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GMOD-14-129: Interim Decision

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Ms. No.: GMOD-14-129

Title: Applying geometric constraints for perfecting CAD models in reverse engineering

Corresponding Author: Mr. István Kovács

Authors: Tamás Várady; Péter Salvi

Dear Mr. Kovács,

I am pleased to inform you that your paper is acceptable for publication provided minor revisions are made. Please carefully address the issues raised in the comments and make appropriate changes in the manuscript.

Your revision is due Apr 18, 2015.

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Thank you, and we look forward to receiving your revised manuscript.

With kind regards,

Stefanie Hahmann
Managing Guest Editor
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Elsevier

Reviewers' comments:

Editor's Comment from Guest Editors (T.Dokken, F.Chen, T.Grandine, S.Hahmann)

Dear authors,

Please consider the suggested upgrades for further augmenting your paper "Applying geometric constraints for perfecting CAD models in reverse engineering", and submit a new version as soon as possible, so that we can take our final decision.

Reviewer #1: ***** BEGINNING OF REVIEW *****

1) RATIONALE AND REQUIRED MAJOR CHANGES

PLEASE JUSTIFY THE ABOVE EVALUATIONS AND LIST ALL THE MAJOR CHANGES THAT YOU BELIEVE THE AUTHORS MUST MAKE TO THE MANUSCRIPT IN ORDER TO MAKE IT ACCEPTABLE FOR PUBLICATION IN GMOD.

The paper is good. It addresses the problem of capturing design intent from measurements of an object that was originally designed as a CAD model. This is an interesting problem within reverse engineering. The paper focuses on a restricted set of surfaces types, but this set still covers a large group of models. The paper is clearly written and the examples that are given in most sections ease the understanding.

2) DETAILS

HERE, PLEASE LIST ALL SMALL PROBLEMS THAT YOU HAVE NOTICED. BE AS SPECIFIC AS POSSIBLE.

Section 3.1.

The normalization constraints: This section revisits methods presented in an earlier paper where more information about these constraints are presented. Some text on faithful representation and the related reference should be included also in this paper.

The tangential constraints: Some details on how these constraints are obtained could be useful.

Section 3.2.

Table 1: The parameters r and k are not presented prior to this table and not the caption. The parameters are explained later (section 6). This should be mentioned in the caption.

Section 3.3.

Should it be "the approximation error increases with a negligible extent"?

Observations about the methods discussed in Section 6 can be postponed to Section 6

Section 4.

As already mentioned, the concept of faithful representation should be elaborated a little bit more

Section 5.

Last sentence before 5.1: Should it be "have identified a complementary group"?

Section 5.1

Step 5 in the algorithm is not clear to me. Could it be explained more clearly? What is p^* ?

Section 5.3

Refer to figure 1

Section 5.4

That is the difference between the two pictures in Figure 9. It is very hard to see a difference and to find out how it should be interpreted (if it exists)

Section 6

The expression: $r/h - \text{round}(r/h) = 0$. Explain the use of round. It is possible to deduce it from the content, but it does not make the meaning more clear.

3) SUGGESTED IMPROVEMENTS

HERE, YOU SHOULD LIST SUGGESTIONS THAT ARE NOT MANDATORY, BUT THAT THE AUTHORS MAY CONSIDER DOING TO IMPROVE THEIR PAPER.

The examples are good and are representative for a big class of CAD models. It would, however, be interesting to have some considerations about how well the methods are suited for larger CAD models.

***** END OF REVIEW *****

Reviewer #2: This works extends previous results on constrained fitting of engineering models with analytic surfaces to point data / meshes. The paper is well presented, clearly describes the overall approach and how it improves the previous methods. While still constrained to relatively simple models with basic surfaces only, it is still highly relevant to practical applications and is a clear improvement on the previous approaches. Hence, I recommend the paper to be published without any changes necessary.

Only criticism from my side is that there is actually a conflict between the point fitting and the detected geometric constraints. A perfect fit with all constraints fulfilled is in general not really possible and so the solution will always be a compromise between both, even if of course it seems to be able to make resulting models more useful in practice. However, I'd prefer it if the actual aim could be defined more formally on a higher level than a constraint fitting problem to be able to say what it actually means for a model to be useful in practice.

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