



DigitalOperatives

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# Digital Operatives Kicks Off Project to Automatically Detect Antennas Using Computer Vision

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Digital Operatives is a boutique cyber technology firm delivering advanced technologies that radically change the status quo in a multi-dimensional world.

Digital Operatives recently kicked off one of its latest projects under the Defense Advanced Research Projects Agency (DARPA) Cyber Fast Track program called AERIAL (Automatic Entity Recognition Identifying Antennas Locally).

Existing approaches to conducting communication technology site surveys rely on detecting radio frequency (RF) emissions. This of course is only effective if and when the communications equipment is actively transmitting. Digital Operatives is investigating new approaches to the identification of communications equipment, more specifically antennas, by exploiting one of the few ways that such equipment can be universally detected: by applying state-of-the-art computer vision algorithms to identify antennas. In the AERIAL program, Digital Operatives is developing a prototype entity recognition system for the autonomous detection and classification of antennas. Digital Operatives vision is that this system will be deployed in a very small form factor; work is being done to develop the algorithms as an application on a mobile phone, as well as a sensor payload on a small Unmanned Aerial Vehicle (UAV) that could discover a broad range of antennas in a local area. The ability to automatically detect antennas visually and automatically is an exciting capability with multiple use cases.

Digital Operatives has discovered that small, thin objects like antennas provide a challenge to existing computer vision algorithms since traditional digital image features used in object recognition rely on the existence of facets (*i.e.*, planar surfaces) on the object that are within the camera's field of view. Since antennas usually appear as collections of one-dimensional lines in images, traditional computer vision and machine learning approaches for object detection will perform poorly. Digital Operatives addresses these challenges using a novel technique that exploits specific features of certain types of antennas such as Yagi-Uda and others.