# JANUS

FACIAL RECOGNITION

## INTELLIGENCE VALUE

The Janus program dramatically improved the performance of facial recognition software by increasing the speed and accuracy of identity matching. This was achieved not only for videos and images with properly lit, well-posed frontal facial images, but also when the illumination, observation angle, and facial expressions varied widely, such as in visual media or surveillance video.

Intelligence analysts may be called on to examine still images or video footage to identify subjects. With the proliferation of cameras everywhere, automated face recognition software is needed to handle the sheer volume of images and video. Historically, this software works best on well-lit frontal poses, such as passport photos. It is less accurate "in the wild" when lighting is poor, resolution is low, faces are obstructed, camera angles vary, and/or the facial expression is uncontrolled.

Launched in 2014, the goal of the Janus program was to revolutionize face recognition by fusing information available from multiple views from diverse sensors and visual media to deliver dramatic improvement in speed and accuracy. The program leveraged model-based matching and developed algorithms indifferent to subject pose, illumination, and expression. The Janus program ran for five years and concluded in July 2020. Janus accomplishments include:

- Algorithms twice as accurate as the most widely used government-off-the-shelf systems based on independent evaluation with test images and sequences
- Achieved the program performance goals of 85% verification accuracy at a false match rate of 1 in 100,000, and 98% retrieval accuracy within the top 20 results from a 1 million subject gallery
- Ability to search large scale repositories at near logarithmic speeds
- Transitioned software to the Department of Homeland Security Child Exploitation Investigations Unit
- Over 200 peer-reviewed publications that advanced virtually every aspect of fundamental face recognition research

## PRIME PERFORMERS

- SRI International
- Systems & Technology Research
- University of Maryland
- University of Southern California Information Sciences Institute

## TESTING AND EVALUATION PARTNERS

- National Institute of Standards and Technology
- Noblis Inc.
- U.S. Army Research Laboratory

## KEYWORDS

- Face recognition
- Biometric identity intelligence
- Unconstrained imagery
- Unconstrained video
- Deep neural networks
- Computer vision
- Machine learning

(Left) Image of the Boston Marathon Bombing perpetrators captured at the scene. The Janus program dramatically improved the ability of face recognition algorithms to match (Upper Right) unconstrained images with (Lower Right) traditional mugshot photos. (Public Domain, FBI)

**Source/Rights:** Public domain release by FBI

JANUS

**PROGRAM MANAGER**
Phone: (301) 243-1995
dni-iarpa-info@iarpa.gov

www.iarpa.gov

@IARPAnews

Latest Revision: 05/07/2021