

**Master 2016**

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**Smoothing and Modelling of Sensor Network Data.**

***ABSTRACT - Masterthesis***

The Intelligent Container is used for monitoring food shelf life by monitoring the parameters during transportation. In order to provide an accurate prediction of shelf life of fruits and meat, it is necessary to measure temperature inside food pallets. In order to achieve that, several sensors are mounted on the boxes to capture local temperature deviations inside a truck or container. The sensor node batteries have to survive for several months or even years. Power consumption has to be reduced as much as possible, which can be achieved by limiting the wirelessly transmitted data. The primary purpose of this study is to find algorithms to reconstruct and smooth the data and evaluate prediction error by Root Mean Square deviation. Algorithms for smoothing and modelling should be tested on data related to cooling of fruit containers during ocean transportation. The long term goal is to do in-network processing and send smoothed data with very less parameters. Algorithms for smoothing and modelling should be tested on data related to cooling of fruit containers during ocean transportation.

This report firstly deals with background of the project. In the second chapter the mathematics behind the B-Splines are discussed thoroughly in one dimension and two dimensions followed by regression using the splines in the third chapter. Fourth chapter deals with the smoothing splines and the automated smoothing spline techniques, and their comparisons. Lastly, in the fifth chapter the algorithms are tested on the two data sets. An in - code sections has been added in between the sections to discuss about the functions and the algorithm used in the code to obtain a particular result. A list of functions has been added at the end of the report with their description.