CPS: Synergy: In-Silico Functional Verification of Artificial Pancreas Control Algorithms.

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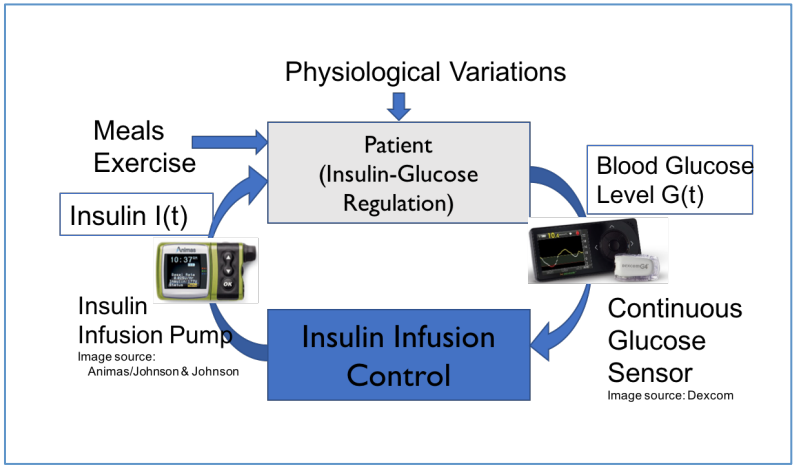
Objectives

Model, Verify and Tune Artificial Pancreas Systems.



Modeling

Human physiological models.
Disturbance models.

Properties

domain specific
+
algorithm specific.

Verification Tools/Techniques

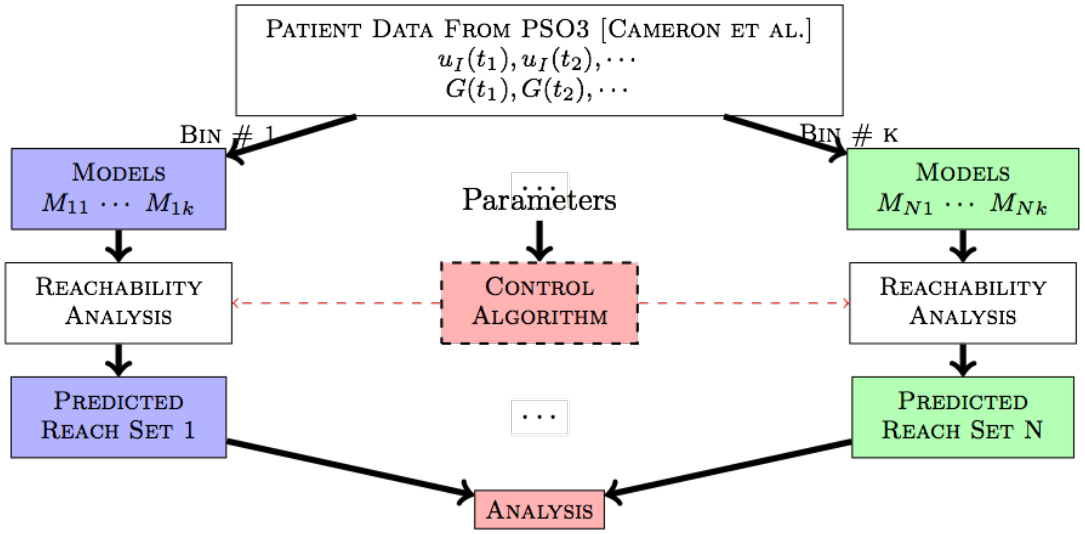
Falsification: S-Taliro
Symbolic Model Checkers: Flow*

Usability

Explaining witnesses.
Parameter tuning.

Data-Driven Tuning

PID with Insulin Feedback
[Steil et al, Weinzimer et al]
Parameters: Kp,Ki,Kd,…



Automatic search for optimal control parameters to avoid hypoglycemia.

Analyzed data for 50 patients x 40 nights/patient.
Data driven analysis yields improved control for 32 out of 50 patients.

Thank You!

http://www.cs.colorado.edu/~srirams/projects/ap-verification-project-page.html

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