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Cloud based intelligent system for delivering health care as a service

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ABSTRACT

The promising potential of cloud computing and its convergence with technologies such as mobile computing, wireless networks, sensor technologies allows for creation and delivery of newer type of cloud services. In this paper, we advocate the use of cloud computing for the creation and management of cloud based health care services. As a representative case study, we design a Cloud Based Intelligent Health Care Service (CBIHCS) that performs real time monitoring of user health data for diagnosis of chronic illness such as diabetes. Advance body sensor components are utilized to gather user specific health data and store in cloud based storage repositories for subsequent analysis and classification. In addition, infrastructure level mechanisms are proposed to provide dynamic resource elasticity for CBIHCS. Experimental results demonstrate that classification accuracy of 92.59% is achieved with our prototype system and the predicted patterns of CPU usage offer better opportunities for adaptive resource elasticity.

1. Introduction

In recent years, technological innovations have led to the development of new computing infrastructures such as cloud computing that provides infrastructure and software on lease to end users. The "pay for use" pricing model, on-demand computing and ubiquitous network access allow cloud services to be accessible to anyone, anytime, anywhere. The inherent benefits like fast deployment, lower costs, scalability, rapid provisioning, instant elasticity, greater resiliency, rapid re-constitution of services, low-cost disaster recovery and data storage solutions promises the potentials of cloud computing [1,2].

Cloud computing can transform the way healthcare is practiced by empowering professionals to deliver better services in effective management of chronic illness such as Diabetes Mellitus, often mentioned simply as diabetes. Diabetes is a metabolic disorder characterized by high levels of blood glucose in the human body that originates from the defects in the insulin production, insulin usage or both. The insulin hormone secreted by pancreatic beta cells regulates the uptake of the glucose from the blood into most cells of human body [3]. The inability of the human body to produce or properly use the generated insulin hormone results in increased level of blood glucose which eventually leads to many health complications such as damage of heart and stroke; high blood pressure; retinopathy with severe vision loss or blindness and many more [4,5].

There are three prominent classes of diabetes eminently Type 1 diabetes or Insulin-Dependent diabetes mellitus (IDDM), Type 2 diabetes or Non-Insulin-Dependent diabetes mellitus (NIDDM) and Gestational diabetes. Type 1 diabetes results from the body failure to produce insulin and therefore requires the person to inject insulin for survival. Type 2 diabetes arises from the inability of the body to efficiently utilize

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