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HomE: Enabling Homomorphic Encryption of DL, a (recently started) ERC Consolidator Grant

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Deep learning (DL) is widely used to solve classification problems previously unchallenged, such as face recognition, and presents clear use cases for privacy requirements. Homomorphic encryption (HE) enables operations upon encrypted data, at the expense of vast data size increase. RAM sizes currently limit the use of HE on DL to severely reduced use cases. Recently emerged persistent memory technology (PMEM) offers larger-than-ever RAM spaces, but its performance is far from that of customary DRAM technologies.

This project aims to spark a new class of system architectures for encrypted DL workloads, by eliminating or dramatically reducing data movements across memory/storage hierarchies and network, supported by PMEM technology, overcoming its current severe performance limitations. HomE proposes a holistic approach yielding highly impactful outcomes that include novel comprehensive performance characterisation, innovative optimisations upon current technology, and pioneering hardware proposals.

JLESC topic

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