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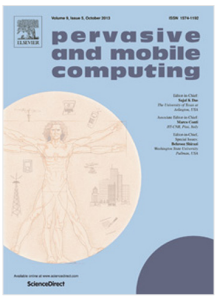

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Using Big Data Analytics to Extract Disease Surveillance Information from Point of Care Diagnostic Machines

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Abstract

This paper explains a novel approach for knowledge discovery from data generated by Point of Care (POC) devices. A very important element of this type of knowledge extraction is that the POC generated data would never be identifiable, thereby protecting the rights and the anonymity of the individual, whilst still allowing for vital population-level evidence to be obtained. This paper also reveals a real-world implementation of the novel approach in a big data analytics system. Using Internet of Things (IoT) enabled POC devices and the big data analytics system, the data can be collected, stored, and analyzed in batch and real-time modes to provide a detailed picture of a healthcare system as well to identify high-risk populations and their locations. In addition, the system offers benefits to national health authorities in forms of optimized resource allocation (from allocating consumables to finding the best location for new labs) thus supports efficient and timely decision-making processes.

Keywords: Point of Care; Big Data Analytics; Internet of Things; Global Health; Machine Generated Data; Machine Learning

1 Introduction

Diagnostic Point of Care (POC) devices are important tools in the battle against infectious diseases as well as other acute and chronic diseases. POC tests can usually run faster than conventional laboratory testing and need less equipment [1]–[3]. Combining the test results data (generated by POC) with patient demographic data results in a comprehensive dataset which can be used efficiently to extract fine-grained surveillance information at individual-

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