Image and Video Person Identification in an Operational Environment

Ioannis A. Kakadiaris, University of Houston

Problem Statement

Effectively **screening** and **identifying** individuals against both known and **unknown perpetrators** is encumbered by the unconstrained pose, arbitrary illumination conditions, and resolution mismatches present in the image and video data

Project beneficiaries and end users

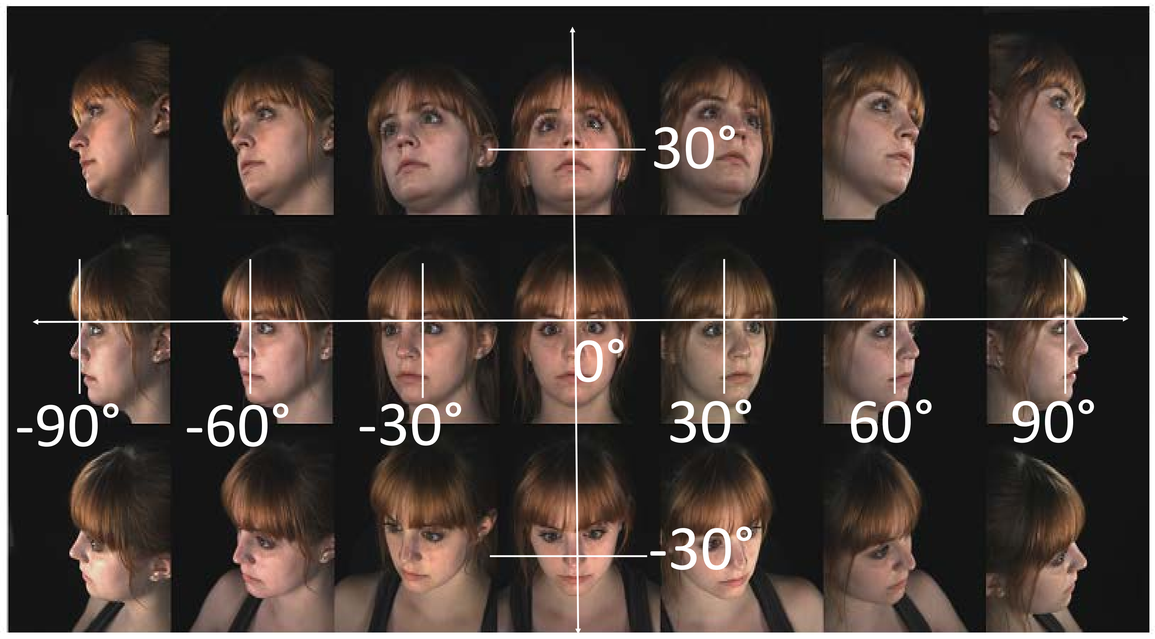
- DHS strategy officials: Analysts
- Enforcement Systems Division specialists: Dispatchers

GAINS desired

A method that will identify individuals in **real-time** to enable the dispatchers to alert the agents dispatched in the field

PAINS at present

The methods currently available **have limitations** for matching images where a person's face is **partially visible** due to **pose** or **illumination**



Project products & services

The product is a **software prototype** for matching a facial image to a gallery of facial images with variety of poses and illuminations. The functionalities for the prototype software include:

1. computing a biometric template (derived by the UH software) from an image
2. ability to ingest a set of images to create a gallery
3. matching biometric templates from a probe image to a gallery of templates

GAINS created

Enablement of the USBP dispatchers to accurately match images along large databases by providing a beyond-state-of-the-art method for identification

PAINS alleviated

- USBP officer increased safety
- Enhancement of the overall situational awareness of the Border Patrol units
- Lower effort and time-saving by agents
- Anticipation of future actions by modelling routes and habits of repeat offenders

Key Accomplishments

		Face identification improvement rates (Percentage above SotA)			
Conditions		Rank-1		Rank-5	
pose	illumination	VGG-Face	COTS	VGG-Face	COTS
Small pose variation	Uniform illumination	26.6	61.0	0.4	18.8
	Non-uniform illumination	7.3	40.8	0.7	80.3
Large pose variation	Uniform illumination	26.6	61.0	14.4	64.7
	Non-uniform illumination	28.3	60.9	18.8	63.4

Next Steps: Testing of the prototype software on USBP data

This material is based upon work supported by the U.S. Department of Homeland Security under Grant Award Number 2015-ST-061-BSH001. This grant is awarded to the Borders, Trade, and Immigration (BTI) Institute: A DHS Center of Excellence led by the University of Houston, and includes support for the project (subrecipient must enter Project Title) awarded to the (subrecipient must enter project lead's Organization). The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Department of Homeland Security.