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MORTICIA, A software package for determining optical surveillance system effectiveness.

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Surveillance modelling in terms of the standard Detect, Recognise and Identify (DRI) thresholds remains a key requirement for determining the effectiveness of surveillance sensors. With readily available computational resources it has become feasible to perform statistically representative evaluations of the effectiveness of these sensors. A new capability for performing this Monte-Carlo type analysis is demonstrated in the MORTICIA (Monte-Carlo Optical Rendering for Theatre Investigations of Capability under the Influence of the Atmosphere) software package developed at the CSIR. This first generation open-source integrated software package is developed primarily in the Python programming language and aims to provide all the functionality required to perform statistical investigations of the effectiveness of optical surveillance systems in specific or generic deployment theatres. This includes modelling of the mathematical and physical processes that govern amongst other components of a surveillance system; a sensor's detector and optical components, a target and its background as well as the intervening atmospheric influences. In this paper we discuss integral aspects of the bespoke framework that are critical to the longevity of all subsequent modelling efforts. Additionally, some preliminary results in the form of target image simulations and sensor quality metrics are presented.

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