

Preface

This volume is the final result of over 10 years of research work in the area of modeling Diabetes and the Healthcare Systems. The work has been carried out by a number of excellent graduate students in the Electronic Systems Engineering program at the University of Regina under my supervision. The idea of modeling a human patient with diabetes was the natural extension of other work done in the research group on modeling complex interacting systems. The first work in this area was performed with Ms. Sara Ghoreishi Nejad who first started the work of developing a software system to model the evolution of blood sugar in a human diabetic patient. This work was extended by Mr. Robert Martens. These ideas were taken much further in Mr. Simerjit Singh's thesis work in which he developed a capability to include the interaction of the patient with the healthcare system. The final thesis in this area was done by Dr. Zhanle Wang in his MASc thesis work in which he extended the model to include the full 24-h circadian cycle and introduced the ideas of the patient agent being self-aware and adjusting its behavior based on observing that its blood sugars were becoming high and therefore increase exercise and decrease food intake.

This manuscript is essentially the MASc thesis of Mr. Simerjit Gill and of Dr. Zhanle Wang put together with some additional thoughts included in the introductory and concluding chapters. We sincerely hope that these highly complementary works presented together will have an impact on the healthcare decisions that are made with regards to this major illness and that this work will stimulate further collaborations in modeling and simulation in this important field.

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<http://www.springer.com/978-3-662-56289-5>

The Diabetic Patient Agent

Modeling Disease in Humans and the Healthcare
System Response

Paranjape, R.; Wang, Z.G.; Gill, S.

2018, XIV, 123 p. 81 illus., 74 illus. in color., Hardcover

ISBN: 978-3-662-56289-5