

Image & Video Processing for Net Centric Operations (IVP_NCO)

CAIR has developed an application framework for the Net Centric Operations (NCO). In the NCO scenario, the sensors, shooters and commanders are spatially separated, requiring sharing of imagery across tactical networks for their processing, archival, retrieval and exploitation. Various technologies are integrated in the developed application, Image & Video Processing for Net Centric Operations (IVP_NCO), and these are being offered as a “capital good” to be used by a production agency in designing adaptations or new products. The integrated technologies consist of efficient and robust implementation of a wide variety of image and video processing algorithms. The key features of the offering are listed as follows:

1. Implementations of algorithms in C/C++, compatible with JAVA through stable JNI wrappers. The implementations are efficient in terms of memory and computations, modular for easy portability and adaptability, and have a uniform interface design.
2. Comprehensive set of algorithms, including geo-registration, segmentation, codecs for progressive image/video transmission, tracking, fusion, mosaicking, super-resolution, video stabilization and content based image and video retrieval etc. These also incorporate Machine Learning methods applicable to image and video processing. Some of the key features also include:
 - a. Meta-data binding and metadata based annotation and search
 - b. Example based query-retrieval for images and videos
 - c. Selective remote archiving as well as selective remote access of the imagery
 - d. Optimized for bandwidth challenged and fault-prone networks.
 - e. Support for range of standard image and video digital formats.
3. Optimizations aware of the NCO context, namely bandwidth, connectivity, and storage, through schemes other than data compression.
4. Incorporation in a JAVA based enterprise class application framework with 3-Tier architecture, supporting login based user management, remote retrieval from database, backend data processing, high availability and easy maintenance.

IVP_NCO is in a fully implemented state. The software has undergone Independent Verification and Validation (IV&V) by a CMMi5 qualified external agency. It can potentially be deployed for military use or can be adapted to a large scale image and video data management system. Many of the technologies developed therein have also been exploited in surveillance and robotics applications under development at CAIR.