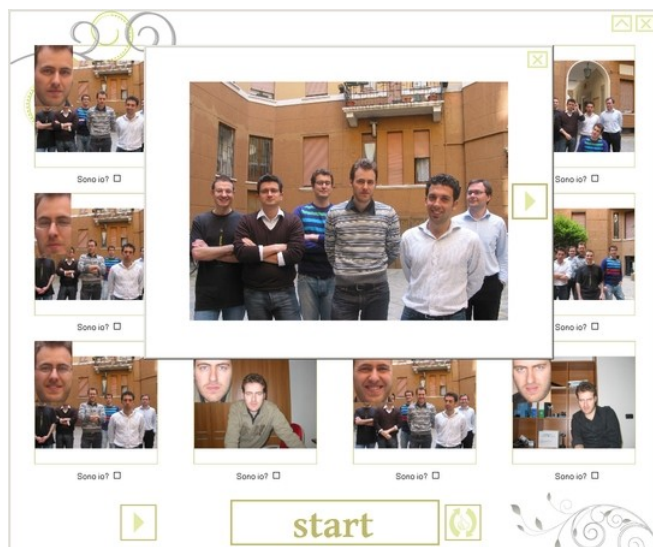
Step 1: press start button to launch the acquisition process and then a custom gallery is created



Step 2: the computed custom gallery is shown as sorted list of thumbnails divided into pages



Step 3: user can select an image, moves through pages or confirm some items and then refine the gallery according to the given feedbacks



Kee Square, founded in July 2007, is a spin-off of the Politecnico di Milano (*the Milan Technical University*).

Founding partners:

- **Politecnico di Milano**, directly and through the participation of Prof. Augusto Sarti and Prof. Stefano Tubaro
- **Celin Technology Innovation Srl**, company founded to deploy innovative products in the ICT market
- **Ghirlanda Smart Card Solutions SpA**, production of magnetic and microprocessor cards for banks, ID, security and health care
- **Principia Sgr**, venture capital

Kee Square has these competitive assets:

- **scientific know-how**: digital signal processing of images and audio signal, statistical pattern recognition, optimization problems
- **performance programming**: SSE, parallel programming, CUDA, OpenCL

Kee Square develops innovative techniques in video and audio signal processing for various application fields:

- biometric identification and tracking
- detection of hazardous events
- advertisement compliance check
- industrial automation

Administrative & Operative Headquarter

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