

IJSCI

INTERNATIONAL JOURNAL OF SYSTEMICS, CYBERNETICS AND INFORMATICS

(January 2007)

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Abstracts

Sl.No.	Title of the paper	Abstract
01	Human Centered Computing In Surgical Environments	<p>With the advent of minimally invasive surgery and robotic surgery, surgical procedures are going through a technological revolution. The advantages are numerous: faster recovery times for patients, lesser cost to the hospital and final user and an increased overall efficacy of the process. However, these technological advancements have been accompanied by decreasing usability of the final devices and tools of operation. Further conventional modes of training such as the apprenticeship model are not suitable for teaching sophisticated procedures. In this paper, we present a methodology to incorporate human centered computing in objective evaluation, analysis and training of surgical procedures. A sensory architecture that uses gesture based hand movement analysis and tool movement analysis is used to drive dynamic virtual reality scenarios that target cognitive and psychomotor development of surgical residents. Initial results show the validity of the approach as well as suggest a generic methodology to incorporate human centered computing approaches in high performance training environments.</p>
02	Tensor State Space Representation: Multi-dimensional Systems	<p>Tensor state space representation of certain multi-dimensional linear dynamical systems is formally described. Utilizing the state space representation, it is shown how various results in one dimensional system theory are translated to certain multi-dimensional systems. Generic guidelines on how the translation is done are described. Utilizing the tensor linear operators multi-dimensional linear stochastic dynamical systems (based on one dimensional AR, ARMA time series models) are formalized. Conventional models of distributed dynamical systems are based on utilization of matrix linear operator. Utilizing Tensor linear operator to represent the local state, various models of distributed dynamical systems are formalized.</p>
03	Review of the Potential Characteristics of Bio-robotic Walking for Orthoses	<p>This paper presents the results of theoretical and experimental studies carried out to design and develop robotic walking aids for spinal cord injured (SCI) persons. The current orthoses technologies are reviewed and their main limitations noted, survey results from SCI people are used to identify the requirements from the user's viewpoint. These include providing the capability to perform sitting to standing (and vice versa), walking and standing tasks. Identification of these functions and component properties have enabled the selection of potential components for experimental testing and characterisation. Powering and actuator selection are important issues discussed in this work; results from rig tests are presented as well as how actuator size (and hence power consumption) can be reduced by adopting energy storage devices. In this respect some actuators are described and results of a prototype robotized walking system are presented.</p>
04	Fuzzy Based Multimodal Biometric System	<p>A biometric System which relies only on a single biometric identifier in making a personal identification is often not able to meet the desired performance requirements. Identification based on multiple biometrics represents an emerging trend. We introduce a multimodal biometric system, which integrates face and Ear recognition by using Shannon entropy in making a personal identification. This system takes advantage of the capabilities of each individual biometrics. It can be used to overcome some of the limitations of a single biometrics. Preliminary experimental results demonstrate that the identity established by multimodal system is more reliable than the identity established by a face recognition system alone. In addition, the proposed decision fusion enables the performance improvement by integrating multiple ones with different confidence measures.</p>
05	Performance Evaluation of a Congestion Aware Adaptive Routing Protocol for Mobile Ad hoc Networks	<p>In a Mobile Ad hoc Network (MANET), packet congestion, channel failure and mobility of the nodes causes packet loss. Normally routing protocols are not congestion adaptive. When congestion is encountered it is sensed by the congestion control mechanism. This approach may cause longer packet delays and packet losses and requires high overhead if a new route is to be chosen. Obviously this problem will create great negative impact in transmission of bulk traffic like audio or video. To overcome this problem an enhanced routing protocol is required that is not only congestion aware but also congestion adaptive. In this paper we propose a new routing protocol that owns all these properties.</p>

06	Extracting Geometric Primitives: Combined approach of Hough Transform, Eigen values and Raster scan Algorithms	<p>In this paper we propose a new method for geometrical primitive identification such as straight line segments and circular features which use the generalized standard Hough transform (HT), Eigen value based statistical parameter analysis and Bresenham's raster scan algorithms. In this method, we use the sparse matrix technique to find the Hough transform of the given image. Since sparse matrices squeeze zero elements and contain a small number of nonzero elements they provide an advantage in matrix storage space and computational time. The Hough peaks due to random accumulation form in the parameter space with same frequency of individual pixels of a geometric feature, a perfect peak identification scheme is required to identify the valid Hough peaks. In our method Hough peaks are identified based on neighborhood suppression scheme. After finding the meaningful and distinct Hough peaks, coordinates of the geometric feature are obtained using Bresenham's raster scan algorithm. Since quantization in parameter space of the HT gives both the real and false primitives due to quantization in the space of digital image, quantization in parameter space of HT and the edges in images do not perfectly constitute the geometrical features. Hence a statistical analysis is done using the Eigen values of covariance matrix to characterize and identifying the geometrical primitive. The proposed method has the advantages of small storage, high speed, and accuracy in valid Hough peaks selection. It also increases the accuracy in identifying the position of the geometric features and reduces the primitive extraction error ratio over previously presented HT based techniques and its variants. The new method has been tested on both the synthetic and real images. The experimental results are given to show the correctness and effectiveness of the proposed method.</p>
07	An Approach for Text Data Compression	<p>In this paper, we have described an approach for lossless data compression. An approach deals with converting the ASCII values of a character from text to binary form that is in bits. The binary data of text is passed to the presented algorithm, which outputs the compressed data in bits. The decompression algorithm takes the compressed data and converts it to an original image. The experiment is carried using MATLAB on different text files containing different text material. The results of an experiment are compared with the results of two efficient lossless data compression techniques: Lempel Ziv coding and Run length coding. The result of comparison with the above technique shows that the proposed approach increases the compression ratio by 15%.</p>
08	A Gurmukhi Collation Algorithm	<p>Sorting and Indexing is one of the basic necessities of the database management system. But unfortunately there does not exist any software for automatic sorting of Punjabi words. The collating sequence provided by ISCII or UNICODE is not adequate. Separate rules have to be written for sorting. In this paper we discuss the various issues involved in sorting of Gurmukhi text and present a Gurmukhi collation algorithm. Gurmukhi, like other Indian languages has a unique sorting mechanism. Unlike English, consonants and vowels have different priorities in sorting. Words are sorted by taking the consonant's order as the first consideration and then the associated vowel's order as the second consideration. In addition there is another complication. The properly sorting "characters" in Gurmukhi often requires treating multiple (two or three) code points as a single sorting element. Thus we cannot depend on character encoding order to get correct sorting instead we have to develop using sorting rules of Gurmukhi linguistic collation function which convert the word into some intermediate form for sorting.</p>
09	Text Mining Approach for Punjabi Language Synonyms Detection Using Bilingual Punjabi Dictionary and Corpus	<p>The problem definition is "Automatic discovery of similar words from online Punjabi language corpus and Punjabi language dictionary using Text Mining [1]". Punjabi is one of the Indian languages. We can also call it as context based text mining. Text Mining is the discovery by computer of new, previously unknown information, by automatically extracting information from different written resources. We have implemented two methods 1) Punjabi Dictionary Method for finding the similar words from online Bilingual Punjabi Dictionary. 2) Punjabi Language Document Vector Space model for finding similar words from online Punjabi Corpus. According to Punjabi Document Vector Space Model, Terms are Punjabi language keywords, and they are similar if they tend to occur in the same documents. This can be represented in a multidimensional space, where each document is a dimension and each term is a vector in document space with Boolean entries indicating whether the term appear in the corresponding document. It is common in the information retrieval to use this type of modal. Two terms are similar if their corresponding vectors are close to each other. The similarity measure between the vector i and vector j is computed using the similarity measure like cosine measure, where i and j are Punjabi language keywords. In Bilingual Punjabi Dictionary Method, Similar words are discovered by matching the right side meanings of original word with right side meanings of rest of words in Bilingual Punjabi Dictionary.</p>

10	Design and Implementation of Punjabi Spell Checker	<p>Spellcheckers are the basic tools needed for word processing and document preparation. Designing a spell checker for Indian languages such as Punjabi poses many new challenges not found in English, which complicates the design of the spell checker. Punjabi language is far different from Western languages in phonetic properties and grammatical rules. Thus the existing algorithms and techniques that are being used to check the spelling and to generate efficient suggestions for misspelt words of English and other Western languages are not actually suitable for Punjabi; rather it needs different algorithms and techniques for expected efficiency. This paper presents the complete design and implementation of a Punjabi spell checker.</p>
11	Evaluation of Direct Machine Translation System: From Punjabi To Hindi	<p>The Direct MT system is based upon exploitation of syntactic similarities between more or less related natural languages. For really close languages, it is possible to obtain better translation quality by means of simpler methods. Punjabi and Hindi are two such languages which are closely related as both originated from the same origin and having lot of syntactic and semantic similarities. These similarities make Direct translation methodology an obvious choice for Punjabi-Hindi language pair. In this paper, we explore the possibility of using direct machine translation system for developing a Punjabi to Hindi MT system. The output is evaluated by already prescribed methods in order to get the suitability of the system for the Punjabi Hindi language pair.</p>
12	Study Of Normal Algorithmic Signal Processing Systems In Terms Of Formal Languages Generated By a Grammar Lecture Series – 5	<p>Formal representation of signals and systems over alphabets has been discussed in this paper. The starting point of our study is the <i>formal representability</i> of words and algorithms over alphabets by elementary formal systems (EFS) of Smullyan. Formulation of a string manipulation language for constructive signal processing is the major objective of this paper. First, Fitting's basic string manipulation languages EFS(str(I)) has been described from the basics. Next, a string manipulation language EFS(sp(A)) for constructive signal processing has been evolved. then, A review on languages generated by M-grammar based on semi-Thue productions of post words is provided followed by the introduction of the problem of generating Markov class rewriting systems by a type-0 phrase structure grammar and formulation of what we call as of M-grammar has been made.</p>