This dissertation documents the design and implementation of a novel investigation into HE for video inference. It provides preliminary insight into the most challenging aspects of integrating the fields of cryptography and computer vision to encourage further research into overcoming the limitations found.

* **Networking:** a client-server application simulating the device-server stack utilised by surveillance companies was constructed to enable the exploration of optimisations to increase the network throughput of videos encrypted using the CKKS HE scheme [CKKS] provided by Microsoft’s Secure Encrypted Arithmetic Library (SEAL) [SEAL].
* **Inference:** multiple inference algorithms were implemented to permit private and plain moving object detection, including investigating online GMMs following Stauffer and Grimson [STAUFFER] and the Expectation-Maximisation algorithm [DEMPSTER].
* **MeKKS:** a HE implementation from first principles following the Homomorphic Encryption for Arithmetic of Approximate Numbers paper by Cheon et al. [HEAAN] to examine the benefits of specialising the implementation for video data by removing unneeded functionality, simplifying data structures, and vectorising ciphertexts.