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NEW GENERATION CLOSED LOOP INSULIN DELIVERY SYSTEM

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ABSTRACT

Diabetes mellitus – usually known as diabetes – is an incurable and progressive condition. It is characterized by high level of blood glucose for longer periods of time. Due to the technological advancements in glucose sensing and insulin delivery systems, Closed loop control of the disease is considered to be the optimal choice by the researchers. Recent advancements in Mobile computing systems, which are incorporated with diverse and powerful sensors, help us in providing contextual information. This information can be useful in providing the better control of the disease. This paper provides the preliminary design of Closed loop system embedded with the Contextual information, which can be helpful in improving the performance of the blood glucose control systems.

Keywords: Activity, Closed loop, Controller, Context, Diabetes, Insulin, Sensor

I.INTRODUCTION

Diabetes is a metabolic disease that affects many different parts of the body. It's a condition when a body is able to produce very little (Type 2) or no insulin. In healthy individuals, glucose is regulated within normal limits (< 154 mg/dl as recommended by American diabetes association) by insulin secretions from pancreas [1]. Maintaining glucose levels within the acceptable limits is of high importance for both diabetic as well as non-diabetic people [2]. There are two main types of diabetes namely: Type 1 (Juvenile onset) and Type 2 formerly called non-insulin dependent diabetes. Type 1 diabetes usually develops in children and adolescents (although can occur later in life). It is usually caused by an autoimmune destruction of beta cells, leading to insulin deficiency [17]. Patients require lifelong insulin injections to prevent hyperglycemia for survival. Type2 diabetes is characterized by hyperglycemia due to a defect in insulin secretion usually with a contribution from insulin resistance. Type 2 diabetes is due to lifestyle factors, including obesity, lack of physical activity, poor diet and stress [18]. Management of Type 2 diabetes is challenging and needs complex treatment, it involves integration of healthy diet, regular exercise, optimum weight control, self-monitoring of blood glucose, and medication adjustment into the daily routine over long periods [19]. Increased glucose levels in blood for a longer duration of time increase the risk of developing heart problems, brain damage, kidney failure, blindness, stroke, etc.