3D VIRTUAL PROTOTYPING AS A NEW VISUALIZATION FOR FOOTWEAR DESIGNING& DEVELOPMENT.

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Abstract

In recent years, A development of 3D/CAD have changed the view of product designing & manufacturing. 3D virtual proto typing will play a vital role in future of footwear designing. Shoemaster, iCad3D+ PRO etc, are 3D CAD system, which give fundamental importance for design validation through prototyping. Virtual 3D is allowing to find the errors, identification of amendments in the styles &it lines, Making it possible to care for new potential Solutions. CAD 3D software for footwear -based products contributes to the aesthetic in appearance and it give possibilities of 3D Virtual as well as technical 2D for creative visualization of new product. Recently, 3D Virtual replaced to the traditional designing process and pattern engineering, tooling or commercialization and It is reducing time consuming as well as the material and human resources of the factory.

This paper will show the evaluation of the methods in virtual prototyping systems and its purposes in designing validation of footwear development and It would exhibit the process meant for easier visualization with aid of rendering, technical flatting, size grading ,etc of the final product with fitting accuracy, and also objection of the paper is incorporating textures, color ,fastening and other attributes of the final products is manifested. The exhibits of this paper are presented as examples of the new possibilities for rapid prototyping in footwear designing and development.

Key words: Virtual 3D, Footwear Designing, Rapid Prototyping, Photorealistic, Visualization .., etc.

INTRODUCTION:

Virtual prototyping is a method used in the process of footwear designing that involves using application of computer aided design(CAD), computer aided Manufacturing & computer aided engineering(CAE) software which aid of design validation and virtual prototyping of them. Its purpose is to integrate all the characteristics of shoes into a virtual model before preparing to making a physical proto.

Applying virtual prototyping will rapidly minimize the number of real prototypes and speed up the product development process. This represents a tremendous reduction in development costs.[1].Recently,3D virtual prototyping have provided more sophisticated tools for footwear prototyping. Specifically, Virtual reality(VR) techniques give possibilities for high accuracy of fitting in model last with high realism.

Traditional prototyping method is more time consuming which requires high manpower and high lead time. The time span of footwear traditional proto typing is about four months and proto type building involves various steps to complete the final stage .After completion of product line manager plans, the designer produces experimental design. Then the range developer produces the initial patterns of each article. and experimental sample(1/2 pair) will produce by cutting, closing, lasting ,etc. Once amendments received from the customer co-coordinator, then further fit trial, sales man sample, confirmation sample ..,etc will taken place before pre- production. In traditional method, CAD 2D applications are used for shoe size pattern grading ,which helps to prepare physical proto typing.

In virtual 3D prototyping method has held on easy visualization of design and manufacturing problems. An example is ICAD+ PRO software . It implies CAE system followed by CAD system. virtual 3D produces images as hyper realistic as photographs taken from real footwear model. It create customizable as well as adapted to the manufacturing process, and it aid to create technical specification sheets, Die charts, skiving charts ,etc. easily. Although 3D virtual give possibilities of 3D printing of sole and heel design which reduce time consuming and mold cost. Often, the 3D CAD system has the option to connect the 3D printer directly. Recently, it give possibility to make numerous deformations, such as changing tongues, altering upper lines, deforming counters and toes, etc.

In the demonstrated project, which give possibilities of introducing CAD 3D in footwear designing for new visualization are investigated. Already Mechanical, Fashion and Apparel .etc, Industries has developed such features for high virtual realism, rapid prototyping but footwear industry needs to fully accept and implement it. The current developments in computer graphics have changed the way product designing and rapid prototyping with virtual optimization, resulting in more and more virtual design, minimize the time consumption, easier documentation, rapid prototyping ,etc. which contrast to physical proto typing. In addition, proto types are often used in supporting discussions among people who have variety of a technical backgrounds.

This article discussed two fundamental ideas. First being, how to use 3D CAD software as a new visualization for footwear designers and secondly how technologists' virtual model expresses an idea, resulting in high visual realism and high accuracy of fitting with model last, Possible of rapid prototyping.

There are many companies that supply CAD 3D soft ware promise greater activism in the process of creation, validation, and production. Similarly, they have similar interfaces, that integrate the 2D and 3D universes with independent windows. Figure 1 represent examples of some of the existing solutions in the market.[7].

Experimental:

As experimental were developed design proposals for Functional footwear designing . shoe master 3D system version 11.02 and iCad3D+ PRO 3D system version 4.0 was used in order to improve the effectiveness of ergonomics analysis through virtual prototypes. The software served as a constructive and creative platform in 3D models and give possibilities of 3D material texture scanning, ornaments and bottom components creation, 3D/2D simultaneous view .etc..

Initial stage starts with importing a selected 3D digital last. A 3D foot measurement device is used for scan the feet of target customer. The last was chosen according to scanning or it depends on standard fitting during commercial footwear designing. Once digital last with (.dxf, .igs, etc) imported to 3D CAD system,

Results and Discussion

Results of 3D Virtual proto typing as a new visualization show similar advantages and drawbacks. 3D Virtual proto typing is more effective compared with traditional prototyping, which give possibilities of high lead time with high accuracy of fitting on last . It also reduce the time consuming in CAD 2D where will rapidly do amendments in patterns as well as 3D sketches. So 3D CAD system is more preferred in order to easier documentation, create more acceptable view(360 degree view). It provides a better outlook and visual representation of idea compare with traditional proto typing.

It is also to be noticed that the discussed method would facilitate the look and high visual realism(VR) and it contributes in sizing and fitting with high accuracy .but 3D CAD system equipments are Expensive compare with traditional or 2D CAD.

Summary

This article discussed two fundamental ideas. First being, how to use 3D CAD software as a new visualization for footwear designers and secondly how technologists' virtual model expresses an idea, resulting in high visual realism and high accuracy of fitting with model last, Possible of rapid prototyping.

Knowledge of Designer in 3D CAD systems plays important role for creating various looks as well as pattern modification in 2D CAD. The visualization of these projects are presented with examples of new possibilities in footwear industry which is not followed by many footwear factories .It also rapidly reduce the time consuming and rejection percentage of sample during prototyping.

3D virtual proto typing will play a vital role in future of footwear designing &development, which compare with traditional proto typing.

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