Objects Recognition in Images

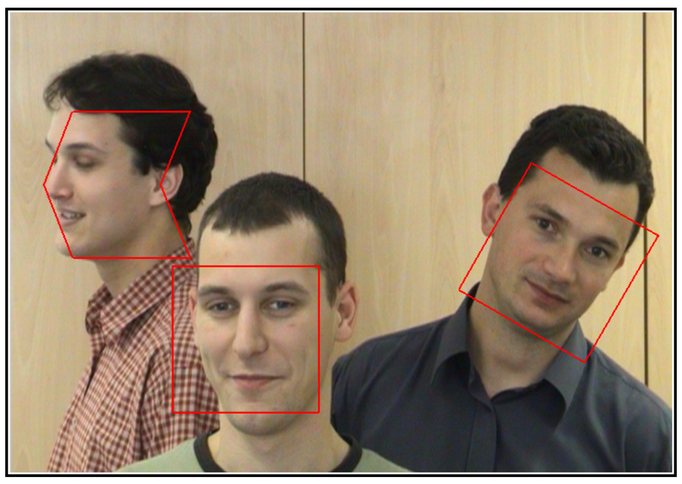
Czech Technical University in Prague, Department of Cybernetics
Jiří (George) Matas, matas@cmp.felk.cvut.cz
http://cmp.felk.cvut.cz

CENTER FOR MACHINE PERCEPTION

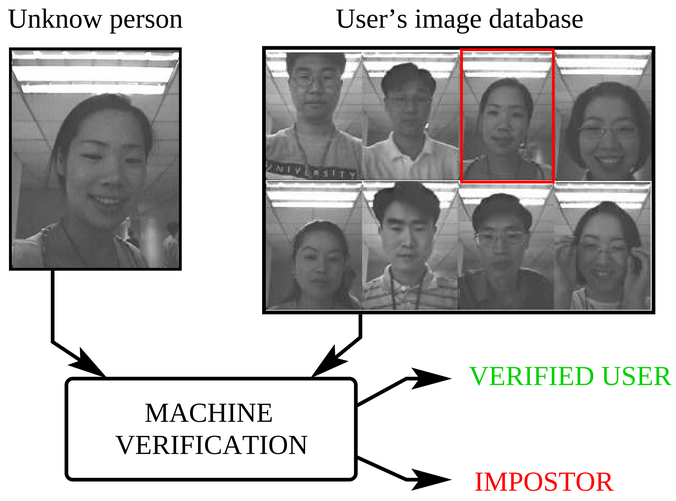
Recognition of objects in images is a core problem of computer vision. Currenly, popular applications include face detection and recognition, license plate recognition, or various biometric data recognition like finger prints. In the future, object recognition methods will power internet search engines to answer queries like "image of a small brown dachshund".

Detection and Recognition of Faces

Human face is a commonly used biometric feature. Despite having lower reliability and discriminability compared to fingerprints and iris scans, face recognition is popular as it is unobtrusive and can be covert, i.e. employed without collaboration or awareness of individuals. CMP focuses on general real-time face detection algorithms which allow detection of human faces in video streams, photographs etc. In this area, CMP collaborates with large multinational corporations.



Face Detection



Face Recognition/Verification

Image Recognition in Telematics

License plate reading is a crucial part of many telematic systems such as automatic parking lot managers, detectors of cars committing red ligt offences, stolen cars search and road tax collection systems. The recognition engine developped in CMP is used e.g. in identification of cars violating speed limit in tunels. A unique feature of the CMP system is its viewpoint invariance - the licence plate can by viewed from any angle, at any rotion and scale. The invariance allows, inter alia, hand-held operation. Trafic sign and trafic situation recognition is another field of CMP research. The goal is to detect and recognize trafic signs. The recognized symbols are fed into the driver information system.

Stolen Cars Search

Trafic Signs Recognition

Robust Recognition of Objects

Recognition of objects in images is a technology with numerous applications. Large retail companies have been using bar-codes in the past and are shifting now to RFID technology. However, there is always a need to double check e.g. whether the goods in the shopping cart are not labeled by a fraudulent bar-code. The problem is challanging, since (i) very large number of objects have to be recognised, (ii) objects - e.g. goods of the same brand - are often very similar, (iii) objects may appear in any position, and (iv) objects may be partially occluded.

Object Models in Database

Recognized Objects