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Abstracts

Sl.No.	Title of the paper	Abstract
01	Optimal Control, Codeword, Logic Function Tensors: Multi-dimensional Neural Networks	<p>Previously known results relating error-correcting codes, logic gates and one-dimensional neural networks are briefly summarized. Previously reported author's research on a multi-dimensional generalization of this relationship is briefly summarized. Also the author's research work relating optimal control vectors and stable states of a one-dimensional neural network is briefly summarized. Utilizing Tensor State Space Representation of Certain multi-dimensional systems, it is shown that the optimal control tensors (in the sense of maximizing the total output energy over a finite horizon) constitute the stable states of a multi-dimensional neural network. Thus combining this result with the earlier results of the author, a unification of control, communication and computation functions in multi-dimensional systems is formally discussed.</p>
02	Application of Artificial Neural Networks To Multi facility Location Problem with Area Constraint	<p>The Multifacility Location problem is an extension of the singlefacility location problem. In the case of multifacility location problem we shall be interested in finding the locations of multiple new facilities with respect to multiple existing facilities in a given environment. A detailed literature survey reveals that a little attention has been paid to problem involving area constraints even though; perhaps every location problem is inherently bound by area constraint of some sort or the other. This has motivated us to take care of the area constraint aspect of multi facility location problem in the present study. Mathematical formulation of multi facility location problem with area constraint has been considered and the solution has been obtained by using Kuhn-Tucker theory. The mathematical solution procedure is very complex and time consuming. Hence, an attempt has been made to get the solution of a complex, constrained multi facility location problem using Artificial Neural Networks (ANN). With the help of Numerical examples, it has been established that the solution obtained through ANN model compares well within the acceptable limits with those obtained through analytical method.</p>
03	Similarity Analysis of Geometrical Features for Fast Decipherment of Addresses - Reading without OCR	<p>While reading text documents, human beings having deeper experience tend to employ 'Pattern Recognition' techniques to quickly 'grasp' the content rather than understand it by reading the entire text. This human behavior based model should be easily extendible to postal automation because the text contents to be read are highly limited, being most of the times proper nouns and some specific common nouns particularly with regard to mail distribution task at a destination (delivery) post office. In this paper we propose to extract the geometrical features of an address component, express it as a symbolic object [20,21] and in sequel subject it to similarity analysis with the knowledge base to decipher the component rather than reading it character by character employing OCR. We have worked on bilingual address components which is a very common happening in any part of India. While working with data samples-containing address components written in English and Kannada, obtained from a destination post office (Head Post Office, Bagalkot in Karnataka State, India), the recognition performance figures happen to be 92.41 % and 87.69 % for address components printed in English and Kannada respectively. The overall performance including the correctness in recognizing the script turned out to be 90.18%.</p>
04	CT Scan Image Enhancement and Denoising	<p>The need for image enhancement and restoration is encountered in many medical applications like CT scan images. In this paper, image denoising is investigated. The CT Scan images are the low cost, non-invasive imaging modality that has proved popular for many medical applications. The noise is an intrinsic property of medical imaging; generally it tends to reduce the image resolution and contrast, thereby reducing the diagnostic value of this imaging modality. The spatial resolution of a CT image depends on the focal spot & size of the detector. The preprocessing allows filtering methods based on assuming the noise to be white and Gaussian, to perform in nearly optimal conditions. This paper evaluates performances of different linear and nonlinear anisotropic diffusion based filtering methods. Diffusion approach is based on partial differential equation [PDE], of which the initial data is the input images, transformed into differential forms and solved with iterations. After comparing the results with other filters, the modified anisotropic diffusion method found very useful for denoising CT scan images.</p>

05	Pulse-Density Neurohardware With On-Chip Perturbation Learning	<p>Artificial Neural Networks (ANNs) are computational models of a fractional part of biological nervous system. Proper selection of learning algorithm is very important when considering hardware realization of Neural Networks (NN) suitable for wider applications. Gradient based learning algorithm involves complex computations and hence difficult to realize in hardware. On the other hand, perturbation algorithm modifies the weight values using simple arithmetic. On-chip realization is easy, due to the absence of error feedback mechanism. Moreover, all internal signals are represented in pulse-density format, as it is less prone to bit-wise errors. In this paper, perturbation algorithm based design of pulse density neurohardware is discussed. Design is implemented in two phases. In phase 1, the logical simulation is done. In phase 2, VLSI realization is performed using the results of the previous phase. The simulated and measured results of two-input AND & XOR logic functions, have verified the performance of the circuits.</p>
06	Design of Reduced Order Multi Level Feedback Controller for an Interconnected Large Scale Discrete Time Linear System	<p>This paper deals with the design of discrete time linear system using a simplified reduced order model. The reduced order model retains the physical meaning of the desired state variable and hence used to indicate which state contains a significant contribution. The linear feedback controller is derived by using the simplified Jury's stability criterion that takes into accounts the realities and constraints of an interconnected discrete time system. An example is given to illustrate the advantages of the proposed method and assesses the effectiveness of the controller. The simulation result demonstrates the stability and two level control strategy of discrete time linear system.</p>
07	IEEE802.11a Physical layer Implementation Using OFDM	<p>Future wireless applications target multimedia and high speed internet access, all requiring techniques to improve the link capacity and robustness. Wireless channels tend to produce intersymbol interference (ISI) and frequency selective fading. Orthogonal Frequency Division Multiplexing (OFDM)/Coded Orthogonal Frequency Division Multiplexing (COFDM) is particularly suited to provide reliable reception of signals affected by ISI and frequency selective fading and by this technique transmission of high data rates can be easily achieved. VLSI implementation of COFDM MODEM has been carried out. Based on the results obtained, the COFDM technique is proposed as a suitable one for the wireless broadband high data rate applications. The effects of multipath propagation, frequency selective fading and the various fading channels like AWGN, Random and Rayleigh have been included. The system coding is done in VHDL and the simulation is performed using Model Sim XE 5.8C tool. The output of the system is verified with the Matlab Implementation. VLSI based approach is considered here for implementation of IEEE 802.11a Baseband.</p>
08	An optimization of Fourth Generation Mobile device for Heterogeneous Network	<p>This research paper discusses the design, implementation, and analysis of a wireless local area network for high mobility both in wireless LAN (WLAN) and cellular air interfaces. The explosion of radio access technologies and wireless networking devices over recent years has triggered the intensive use of nomadic computing. Mobile devices receive intermittent network access, and alternate between connected and disconnected states. However, the personal gadgets need more networking capabilities. Wireless network coverage is becoming ubiquitous, and always on IP-based [3] services is now closer to reality. An average mobile user may connect to a variety of wireless networks in the course of a day to obtain services, for which they demand operational transparency. It is achieved by fourth generation wireless (4G) networks.</p>
09	Word Level Classification of Telugu Script using Language Model	<p>The complexity and the variety of shapes of characters in Indian scripts is a challenge and there are many issues common to several scripts that seriously affect the performance of OCR systems. In this paper an attempt is made to evolve a Language Model as a combination of the connected component approach and the knowledge from zone information. This model is further extended to classify the words of a document image into various classes obtained due to the application of the zonal information to the model of Telugu script.</p>
10	Performance Evaluation of Interoperable Protocols Across Heterogeneous Adhoc Smart Spaces	<p>Mobile dynamic reflective context aware middleware is designed in the middleware layer. A new layer called Middleware layer is built in between the routing and Transport in the protocol hierarchy. Smart spaces are designed in the transport layer and each smart space works on a service discovery protocol. The protocols considered in our study are pervasive discovery protocol, service location protocol and universal plug and play protocols. The interoperability of protocols is built in the middleware layer. Cross layering is adapted between the routing layer and transport layer so that the services could be seamlessly delivered in to the device of the user. Cross layering is the phenomena to establish connectivity between any two layers by skipping a layer in between them. The functionality of the layers will be carried out</p>

without traversing through the layer. Routing interoperability is established between the Adhoc on demand distance vector routing and Destination sequence distance vector routing. Internally interoperability is brought between the proactive and reactive protocol. In order to choose the routing protocol from the routing layer and the services from the transport layer the cross layering is established. The result of interoperability brings all these smart spaces together.

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Realization of Certain Normal
Algorithmic Signal Processing
Operations- Lecture Series-4

In this paper, we demonstrate the use of the string manipulating techniques discussed in series-3, in nonnumerical signal processing. First, we construct a normal algorithm for carrying out cyclic shifting in a string of arbitrary length. Next, we outline a general method for constructing normal algorithmic systems for signal processing operations on symbolic sequences in general. As an illustration, we then construct a normal algorithmic system for carrying out linear convolution of nonnegative integer sequences.