Computational Intelligence based Dosing in Case of Graves' Disease

The thyroid gland produces hormones that are vital for the human body. The amount of hormones to be produced is controlled by the brain. This system obviously is a feedback loop. The occurrence of various autoimmune diseases acts as a disturbance on this feedback loop and only by administering suitable medication the desired behaviour of this system is restored. The Institute of Automation and Control and a group of the Medical University of Graz have jointly developed a mathematical model describing the main dynamics of the relevant thyroid hormone.

In this thesis algorithms based on methods from the field of computational intelligence will be investigated to generate dosing prescriptions. This thesis is about:

- Brief study of the existing model, the dosing strategy and the thyroid functionality
- Modeling of the thyroid functionality using machine learning algorithms
- Generating a reinforcement learning based dosing strategy
- Evaluating the developed methods within a digital-thyroid framework

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