TU München
Fakultät für Informatik
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Machine Learning for Robotics and Computer Vision
Winter term 2015

Homework Assignment 2
Topic: Regression
October 26th, 2015

Exercise 1:

We are testing a tracking program. We evaluate it with the help of a quadrocopter. The quadrocopter sends estimates of its velocity and the tracking program estimates its global position with respect to the quadrocopter's initial position (before flying).

a) The tracker yields these tracked position estimates at a frequency of $1Hz$:

$$\mathcal{T} = \left\{ \begin{pmatrix} 2 \\ 0 \\ 1 \end{pmatrix} \begin{pmatrix} 1.08 \\ 1.68 \\ 2.38 \end{pmatrix} \begin{pmatrix} -0.83 \\ 1.82 \\ 2.49 \end{pmatrix} \begin{pmatrix} -1.97 \\ 0.28 \\ 2.15 \end{pmatrix} \begin{pmatrix} -1.31 \\ -1.51 \\ 2.59 \end{pmatrix} \begin{pmatrix} 0.57 \\ -1.91 \\ 4.32 \end{pmatrix} \right\} \tag{1}$$

Plot these data with your tool of choice (e.g. Matlab).

b) Assuming the quadrocopter flies with constant speed, which speed does it have? What is the residual error of the estimation?

c) Now assume that the quadrocopter flies with constant acceleration. What is the residual error now? Is the error higher or lower? Why?

d) According to our last model, what is the quadrocopter's most likely position in the next second?

Hint for b) and c): Use the Polynomial Regression method introduced on slides 8 - 12 of the lecture.

Exercise 2: Programming

Solve exercise 1 in your preferred programming language.

The next exercise class will take place on **November 20th, 2015**.

For downloads of slides and of homework assignments and for further information on the course see

http://vision.in.tum.de