CHAPTER 28

MATHEMATICAL SCIENCES
COMPUTER SCIENCE

Doctoral Thesis

270. AHMED SULTAN GAMIL AL-HEGAMI
On Quantification of Novelty in Knowledge Discovery Systems.
Supervisors : Dr. Vasudha Bhatnagar and Dr. Naveen Kumar
Th 14746

Abstract

Analyses the types of deviation that can arise between two rules and compute objectively a novelty index based on rule deviations. The user involvement is sought only for categorization of rules based on novelty index. The proposed framework has been applied in the pattern analysis and data mining stages of the KDD process. In the pattern analysis stage, the domain-innocent user is aided by the filters and is always returned novel patterns, as per the specified threshold. The threshold can be dynamically varied to suit the needs of users at bibliography.

Contents

271. BANATI (Hema)
Determining Web Usability : A Pragmatic Approach.
Supervisor : Dr. Punam Bedi
Th 14744

Abstract

Usage of a site is driven by the trust user places on a site. The more a user trusts a website, more shall be the usage and vice-versa. Identification of crucial trust factors helps in trust building and maintaining during the entire usability lifecycle. The work presents a unique way of quantifying trust by identifying the important trust factors. The influence of the state of

the features in the website on the user trust is also explored. The "state of a feature" is identified as a distinctive criterion which influences the degree of usability of a website. The study identified four different dynamic states of the features in a website. These are "Irritant", "Chaotic", "Assuring", and "Motivating". These states are determined by the design of the website and hence affect the usability of the website. The HISE approach, which highlights the motivating, improvises the assuring, simplifies the chaotic and eliminates the irrtant features, is established as a part of the work. Usability criteria to measure usability also included efficiency, effectiveness, learnability, memorability, appearance of the site, work satisfaction, emotional satisfaction, state of features, and trustworthiness of the site. A distinct four level pyramid, which considers these criteria to gauge the user view of usability of a website, is presented in this work. The dynamic usability calculation, keeping in consideration the fuzzy user opinion, provides an edge over the existing usability measures. It acts as yardstick for comparing the usability levels of different websites. In today's era where users quickly shift from one site to another, such a measure can be helpful to web designers for designing websites to retain their users and hence pragmatically improve the website usability.

Contents

272. PAL (Saibal Kumar)
Development of Techniques for Protection and Analysis of Hidden Digital Information.
Supervisors : Dr. S. K. Muttoo and Dr. P. K. Saxena
Th 14745

Abstract

Focuses on protection of information hidden in digital media like images, human speech and music. Different schemes for steganography and watermarking are proposed. Properties of different sets of transform-domain coefficients are exploited for providing protection under different network constraints. Improvements for securing the hidden information are suggested. Design issues for protecting the embedded data from

unintentional as well as active attacks are critically examined. New ideas and applications based on information hiding technologies are described. Novel ideas regarding steganalysis and active attacks on digital media are presented. Weaknesses of existing methods for information hiding are studied and improvements are suggested to take care of powerful wardens monitoring the communication channels in practical situations. Recent developments in this interesting field of research are also included.

Contents

1. Introduction. 2. Information hiding in images using singular value decomposition. 3. Information hiding in images using the discrete hadamard transform. 4. Information hiding in digital audio. 5. Security analysis of steganographic schemes. 6. Improving steganographic schemes. 7. Information hiding applications. 8. Conclusions and future directions.

273. SEHGAL (Priti)
Study and Enhancements of Non-Photorealistic Rendering Techniques.
Supervisor : Prof. P. S. Grover
Th 14742

Abstract

There exist a variety of techniques in non-photorealistic rendering (NPR) to imitate the style of artists. However, the range of rendering styles is limited. Studies these NPR techniques and to expand the range of rendering styles available to the artists and designers for creating images and animations. Also provides the techniques to combine the expressivities of natural media with the flexibility of computer graphics. Also animated art forms are possible with digital tools that would be impossible with traditional media. Focuses on three of them, listed below, in detail since they have recently emerged, as important areas of NPR study, hence are a state-of-art. (i) Cartoon render; (ii) Crayon rendetring; (iii) Glass paintings.

Contents

1. Introduction. 2. Study and analysis of cartoon style rendering algorithm. 3. Cartoon style rendering using crayon texture. 4. Non-photorealistic rendering of glass paintings. 5. Glass painting filter. 6. Conclusions and Bibliography.