Special Section on Artificial Intelligence for Diabetes

This special section of this issue of *the Artificial Intelligence in Medicine* (AIIM) journal originates from the First Workshop on Artificial intelligence for Diabetes (AID 2016) on 30th August 2016. The workshop was part of the 22nd European Conference on Artificial Intelligence (ECAI 2016) in The Hague, Holland. Authors with papers accepted for the workshop were subsequently invited to revise and extend their work for publication in this issue, and a wider call was also announced to attract work from other outstanding researchers in the area. Following the success of the inaugural event, a Second Workshop on Artificial intelligence for Diabetes (AID 2017) was held on 24th June 2017 under the umbrella of the Sixteenth European Conference on Artificial Intelligence in Medicine (AIME 2017) in Vienna Austria, and plans are already underway for a third meeting.

The complexities involved in the prognosis and management of diabetes has led to Artificial Intelligence (AI) becoming a key technology through which to provide solutions that empower both caregivers and patients in their everyday life. Several publicly-funded projects have been conducted to support diabetes management, such as: EMPOWER, MOBIGUIDE, COMMODITY12 EU, DIADVISOR, DIABEO, and the more recent PEPPER project. However, a lot of work remains to be done. The new series of international workshops on Artificial Intelligence in Diabetes (AID) from which this volume stems has therefore been established as a first step towards finding compatible and complementary tools for people with diabetes and building a research community in this important field.

Authors were invited to submit original contributions on the overarching theme of Artificial Intelligence-based solutions to problems associated with diabetes. In particular, papers were sought on topics including Intelligent solutions to empower citizens with self-management of health conditions; Intelligent systems for glucose prediction and alarm generation; clinical decision support tools to deal with the avalanche of data gathered by sensors; data mining approaches for risk prediction and prevention of diabetes comorbidities; as well as community tools, platforms to support research in this area and data sets for benchmarking.

Ten papers were received, and three papers have been accepted for publication in this special section, representing a small sample of the latest work in the area by several research groups. The papers are substantial extensions of the original ECAI 2016 workshop papers.

The first paper, by Brown et al. [1], concerns decision support for patients. The focus is insulin-treated diabetes, which is predominantly type 1. The paper explores the use of case-based reasoning to personalise the insulin dose calculation in order to adapt to the specific circumstances of an individual. The novel aspect of the research is the use of temporal sequences to take into account preceding events, instead of considering events in isolation. The method shows promising in-silico results including a convincing reduction in the blood glucose risk index.

The paper by López et al. [2] use the Random Forest technique to make predictions of risk to inform a decision support tool for clinicians. In this case the sphere of interest is the prognosis of type 2 diabetes. The aim of the work is to help clinicians to determine which Single Nucleotide Polymorphisms promote the development of the disease. Random Forests are used to seek the most significant attributes and assign weights according to risk contribution. The technique is shown to outperform both support vector machines and logistic regression in terms of prediction accuracy, as well as stability of the attribute weighting.

The third paper by Saleh et al. [3] explores the use of classifiers to determine the risk to each individual of developing diabetic retinopathy, one of the most common long-term complications of diabetes. The study uses two kinds of ensemble classifier: Fuzzy Random Forest and Dominance-Based Rough Set Balanced Rule Ensemble. The ultimate purpose of the work is to develop a personalised decision support system to help clinicians to target scarce resources towards the patients who have the greatest need.

We hope that readers will find the section stimulating to read. Although not fully comprehensive, the papers represent some current research trends at the forefront of interest to the Artificial Intelligence in Diabetes community. We would like to thank the contributing authors and also the reviewers who played an invaluable role in helping us compile this special issue: Chang Young Hwan, Robert Marti, Cindy Marling, Altoff Klaus Dieter, Isabelle Bichindaritz, Pau Herrero, Josep Lluis Arcos, Annette ten Teije, Nick Oliver, Eva Armengol, Ozgur Kafali, Suresh Munuswamy, Jenny Lundberg, Jorge Bondia, Marcelo Ledeira, Tjeerd olde Scheper, Peter Pesl and Benjamin Evans.

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