Subject: Re: Least squares fit of a model to a skeleton consisting out of 3D points.
Posted by Jeremy Bailin on Mon, 24 Nov 2008 16:04:00 GMT
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On Nov 24, 10:56 am, Johan <jo...@jmarais.com> wrote:
> On Nov 24, 3:13 pm, Paolo <pgri...@gmail.com> wrote:
>
>
>
>> Johan wrote:
>>> I have the following problem to solve and was wondering whether the
>>> mpfit routines of Craig Markwardt will do the job?
>
>>> Do have the following model:
>>> Let g(X,Y,Z)=1 be a quadratic function in the coordinate system
>>> (O,Z,Y,Z) defined by the long, horizontal and vertical axes
>>> (ellipsoid). Write the equation of this quadratic function in matrix
>>> notation as follows:
>
>>> g(X,Y,Z) = [X, Y, Z]*[[A1,A4,A5],[A4,A2,A6],[A5,A6,A3]]*[[X],[Y],[Z]]
>>> + [X, Y, Z]*[[A7],[A8],[A9]]
>
>>> Need to fit this model to a 3D skeleton of N points by using least
>>> squares by calculating the coefficients Ai .
>
>>> This is achieved by minimizing the total squared error between the
>>> exact position of the points (Xi, Yi, Zi) on the quadratic surface and
>>> their real position in the coordinate system (O, X, Y, Z).
>
>> I am confused by this statement. In which system are Xi,Yi,Zi
>> measured?
>> What are "exact" and "real" position? This is very confusing...
>
>> Paolo
>
>>> The
>>> minimizing is performed from the derivative of the equation below with
>>> respect to A1 ... A9:
>
>>> J(A1 ... A9) = for i=0,N sigma(1 (Xi, Yi, Zi))^2
>
>>> This equation yields a linear system of nine equations in which the
>>> values of coefficients A1 ... A9 are unknown.
>
>>> Anyone that can help?
>>> Johan Marais- Hide quoted text -
>
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>
> The description I gave is an extract from a publication from which I
> want to implement a specific algorithm and it doesn’t seem to be that
> clear in general.
>
> The problem I want to solve is as follows:
> I have a set of points in 3D from my data that are represented by in a
> specific cartesian coordinate system. I want to fit a 3D ellipsoid (in
> the same coordinate system) to these points to get the long,
> horizontal and vertical axes (their dimensions and orientations) of
> the fitted ellipsoid. My understanding is that the “real” position is
> the position of the specific data points of the data and the “exact”
> position is the position of each point should they fall on the fitted
> ellipsoid’s surface.

You know, I'm pretty sure I used to have IDL code that solved exactly
this problem, but which died during The Great Hard Drive Crash Of
2000. :-(But there's a chance it was from after that... let me see
if I can find it.

-Jeremy.
