**A Blockchain Approach for Sharing and Analysing Patient Data**

Contact Person: Dr Panagiotis Chountas, email: chountp@westminster.ac.uk

Sharing healthcare data between institutions is challenging. Heterogeneous data structures may preclude compatibility, while disparate use of healthcare terminology limits data comprehension. Even if structure and semantics could be agreed upon, both security and data consistency concerns abound. Centralized data stores and authority providers are attractive targets for cyber-attack and establishing a consistent view of the patient record across a data sharing network is problematic. In this PhD proposal we present a Blockchain-based approach to sharing and mining patient data.

Envisioning a node not as a single institution, but as an entire blockchain-based data sharing network. We can now imagine not only cross-institutional sharing, but cross-network sharing as well. This would enable the institution/provider-based networks to grow and evolve, at the same time allowing them to connect to similar networks. This notion of aggregation, or nested blockchains, may be an approach to extending the reach of collaborations and sharing beyond local networks. For example, developing machine learning algorithms that can look at a radiology CT scan and make diagnosis predictions are time consuming to develop, but once developed are easy to execute. By leveraging blockchain technology, one can envision a world in which a service provider publishes diagnostic reports of radiology images to the blockchain. An AI service provider that specializes in developing novel machine learning algorithms with which the hospital has partnerships would be allowed to run their algorithm over the images and publish the AI diagnosis output back to the blockchain. The radiologist at the hospital could then use this result as an independent reference to compare his or her own diagnosis.

*Business Value*

Patient Perspective: – Patients no longer need to coordinate the tedious and frustrating task of gathering records from various providers to send to their specialist. Instead, they would provide the specialist access to the blockchain, enabling them access to the data as they see fit. –. They also no longer need to manually reconcile the data when they visit multiple providers, which can be a non-trivial task. – Ultimately, better, and more available data leads to better care for the patient.

Provider and Organization Perspective: The true collaborative nature of creating and sharing data would eliminate many of the challenges of existing Health Information Exchange approaches. – Healthcare organizations do not have to fight for a data-driven competitive advantage, because they all have access to the same information. This approach will enable organizations to collaborate on care coordination and outcomes-based care. Data can be shared for research activities including clinical trials, enabling larger and more diverse patient populations.