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Suitability and Precision of Xerographic and Computer-Assisted Methods

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Abstract

This study was to compare the suitability and precision of xerographic and computer-assisted methods for bite mark investigations. Eleven subjects were asked to bite on their forearm and the bite marks were photographically recorded. Alginate impressions of the subjects' dentition were taken and their casts were made using dental stone. The overlays generated by xerographic method were obtained by photocopying the subjects' casts and the incise edge outlines were then transferred on a transparent sheet. The bite mark images were imported into Adobe Photoshop® software and printed to life-size. The bite mark analyses using xerographically generated overlays were done by comparing an overlay to the corresponding printed bite mark images manually. In computer-assisted method, the subjects' casts were scanned into.

Keywords: Computational constructs; Molecular computation; Strand displacement

Introduction

The bite mark analyses using computer-assisted overlay generation were done by matching an overlay and the corresponding bite mark images digitally using Adobe Photoshop®. Another comparison method was superimposing the cast images with corresponding bite mark images employing the Adobe Photoshop® CS6 and GIF-Animator©. A score with a range of 0–3 was given during analysis to each precision-determining criterion and the score was increased with better matching. The Kruskal Wallis H test showed significant difference between the three sets of data ($H = 18.761$, $p < 0.05$). In conclusion, bite mark analysis using the computer-assisted animated-superimposition method was the most accurate, followed by the computer-assisted overlay generation and lastly the xerographic method. The superior precision contributed by digital method is discernible despite the human skin being a poor recording medium of bite marks. It is generally accepted that the geomagnetic K indices derived by experienced observers are of great value.

Discussion

The interactive method (IM) based on the traditional hand-scaling methodology is tested in this study. The tests are performed utilising the data from the Hurbanovo and Budkov magnetic observatories. These data include both digital records of the geomagnetic field and hand-scaled K indices that had been derived by experienced observers. The authentic K indices from Hurbanovo cover the year 1997 and the same kind of data from Budkov covers the years 1994–1999. In addition to these data, hand-scaled K indices are used which were derived by the experienced observer from printed digital magneto grams for both of the observatories for the years 2000–2003. The results of this study indicate that for high values of K indices (the values being at least 5) the tested method follows the traditional hand-scaling better than the widely used computer methods FMI and AS. On the other hand, for the K indices less than 5 the tested method turns out to be the worst when compared with the FMI and AS methods. For very low geomagnetic activity (K-index values equal to 0) the performance of the tested method is comparable to the two computer methods [2]. Computational algorithms can be described in many methods and implemented in many languages. Here we present an approach using storytelling methods of computer game design in modeling some finite-state machine algorithms and applications requiring user interaction. An open source software Twine is used for the task. Interactive nonlinear stories created with Twine are applications that can be executed in a web browser. Storytelling approach provides an easy-to-understand view on computational algorithms allowing communication with people with no computer science education. It also allows rapid prototyping and testing in mixed background work teams. In monitoring process, quantity of components has brought heavy burden to operators, thus, human errors are easily triggered [1-4].

To solve the problem, the authors propose an optimization process, a quick convergence search method and an affinity error probability mapping function. Two balanceable parameter values of the affinity error probability function are obtained by experiments. The experimental results show that the affinity error probability mapping function about human-computer interface has very good sensitivity and stability, and that quick convergence search method for fuzzy segments divided by component quantity has better performance than general algorithm. A collision avoidance system plays an important role in reducing incidents occurring on the road, which the object detection is crucial to enable obstacle avoidance for this system. The objective of this paper is to improve general object detection methods for vehicles in order to prevent a collision of the vehicles and the obstacles - of which we do not know the exact shape, size or colour. A combined computer vision system with artificial neural networks can improve the performance of the vehicle has the ability to see and recognize the obstacles like human beings. In this paper, the authors present the algorithm for vehicles to detect general objects, which can classify obstacles that are real obstacles or fake obstacles, such as a painting or text on the road. The proposed method, we combined on-board computer vision system based on Histograms of Oriented Gradient (HOG) and Time Delay Neural Network (TDNN). We extract feature of the obstacles by HOG and using TDNN to recognize and classify the obstacles. The experimental results showed that this system

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can detect general objects, and is not restricted to vehicles, objects or pedestrians. It has provided good results along with high accuracy and reliability, which it is accurate enough to provide a warning to the driver when a collision is imminent. An improved polygon-based method is proposed for sub wavelength pixel pitch computer generated holograms (CGHs). By employing the basic principle of image-plane holograms, and by optimizing the parameters, objects are reconstructed with high quality from the CGHs whose pixel pitch is smaller than wavelength. It is believed that the proposed method is potentially promising for future large viewing angle holographic 3D displays. Many very difficult problems in applied mathematics and other scientific disciplines cannot be solved without powerful computational systems, such as symbolic computation and computer graphics. In this paper we construct two new families of the fourth order iterative methods for finding a multiple real or complex zero of a given function. For developing these methods, a recurrent formula for generating iterative methods of higher order for solving nonlinear equations is applied and implemented by symbolic computation through several programs in computer algebra system Mathematical. Symbolic computation was the only tool for solving the considered complex problem since it provides handling and manipulating complex mathematical expressions and other mathematical objects (Figure 1).

The properties of the proposed rapidly convergent methods are illustrated by several numerical examples. To examine the convergence behavior of the presented methods, we also give the dynamic study of these methods using basins of attraction. Such a methodology, besides a visualization of iterative processes, deliveries very important features on iterations including running CPU time and average number of iterations, as a function of starting points. The program for plotting basins of attraction in Mathematical is included [5-7].

We present a Malenkov type approach for establishing transversal intersections of stable/unstable manifolds of perturbed normally hyperbolic invariant manifolds (NHIMs). The method is based on a new geometric proof of the normally hyperbolic invariant manifold theorem, which establishes the existence of a NHIM, together with its associated invariant manifolds and bounds on their first and second derivatives. We do not need to know the explicit formulas for the monoclinic orbits prior to the perturbation. We also do not need to compute any integrals along such homoclinics. All needed bounds are established using rigorous computer assisted numerics. Lastly, and most importantly, the method establishes intersections for an explicit range of parameters, and not only for perturbations that are 'small enough', as is the case in the classical Melnikov approach. During the design of Human-Computer Interaction (HCI) systems, the creation of visual artefacts forms an important part of design. On one hand

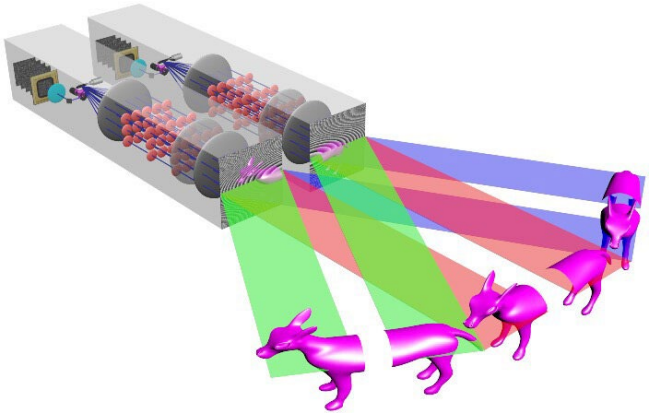

Figure 1: Future large viewing angle holographic 3D displays.

producing a visual artefact has a number of advantages: it helps designers to externalise their thought and acts as a common language between different stakeholders. On the other hand, if an inappropriate visualisation method is employed it could hinder the design process [6].

To support the design of HCI systems, this paper reviews the categorisation of visualisation methods used in HCI. A keyword search is conducted to identify a) current HCI design methods, b) approaches of selecting these methods. The resulting design methods are filtered to create a list of just visualisation methods. These are then categorised using the approaches identified in (b). As a result 23 HCI visualisation methods are identified and categorised in 5 selection approaches (The Recipient, Primary Purpose, Visual Archetype, Interaction Type, and The Design Process). X Quality assessment of food products and beverages might be performed by the human senses of smell, taste, sound and touch. Likewise, sparkling wines and carbonated beverages are fundamentally assessed by sensory evaluation. Computer vision is an emerging technique that has been applied in the food industry to objectively assist quality and process control. However, publications describing the application of this novel technology to carbonated beverages are scarce, as the methodology requires tailored techniques to address the presence of carbonation and foam ability. Here we present a robotic pourer (FIZZeyeRobot), which normalizes the variability of foam and bubble development during pouring into a vessel. It is coupled with video capture to assess several parameters of foam quality, including foam ability (the ability of the foam to form) drain ability (the ability of the foam to resist drainage) and bubble count and algometry. The foam parameters investigated were analyzed in combination to the wines scores, chemical parameters obtained from laboratory analysis and manual measurements for validation purposes. Results showed that higher quality scores from trained panellists were positively correlated with foam stability and negatively correlated with the velocity of foam dissipation and the height of the collar [8-10].

Conclusion

Significant correlations were observed between the wine quality measurements of total protein, titratable acidity, pH and foam expansion. The percentage of the wine in the foam was found to promote the formation of smaller bubbles and to reduce foam ability, while drain ability was negatively correlated to foam stability and positively correlated with the duration of the collar. Finally, wines were grouped according to their foam and bubble characteristics, quality scores and chemical parameters. The technique developed in this study objectively assessed foam characteristics of sparkling wines using image analysis whilst maintaining a cost-effective, fast, repeatable and reliable robotic method. Relationships between wine composition, bubble and foam parameters obtained automatically, might assist in unravelling factors contributing to wine quality and directions for further research.

Acknowledgment

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Conflict of Interest

None

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