Editorial

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Introduction

The First International Conference on Advanced Research in Virtual and Rapid Prototyping (VR@P) was held on 1–4 October, 2003. This conference was hosted by Leiria Polytechnic Institute in Leiria, Portugal. Nearly a hundred papers were presented by authors from all over the World on many subjects relating to virtual prototyping, rapid prototyping, or a combination of the two. The breadth and depth of research papers presented at this conference reflected a vibrant and exciting discipline.

It is a pleasure to present in this journal a selection of some of the best papers that were presented during the four days of the conference. As a theme, we have chosen papers, which deal with the relationship between the virtual and the physical prototyping worlds, in particular. The relationship between physical and virtual prototyping in the product development process is a subject very close to our hearts and we were honoured to have many distinguished experts speaking on this issue. It is clear that both types of prototyping should be used at appropriate times during the process in order to enhance product design and optimise product throughput. Dr. Ian Campbell expressed his views on this topic as a keynote speaker and the first paper in this special journal issue is a combination of the two keynote papers presented by Dr. Campbell and Dr. Gibson. We trust that the seams that join these two papers together are not too obvious. A more practical understanding of the relationship between real and virtual prototypes was presented by P. Ottosson. His paper shows how both prototypes can be used to solve product development problems and serves to complement the first paper.

The reverse engineered (RE) data sampled using 3D digitising equipment is taken by many products as their starting point. Such data are often referred to as point cloud data and sometimes such data are just required to be replicated in some way. Rather than import, process, and clean the data using RE software and CAD, it is perhaps more preferable to directly convert the data from point cloud to a form where machines can read them. G. Saravana Kumar et al. presents an interesting example of how this can be done.

When using RE data, particularly from laser scanners, parts are not always fully digitised. Concave regions are particularly difficult to capture. However, if it is possible to define a strategy for scanning so that the direction of scanning is varied, then more of the object may be digitised. W. Dirigent presents an interesting study of how to determine the visibility of an object from a particular angle. This study helps to understand, to an extent, how much of the object has been captured.

J.C. Ferreira et al. look at an important application area for RE, that of production of parts based on medical data. Many research-based and commercial RE systems focus on

this topic and this paper highlights a number of issues that are of importance when capturing, processing and using this data to create medical prostheses.

The final paper in this issue relates to another interesting application area, that of reproducing obsolete parts directly from originals. Obviously, original parts may in fact be damaged or flawed in some way and so it is important to understand how the parts function in order to ensure the correct features are reproduced. This paper considers automotive parts from pre-CAD automobile designs of what might be called classic cars. Using methods similar to medical data capture, the authors attempt to reproduce functioning engineering components faithfully from the originals. This includes how these components might be fabricated using casting techniques.

We hope you agree that these papers are both interesting and informative, and that they provide you with both insights on exciting topics as well as illustrate just how good the original VR@P conference was. Finally, our thanks to Dr. Mohammed Dorgham for his support regarding this special issue.