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3.3.3 Number Of Books And Chapters In Edited Volumes/Books Published And Papers In National/International Conference Proceedings During The Year

3.3.3 Number Of Papers In National/International Conference Proceedings During The Year

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Elastic Properties of Silver Borate Glasses Doped with Praseodymium Oxide

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Abstract. A series of glasses xPr_6O_{11}-(35-x) Ag_2O-$65B_2O_3$ with x=0, 0.1, 0.2, 0.3, 0.4 and 0.5 mol % were synthesized by melt quenching technique. Longitudinal and shear ultrasonic velocity were measured at 5 MHz frequency and at room temperature. Elastic moduli, Poisson's ratio and Debye temperature have been calculated from the measured density and ultrasonic velocity at room temperature. The experimental results indicate that the elastic constants depend upon the composition of the glasses. The role of the Pr_6O_{11} inside the glass network was discussed.

Keywords: Silver Borate glass, Praseodymium Oxide, Ultrasonic velocities, Elastic moduli, Poisson's ratio.
PACS: 43.35.Ae, 43.35.Bf, 43.35.Cg, 61.43.Fs:

INTRODUCTION

Borate glasses containing silver ions have been studied extensively because of their technological applications in solid state batteries [1]. The ability of boron to exist in three and four oxygen coordinated environments and the high strengths of covalent B-O bonds enable borates to form stable process [2]. The physical properties indicate a strengthening of the glass structure as Pr ions are introduced [3].

Among the various non-destructive evaluation (NDE) techniques, ultrasonic technique is a versatile tool for investigating the changes in microstructure, deformation process and mechanical properties of materials. The ultrasonic waves are closely related with the elastic and inelastic properties of the materials [4]. Combining silver oxide (Ag_2O) and rare earth oxide (Praseodymium oxide Pr_6O_{11}) with boron Oxide (B_2O_3) allows one to tune the physical properties in wide range depending on the glass composition. The present work intends to study the role of Pr ion on the elastic properties of Pr_6O_{11}-Ag_2O-B_2O_3 glasses by employing ultrasonic technique.

MATERIALS AND METHODS

The xPr_6O_{11}-(35-x)Ag_2O-$65B_2O_3$ (x=0, 0.1, 0.2, 0.3, 0.4 and 0.5 mol %) glasses have been prepared starting from analar grade chemicals Praseodymium oxide (Pr_6O_{11}), silver oxide (Ag_2O) and boric acid (H_3BO_3). The chemicals were first mixed together by grinding the mixture repeatedly to obtain a fine powder. The powder was melted in porcelain crucibles at about 1200 °C in muffle furnace for few minutes to homogenize the melts. The melts were quenched in special metal mould preheated (about 200 °C) to avoid the breaking of the samples due to thermal stresses.

The density of glasses were measured using Archimedes's principle with toluene as immersion liquid (density = 0.8635 gm/cm^3 at RT). The molar volumes, V_m were calculated as M/ρ where M is the molecular weight and ρ is the density of the corresponding glass samples. The ultrasonic velocities, Longitudinal (V_L) and transverse (V_T) at room temperature were obtained using the pulse-echo method (Model: VCT-70A). In this method, X-cut and Y-cut transducers operated at a fundamental frequency 5 MHz and a digital ultrasonic flaw was used.

Determination of elastic constants: The various elastic properties of prepared glasses have been determined from measured densities and the velocities of longitudinal (V_L) and transverse (V_T) ultrasonic waves using the standard relations [5].

Longitudinal modulus	$L = \rho V_L^2$	(1)
Shear modulus	$G = \rho V_T^2$	(2)
Bulk modulus	$K = L-(4/3) G$	(3)
Young's modulus	$E = (1+\sigma) 2G$	(4)
Poisson's ratio	$\sigma = (L-2G)/2(L-G)$	(5)
Debye temperature	$\theta_D = h/k (9N/4\pi V)^{1/3} V_m$	(6)

ChemTech

Application of Bio technology in Treatment of Heavy Metal Contaminated Industrial Waste Water-A case study

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Abstract : Human life, as with all animals and plants life on this planet, is dependent upon water. Effluents from industries like; textile, leather, electroplating, dyes and pigment, metallurgical contain considerable amounts of toxic metal ions. These metal ions pose problems to the water environment as the industries often indulge in discharging waste water into underground and open drains or pit. The potential impacts from leaching operations on the environment are most likely to be experienced as changes to surface and groundwater quality. In this study an attempt has been made to utilize the microbes in treatment of industrial waste water collected from textile, electroplating industries. Studies have been carried out to specifically utilize the selected species of locally available microbial species in treatment of chromium contaminated industrial waste water. Waste water samples were collected from various industries subjected to characterization and compared analysis results. The waste water was subjected to bio remediation process to treat the waste water and the results have shown that the possibility of application Acidthiobacillus microbial community in effective treatment of chromium contaminated industrial waste water.

Keywords : Effluents. Treatment, Acidthiobacillus, chromium.

Introduction:

Water a necessity for life. This vital resource makes up 60 percent of the human body. A person can live no more than 4 to 5 days without water, and we rely on it for drinking, Cooking, bathing, washing clothes, growing food, recreation, industry, and mining, as well as generation of electric power. Water is a renewable resource (Stephen J. Vandas*et. al* 2002). Cr (VI) is toxic, carcinogenic and mutagenic metal ion to animals as well as humans and is associated with decreased plant growth and changes in plant morphology. It is one of the most strategic, critical & highly soluble metal pollutant having wide range of uses in the metals and chemical industries. Chromium exists in the environment in several diverse forms such as trivalent Cr (III) and hexavalent Cr (VI), of which hexavalent chromium Cr (VI) is a so-called carcinogen and a potential soil, surface water and ground water contaminant. Both human beings and animal community are being affected by the increased concentration of chromium metal in the water or soil environment. The main diseases includes, "gastrointestinal bleeding, tuberculosis, asthma, infertility, birth defects, and stillbirths" (Williams N, 1998). Potential health effects after exposure to chromium the chronic allergic contact dermatitis that it can lead to considerable health problems are studied (Malene Barre Hansen *et.al* 2002). Bioremediation is one of the most

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Preparation and Characterization of Kidney Stone Phantoms with Compression Strength and Dielectric Property Studies

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Abstract: Standardized and reproducible artificial kidney stone phantoms are used to perform comparative studies to improve stone treatment methods like lithotripsy. Such studies of renal stone phantom dictate the manner by which stones interact with mechanical stresses produced while shock wave lithotripsy. The major difficulty in performing mechanical tests on urinary calculi is the irregularity in size and shape of naturally occurring stones. Intact calculi cannot be directly tested by conventional methods, as it is impossible to apply forces uniformly over measurable surface areas with an appropriate degree of accuracy. To over come his kidney stone phantom were been prepared which mimic the properties of original kidney stones. Five types of phantoms were been prepared based on the composition using a mould. The dimensions of the mould were according to ASTM standards. The stones were characterized by XRD analysis. Compression strength studies were helpful in understanding the internal structure of the urinary stones and hence optimizing the treatment parameters of shockwave lithotripsy and other similar non-invasive techniques. These data suggest that these stone phantoms are suitable for performing standardized and reproducible in vitro investigations, especially with regards to fragility of kidney stones during kidney stones during shock wave lithotripsy.

Keywords: phantoms, shockwave lithotripsy, compression, fragility.

Introduction

The urinary stones obtained from a stone analysis laboratories and hospitals were subjected to various analytical and characterization techniques to alleviate the sufferings due to urolithiasis[1]. The major difficulty in performing mechanical tests on urinary calculi is the irregularity in size and shape of naturally occurring stones. The use of natural stones in experiments is also problematic as it is very difficult to procure natural calculi which are identical in their chemical composition and physical properties and using them in experiments to device the treatment modalities and also for the assessment of various stone fragmentation devices[2,3]. Artificial stones made from a number of materials including chalk, ceramic material, dental cement and plaster-of-Paris are of limited value as they are unable to simulate the physical or fragmentation properties of natural stones.

Artificial urinary stones for our studies were prepared using a uniform composition of begostoneplus, albumen and distilled water with each component present in a specific amountfor each type of kidney stone phantom.

National conference on Nanomaterials for Environmental [NCNER-2015]
19th & 20th of March 2015

Characterisation and Analysis of Nanosized Fertilizers and their Effect on Cereal Plants

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Abstract : Nanotechnology has been evolved as a great tool in almost all the disciplines of science and technology. It has its major contributions in the field of agriculture, disease diagnosis, medicine and industry. Nanofertilizers, nanoherbicides, nanopesticides have a great impact on the growth and yield of crop plants. This is due to their smaller size which has made them possible to penetrate easily into the plant body through small pores present on plant body. In this paper, investigation was done to study the effect of nanosized chemically synthesized particles on the plant growth and development. Chemically synthesised fertilizers in granule form were grinded to powder form. Further characterization studies were performed to confirm the particle size of fertilizer. Sterilized soil and seeds were used to nullify the effect of microorganism which may affect the plant growth. A comparative study was done between the plants grown by utilizing nanosized fertilizers and granules. The main objective of this study is to make the fertilizers available to crop plant effectively thereby increasing the uptake of them. These in turn reduces the loss of fertilizers by the supply of balanced and sufficient amount of them in nanosize.
Keywords: Nanotechnology, Nanosized fertilizers, sterilized soil, granules, seeds.

1. Introduction:

Agriculture is backbone for national economy. Technology is applied on agriculture to obtain better yield, decrease the product price and improve nutrition and to reduce the hazardous effect of certain chemicals[1]. In this route of development in agriculture sector nanotechnology has been stood forward. Nanotechnology has its unique physical property of tiny particle size which enables it to give novel application in agriculture field. Nanotechnology enhances the plant growth by monitoring them and protects the plants by detecting the diseases. Along with this it also increases the food productivity and quality[2]. In addition to these nanoparticles helps in rapid seed germination and early seedling[3]. When the particles are in nanoscale they show enormous, extraordinary properties which are not possible in the case of large sized particle[4]. It is possible by nanotechnology to study the mechanism of plant diseases by examining the interactions between pathogens responsible for causing disease and the organelles of plant cell[5]. For the efficient transportation of chemicals such as fertilizers, growth regulators, herbicides, insecticides etc, nanoparticle acts as vector[5, 6].

Enhanced Stego-Crypto Techniques of Data Hiding Through Geometrical Figures in an Image

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Abstract— Cryptography is a technique for secret communication where as obscuring the secret communication using for different data is Steganography. The secret communication is carried through many sources like image, audio & video files. Our work is mainly proposing data hiding by embedding the message of interest using geometric style of cryptographic algorithm, thus providing high security. Wavelet and curvelet transform algorithms are used to perform pre-processing of images.

Even if the image carrying embedded data i.e., Stego image undergoes a reverse operation and data cannot be extracted if the receiver is unaware of the exact coordinates of the geometric shape. Hence retrieving secret image for an attacker becomes a hard task. Our Experimental results are verified for both the properties of Cryptography and Steganography it may be applicable for kind of multimedia applications.

Key words—Cryptography, steganography, geometrical way of embedding.

I. Introduction

Today an Internet provides communication between billions of people all around the world. When communication is ascending, security becomes key factor to deal with it. Since Internet communication is entirely digital, the security can be provided in two ways, one is Cryptography and the other is Steganography[9]. Cryptography is considered to the area of both Mathematics and Computer Science. Cryptography is a method of sending an enciphered content so that nobody except the receiver can decipher it. Steganography on the other hand is akin to Cryptography. Though Steganography is an ancient method, modern computer technology has given a new life to it. A combination of both Cryptography and Steganography[14] provides a very high security.

A. Wavelet Transform

In last decade, wavelet transform has been recognized as a powerful tool in a wide range of applications, including image/video processing, numerical analysis, and telecommunication. The advantage of wavelet is that wavelet performs an MRA of a signal with localization in both time and frequency .In addition to this, functions with discontinuities and functions with sharp spikes require fewer wavelet basis vectors in the wavelet domain than sine cosine basis vectors to achieve a comparable approximation. Wavelet operates by convolving the target function with wavelet kernels to obtain wavelet coefficients representing the contributions in the function at different scales and orientations. Wavelet or Multiresolution theory can be used alongside segmentation approaches, creating new systems which can provide a segmentation of superior quality to those segmentation approaches computed exclusively within the spatial domain.

Discrete wavelet transform (DWT) can be implemented as a set of high-pass and low-pass filter banks[5]. In standard wavelet decomposition [13], the output from the low-pass filter can be then decomposed further, with the process continuing recursively in this manner. According to [13], DWT can be mathematically expressed by

$$a_j(n) = \sum_{i=0}^{L-1} l(i) a^{j-1}(2n-1), \quad 0 \le n \le N_j \qquad (1)$$

$$d_j(n) = \sum_{i=0}^{L-1} h(i) d^{j-1}(2n-1), \quad 0 \le n \le N_j \qquad (2)$$

The coefficients $a^j(n)$ and $d^j(n)$ in equation (1) and (2) refer to approximation and detailed components in the signal at decomposition level j , respectively. The l(i) and h(i) represent the coefficients of low-pass and high-pass filters, respectively.

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Enhanced Stego-Crypto Techniques of Data Hiding Through Geometrical Figures in an Image

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Modified Pre and Post Processing Methods for Optimizing and Improving the Quality of VP8 Video Codec

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Abstract: Pre-processing and post-processing algorithms improve on the performance of a video compression system especially by removing spurious noise and insignificant features from the original video data. So that this will increases compression efficiency, attenuates coding artifacts and mainly improving the quality of Video data. And more over existing video compression standards like MPEG, H.26x series are highly computationally expensive and hence they are not suitable for real time applications. Unlike video compression/decompression codec's, video pre- and post-processing algorithms are not much standardized as of now. They might be different by end product. In addition, these algorithms are constantly being updated and new ones regularly appear. One more importance of these techniques are achieving low bit rate, high bit rate reduction while maintaining the best possible perceptual quality, post processing techniques provide one attractive solution. In result, the quality of the images is significantly improved.

Keywords: Post processing, compression, artifacts, Preprocessing, VP8 Video codec, Low Bitrates.

i.Introduction

While digital video-compression codec's are at the heart of the video revival as a hot consumer-product category, these codec's are now standardized for HD (high-definition)[9] and other video products and do not offer much room for product differentiation. Instead, consumer-product developers have discovered that video pre- and post-processing algorithms (performed before video encoding and after video decoding) are the tools they need to make their video applications offerings stand out in a very crowded market.

Video is a sequence of images which are displayed in order. Each of these images is called a frame. This technology (video compression) reduces redundancies in spatial and temporal directions. Spatial reduction physically reduces the size of the video data by selectively discarding up to a fourth or more of unneeded parts of the original data in a frame. Temporal reduction, Inter-frame delta compression or motion compression, significantly reduces the amount of data needed to store a video frame by encoding only the pixels that change between consecutive frames in a sequence. Compression algorithms typically exploit spatial, temporal and psycho-visual redundancies. Present in a video. Some of the widely used video compression algorithms are MJPEG, MPEG series, H.26x series and VP8 Video codecs[1]. In MJPEG (Motion JPEG), each frame is individually coded using the JPEG algorithm. MJPEG does not exploit the temporal redundancies in the video and therefore it results in lower compression. A compression ratio of around 10:1 to 15:1 can be achieved using MJPEG without introducing any visual artifacts. MPEG (Moving Pictures Experts Group) is an experts group set by ISO and IEC. They have come up with standards like MPEG-1, MPEG-2, MPEG-4,H264 and VP8 Video etc. which have been widely used for video compression.

But due to the rapid developments in internet technology and computers, popularity of video streaming applications is rapidly growing in faster way. Therefore today, storing and transmitting uncompressed raw video requires large storage space and network bandwidth. Special algorithms which take these characteristics of the video into account can compress the video with high compression ratios. In a video, the images called as frames are streamed at the rate 25-30 frames per second (fps). The lower the bit rate, the more severe the coding artifacts due to loss of information. The coding bit rate is another important factor that determines quality.

ii.DIGITAL Video HISTORY

So that without doubt, digital compression technology has remade the world of consumer video. At the beginning of the 1990s, digital video was rare and analog video ruled. This was the VCR era. During the early part of the 1990s, the electronics industry dabbled with various digital video experiments such as the video CD (V·CD), digital satellite broadcasting, and various video-streaming computer file formats. Many of these early experiments with digital video used the MPEG-1 video-compression standard, which was developed in the late 1980s and finally approved in late 1992. Perhaps the most notable legacy of the MPEG-1[2] video experiments was the development and wide adoption of the

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Numerical Integration Over a Nonconvex Polygonal Domain for Finite Element Analysis

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Abstract: This paper deals with mesh generation technique over non convex polygonal domain for finite element analysis to evaluate the integral of the form $I = \iint_p f(x, y)dxdy$ where f(x, y) is arbitrary function, P is non convex polygonal domain. evaluated numerically by Gauss Legendre quadrature rule. We present a new algorithm to generate sampling points and its weight coefficients of various order. The performances of the quadrature rules is illustrated with several numerical examples.

Keywords: Numerical Integration, Nonconvex polygonal domain, Gass Legendre Quadrature, Quadrilateral Mesh Generation.

1. INTRODUCTION

Numerical integration is an major role in many solution techniques in engineering and applied science problems with the development of numerical methods. The calculation of integrals of arbitrary functions over nonconvex polygonal domain is one of the most difficult part in solving applied problems in electrodynamics, quantum mechanics, fluid dynamics. The finite element method has become a powerful tool for the numerical solution of a wide range of engineering and applied science problems, FEA has become an integral and major component in design or modeling of a physical phenomenon in various disciplines.

The surface finite element method, which is a special case of the finite element method for solving partial differential equations on surfaces, which requires surface integrals. The integrals arising in practical problems are not always simple and quadrature scheme cannot evaluate exactly. Numerical Integration over triangle, Square region are simple but convex and non convex polygonal domain is challenging task to integration over a arbitrary function. The integration points have to be increased in order to improve the integration accuracy and is desirable to make these evaluations by few gauss points as possible. The method proposed here is termed as Gauss Legendre quadrature rule

From the literature of review we may realize that several works in numerical integration using Gaussian quadrature over various regions have been carried out [1-5]. Gaussian Legendre quadrature over two- dimensional triangle region given in [6-9], In this paper we use Gauss Legendre quadrature method to evaluate integral of arbitrary functions over the non convex polygonal domain.

The paper is organized as follows. In section 2 we derive a new Gaussian quadrature formula over a quadrilateral region, calculate the Gauss Legendre quadrature nodes and weights In section 3. we compare the numerical results with [11]

Formulation of Integrals over a Non convex polygonal domain

The Numerical integration of an arbitrary function f over the Nonconvex polygonal region P is given by

$$I = \iint_p f(x, y)dxdy \qquad (1)$$

$$I = \iint_P f(x, y)dx\,dy$$
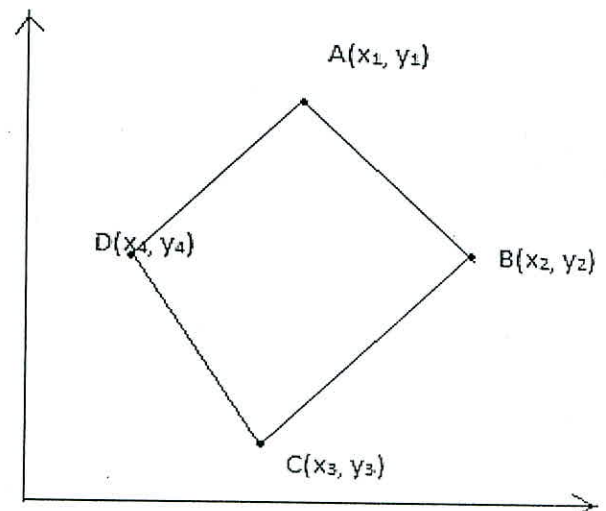
(a) Convex Quadrilateral region in Cartesian space

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ELSEVIER

Synthesis and characterization of Pullulan Acetate coated magnetic nanoparticle for Hyperthermic therapy

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Abstract

Magnetic nanoparticles have attracted increasing attention due to their potential applications in many industrial fields, even extending their use in biomedical applications like in drug delivery system, Implants, biosensors, lab on a chip, image enhancement, hyperthermia therapy and so on.For better experimental applications magnetic nanoparticles are encapsulated. The coating material used in this study is pullulan. Pullulan is a non toxic, non immunogenic, plasma expanders which are coated with the magnetic nanoparticles. Acetylation of pullulan is carried out using Motozato's method and along with this magnetic gel was prepared . Pullulan acetate coated magnetic nanoparticles was the outcome of pullulan acetate and magnetic nanoparticles by solvent diffusion method. The sample was characterized using XRD (X-ray Diffraction), FTIR (Fourier Transform Infrared Spectroscopy), SEM (Scanning Electron Microscopy), VSM (Vibrating Sample Magnetometry) and DLS (Dynamic Light Scattering). Biocompatibility studies show the percentage of cell viability with different concentration of samples. The material was checked for the increase in temperature by varying magnetic field and field intensity.

Keywords: Nanoparticles; pullulan; biomedical applications; Hyperthermia.

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Characterisation and Analysis of Nanosized Fertilizers and their Effect on Cereal Plants

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Abstract : Nanotechnology has been evolved as a great tool in almost all the disciplines of science and technology. It has its major contributions in the field of agriculture, disease diagnosis, medicine and industry. Nanofertilizers, nanoherbicides, nanopesticides have a great impact on the growth and yield of crop plants. This is due to their smaller size which has made them possible to penetrate easily into the plant body through small pores present on plant body. In this paper, investigation was done to study the effect of nanosized chemically synthesized particles on the plant growth and development. Chemically synthesised fertilizers in granule form were grinded to powder form. Further characterization studies were performed to confirm the particle size of fertilizer. Sterilized soil and seeds were used to nullify the effect of microorganism which may affect the plant growth. A comparative study was done between the plants grown by utilizing nanosized fertilizers and granules. The main objective of this study is to make the fertilizers available to crop plant effectively thereby increasing the uptake of them. These in turn reduces the loss of fertilizers by the supply of balanced and sufficient amount of them in nanosize.

Keywords: Nanotechnology, Nanosized fertilizers, sterilized soil, granules, seeds.

1. Introduction:

Agriculture is backbone for national economy. Technology is applied on agriculture to obtain better yield, decrease the product price and improve nutrition and to reduce the hazardous effect of certain chemicals[1]. In this route of development in agriculture sector nanotechnology has been stood forward. Nanotechnology has its unique physical property of tiny particle size which enables it to give novel application in agriculture field. Nanotechnology enhances the plant growth by monitoring them and protects the plants by detecting the diseases. Along with this it also increases the food productivity and quality[2]. In addition to these nanoparticles helps in rapid seed germination and early seedling[3]. When the particles are in nanoscale they show enormous, extraordinary properties which are not possible in the case of large sized particle[4]. It is possible by nanotechnology to study the mechanism of plant diseases by examining the interactions between pathogens responsible for causing disease and the organelles of plant cell[5]. For the efficient transportation of chemicals such as fertilizers, growth regulators, herbicides, insecticides etc, nanoparticle acts as vector[5, 6].

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Application of Bio technology in Treatment of Heavy Metal Contaminated Industrial Waste Water-A case study

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Abstract : Human life, as with all animals and plants life on this planet, is dependent upon water. Effluents from industries like; textile, leather, electroplating, dyes and pigment, metallurgical contain considerable amounts of toxic metal ions. These metal ions pose problems to the water environment as the industries often indulge in discharging waste water into underground and open drains or pit. The potential impacts from leaching operations on the environment are most likely to be experienced as changes to surface and groundwater quality. In this study an attempt has been made to utilize the microbes in treatment of industrial waste water collected from textile, electroplating industries. Studies have been carried out to specifically utilize the selected species of locally available microbial species in treatment of chromium contaminated industrial waste water. Waste water samples were collected from various industries subjected to characterization and compared analysis results. The waste water was subjected to bio remediation process to treat the waste water and the results have shown that the possibility of application Acidthiobacillus microbial community in effective treatment of chromium contaminated industrial waste water.

Keywords : Effluents. Treatment, Acidthiobacillus, chromium.

Introduction:

Water a necessity for life. This vital resource makes up 60 percent of the human body. A person can live no more than 4 to 5 days without water, and we rely on it for drinking, Cooking, bathing, washing clothes, growing food, recreation, industry, and mining, as well as generation of electric power. Water is a renewable resource (Stephen J. Vandas*et. al* 2002). Cr (VI) is toxic, carcinogenic and mutagenic metal ion to animals as well as humans and is associated with decreased plant growth and changes in plant morphology. It is one of the most strategic, critical & highly soluble metal pollutant having wide range of uses in the metals and chemical industries. Chromium exists in the environment in several diverse forms such as trivalent Cr (III) and hexavalent Cr (VI), of which hexavalent chromium Cr (VI) is a so-called carcinogen and a potential soil, surface water and ground water contaminant. Both human beings and animal community are being affected by the increased concentration of chromium metal in the water or soil environment. The main diseases includes, "gastrointestinal bleeding, tuberculosis, asthma, infertility, birth defects, and stillbirths" (Williams N, 1998). Potential health effects after exposure to chromium the chronic allergic contact dermatitis that it can lead to considerable health problems are studied (Malene Barre Hansen *et.al* 2002). Bioremediation is one of the most

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Identification of Hydrologically Active Areas in a Watershed using Satellite Data

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Abstract

Information on the spatial distribution of Hydrologically Active Areas (HAAs) in a watershed is an important input for many applications, such as hydrological modeling, water resource planning and flood estimation. HAAs can be delineated using a wetness index derived from either a Digital Elevation Model (DEM) or from satellite data. The purpose of this study was to develop and apply a methodology to delineate the HAAs in the Harangi ($535 \ km^2$) and Hemavathy ($2974 \ km^2$) watersheds located in Karnataka, India. Spatial distributions of HAAs derived from the DEM and from satellite data (Landsat 7 ETM+ sensor) were compared. It was found that wetness index obtained from satellite data was better able to capture the HAAs in comparison to the use of DEM. The delineated HAAs will be useful in identifying runoff generation areas and improve process representation in distributed hydrological modeling of the watershed.
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Keywords: Hydrologically Active Areas; Wetness Index; Satellite Data; DEM.

1. Introduction

Protection and conservation of Hydrologically Active Areas (HAAs) in watersheds help to achieve long-term water quality and also contributes to the sustainable water resources management. The HAAs is auxiliary to identify the runoff contributing areas and also analyzing movement of pollutants in the watersheds. Although Land Use/Land Cover (LU/LC) changes exhibit significant impacts on HAAs, not every part of watersheds contributes equally to

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An Adaptive Threshold based FPGA Implementation for Object and Face Detection

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Abstract— **The moving object and face detection are vital requirement for real time security applications. In this paper, we propose an Adaptive Threshold based FPGA Implementation for Object and Face detection. The input Images and reference Images are preprocessed using Gaussian Filter to smoothen the high frequency components. The 2D-DWT is applied on Gaussian filter outputs and only LL bands are considered for further processing. The modified background with adaptive threshold are used to detect the object with LL band of reference image. The detected object is passed through Gaussian filter to enhance the quality of object. The matching unit is designed to recognize face from standard face database images. It is observed that the performance parameters such as percentage TSR and hardware utilizations are better compared to existing techniques.**

Keywords— *Discrete Wavelet Transform; Gaussian Filter; Adaptive Threshold; Object Detection and Face Recognition.*

I. INTRODUCTION

The biometrics are classified based on their physical and behavioural characteristic parameters. The physical characteristic traits are fingerprint, iris, palm print, DNA etc., of a person and are constant throughout life span. The recognition using physiological traits are easy and require less number of samples to build high speed real time biometric system efficiently with less complexity. The recognition using behavioural traits are not very accurate and require more number of samples to build real time biometric system. The behavioural biometric traits are signature, voice, keystroke, gait etc., and are time variant parameters.

The general biometric system has three sections to recognize a person viz., pre-processing, feature extraction and matching section. In pre-processing section, the images are resized to convert different sizes into uniform size, colour images are converted into gray scale images to reduce computation complexity and noises in the images are removed to enhance the quality of the images. The features like mean, variance, standard deviation and principal component analysis are extracted in spatial domain by directly manipulating enhanced image. The transform domain features are extracted from Fast Fourier Transform (FFT), Discrete Cosine Transform (DCT), Discrete Wavelet Transform (DWT), Dual Tree Complex Wavelet Transform (DTCWT) etc. The Euclidian Distance (ED), Hamming Distance, Neural Network, Support Vector Machine (SVM) etc., are used in matching section to compute similarities and distance and differences among images.

In this paper we propose an Adaptive Threshold based FPGA Implementation of Object and Face Detection. The preprocessing block, modified background subtraction and adaptive threshold techniques are used to detect moving object and recognize face effectively. One of the major advantages of proposed technique is the adaptive threshold approach is used to compute variable reference values for different object and face image of different persons.

The performance parameters are improved since adaptive threshold, modified background subtraction and filters used in the architecture.

Contribution: *The contribution and novel aspects of the proposed techniques are listed as follows*

(i) The threshold values are computed adaptively based on characteristics of the images.

(ii) The modified background subtraction technique is used on filtered LL coefficients of background image/face database and actual image/test face image to compute absolute difference between LL coefficients of two sets of images. The absolute difference is compared with adaptive threshold values to detect object.

(iii) The object detection architecture is extended to face detection by using global threshold and matching unit blocks.

Organization: *Section 2 briefly reviews literature of recent research papers. Section 3 presents proposed architecture. Hardware implementation is given in Section 4. Section 5 explains Performance analysis of proposed object and face detection architecture. The conclusion is given in section 6.*

II. LITERATURE SURVEYS

Andra et al., [1] proposed four-processor architecture for 2D-DWT which is used for block based implementation for 2D-DWT, which requires large memory. Liao et al., [2]

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An Improved Handwritten Word Recognition Rate of South Indian Kannada Words Using Better Feature Extraction Approach

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Abstract

Ever since the evolution of communication in human day to day activities, hand writing has gained its own impact and popularity. Therefore, Handwritten Word Recognition (HWR) is quite challenging due to heavy variations of writing style,

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A Survey on Opportunistic Channel Scheduling in Cognitive Radio Networks with QoS Guarantees

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Abstract- An opportunistic scheduling policy is being employed in the cognitive radio networks wherein the applicable resources are allocated to the primary users and as well as secondary users by understanding their spectral activities and ranges. But major problem seen here is that secondary users have the capacity to transmit only if primary users are not transmitting. It is very much essential to provide the co-ordination between the primary and secondary users so that the channel is utilized efficiently. From the studies it is proved that a scheduling scheme is used that improve the services received by secondary users and at the same time aims to reduce the collisions with primary users. To effectively utilize the channel, a channel scheduling scheme is being used. Also to overcome delay tolerance(wherein maximum numbers of packet transmissions are done before exceeding the deadline).To keep track of this issue,dynamic priority queue scheduling mechanism is considered.Cognitive radio networks are basically used to improve the capacity of the network;researchers have also shown that these could be implemented from pure theory.

Index terms: Cognitive radio networks,opportunistic channel scheduling.

I.INTRODUCTION

Cognitive radio networks are recent advances in wireless communications, where they aims to improve the radio spectrum that exists already. The key aspect used is the cognitive radio. The cognitive radio dynamically adjusts the operating points over a wide range depending on spectral availability. We know that cognitive radio is the special class of capacity wherein they aim to improve the total capacity of wireless networks. Opportunistic scheduling paradigm included in cognitive radio networks solves various issues such as:i)maximizing the throughput and minimizing interference to primary users.ii)aims to improve fairness among users.iii)co-ordinating channel access,wherein secondary users are allowed to transmit along with the primary users.iv)collisions among the secondary users and Between primary and secondary users should be minimized.v)To serve multiple secondary users within the same network that exhibit different network characteristics. In normal scenario, the primary users are called the licensed users and the secondary users are the unlicensed users, they have the opportunity to transmit only if the primary users are not transmitting.

There are two types of users:

(i)Primary users: These users have the priority access and are subject to QoS (Quality of service) constraints and those must be guaranteed. Primary users are the license holders of the spectrum of their interest.

(ii)Secondary users: These users use the unused spectrum and they have the cognitive ability to communicate while ensuring communication of primary users is kept at certain level.

Cognitive behavior networks that contain cognitive radios should achieve better performance than networks in which cognitive radios are absent. CRN's should achieve better performance because of the following reasons:(1) they are capable of sensing and adapting to their wireless environment and thus they exploit cognitive abilities.(2) exploits policies to enable secondary users to share the spectrum with the primary users. Performance basically depends upon the how the cognitive radios know about their environment and act accordingly.

The three types of cognitive behavior we consider are:

(i)Interference avoiding behavior (spectrum interweave):

Here the secondary users use the primary spectrum without interfering with the primary users. Also primary and secondary signals are said to be orthogonal to each other. They may access the spectrum in TDMA or FDMA fashion and they ensure that primary and secondary signals do not interfere with each other. The secondary users need to know this information.

(ii)Interference controlling behavior (spectrum underlay):

The secondary users transmit over the spectrum that the primary users use to transmit but they do so in a way that the interference seen by primary users from cognitive users is controlled to some acceptable level. This acceptable level is captured by primary QoS constraints. Cognitive radio transmit such that they appear to be noise under the primary signals. Particularly the knowledge with respect to acceptable levels are required for efficient transmission.

(iii)Interference mitigating behavior (spectrum overlay): In this scenario the secondary users transmits along with the

Machining C-45 Steel With Cryogenically Treated and Microwave Irradiated Tungsten Carbide Cutting Tool Inserts

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ABSTRACT: Tungsten Carbide tool inserts have excellent machining properties. But In machining of high strength temperature resistance alloys used in aerospace, marine and nuclear applications, they have failed miserably due to rapid wear. This has forced the machining Industry to bring in innovative changes in process design and application in terms of rigid machine tool and new cooling strategies. However, machining of these new classes of materials is still plagued by low productivity due to rapid wear. In the present work, uncoated Tungsten Carbide cutting tool inserts of geometry SNMG 120408-MR4 have been used. The inserts were cryogenically treated and were subjected to Microwave Irradiation. The inserts were placed on refractory brick, covered with charcoal powder and then heated for 9, 11, 13 mins. The inserts were left to cool to room temperature inside the microwave oven itself. he samples showed appreciable improvement in hardness and microstructure study revealed that carbide phase distribution was fairly uniform with binder phase segregating slightly in few cases. Under all cutting velocities, Cryo-treated and microwave irradiated inserts showed the highest tool life and wear resistance. Microwave heating has significant influence on the phases present in WC+Co inserts and subsequently influences their machining performance.

KEYWORDS; Machining, Cryogenic Treatment, Tungsten Carbide, Microwave Irradiation

I.   INTRODUCTION

Cryogenic treatment refers to the treatment of materials at very low temperatures generally around -1830c which is much lower than cold treatment where temperatures are around -960c.The appreciable changes include the changes in mechanical properties and in the crystal structure of materials. In last thirty years there has been increasing interests in the effects of cryogenic treatment on mechanical properties. Other related works show that both hardness and wear resistance of tool steels can be improved simultaneously through cryogenic treatment.

The present work proposes to study the performance of thermally treated W-CO cutting inserts in machining of difficult to machine alloys like Ti-6Al-4V and Inconel over a wide range of cutting velocity feed combinations. The objective of present work is to evaluate the performance of WC+Co uncoated cutting tool inserts in turning of C-45 steel under following conditions.

As received Cryotreated Cryotreated and microwave irradiated Performance evaluation is carried out by subjecting the inserts to machining (turning) conditions on constant speed Lathe at different feed rates, depth of cut and time intervals. Survey of literature shows that large part of the research work has been limited to cryogenic treatment on ferrous metals. Barron [1] performed abrasive wear tests on a wide variety of steels and concluded that metals which can exhibit retained austenite at room temperatures can have their wear resistance significantly increased by subjecting them to cryogenic treatment. Collins [2] has explained in detail the process of austenite to mortensite transformation and also explains how cryogenic treatment process can be used in combination with austeniting treatment to achieve either increase or decrease in hardness or an increase or decrease in wear in wear resistance for tool steels. Other related works show that both hardness and wear resistance of tool steels can be improved simultaneously through cryogenic treatment. The above detailed literature study has encouraged us to conduct detailed investigations on machining with

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Formation of Al-Zn-Mg Based Hybrid Composites and Investigation on Effect of Reinforcements and Heat Treatment on Hardness

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Abstract. Metal Matrix Composites (MMCs) consist of either pure metal or alloy as the matrix material, while the reinforcement generally a ceramic material. These are important class of design and weight-efficient structural materials that are encouraging every sphere of engineering applications, mainly in aerospace sector. Majority are Aluminum Matrix Composites (AMCs). The key features of AMCs are high specific strength, improved wear resistance, hardness and good thermal conductivity. The present investigation is to form a new class of composite, Al7075 alloy matrix reinforced with E-glass short fibers and fly ash particulates. Different composites were obtained by using stir casting method, varying E-glass with constant fly ash and vice-versa. The MMCs were obtained for the different compositions of E-glass and fly ash particulates. The microstructures of the composites were studied to know the dispersion of the fly ash and E-glass fibers in the matrix. The test specimens were prepared to the standard size by turning and facing operations to evaluate hardness and the specimens were subjected to heat treatment. The results are plotted and it is concluded that the MMCs obtained have got better hardness compared to Al7075 alone. Further, it was observed that hardness of heat treated composites higher when compared to as cast composite.

Keywords: Fly ash, E-Glass, Hardness, Heat treatment.

1. Introduction

Materials are essential part of the engineering industry. An engineer needs materials to give shape to his/her concept and design [1]. In general, materials of high strength will have relatively high density. Materials for aerospace, transportation and structural application should have low density but yet strong and hard. Conventional materials will not posses this unusual combination of prosperities. The mechanical and tribological prosperities of various materials can be improved by forming new class of materials known as composites. A composite material is defined as a structural material formed artificially by combining two or more materials having dissimilar characteristics. A composite is designed to display a combination of the best characteristics of each of the component materials [2]. Metal Matrix Composites (MMCs) consists of either pure metal or an alloy as the matrix material, while the reinforcement generally a ceramic material. Aluminum is the most popular matrix for the metal matrix composites. The Al alloys are quite attractive due to their low density, capability to be strengthened by precipitation, good corrosion resistance, and high thermal and electrical conductivity. Aluminum Matrix Composites (AMCs) are the class of light weight high performance materials. The reinforcements in AMCs could be in the form of continuous/discontinuous fibers whisker or particulates [3, 4]. In the present investigation fly ash and E-glass are reinforced with Al7075 alloy matrix which is a high strength alloy mainly used in aerospace applications [5]. Fly ash is the residue resulting from the combustion of coal in thermal power plants and is one of the inexpensive low dense reinforcement with excellent engineering properties. E-glass is used as reinforcing phase which has excellent fiber forming capability with all round good properties [6, 7].

2. Experimental Work

The matrix material for this experimental investigation is commercially available aluminum Al7075 in the form of ingots. The reinforcements are fly ash particulates in the range of 0.1 to 100 μm and E-glass short fibers of length 2 to 3 mm .The hybrid composite is formed by stir casting method. An electric arc furnace was used for melting the alloy. The ingots of the alloy were cut into small pieces and were put into the crucible which was preheated and then it was kept for melting in the furnace. Molten metal was heated to 800°C. Degassing was carried out by adding chloromethane to remove hydrogen from the molten metal in order to avoid the void formation during solidification. The pre-heated E-

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DESIGN, IMPLEMENTATION AND COMPARISON OF VARIOUS CMOS CHARGE PUMPS

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ABSTRACT

A charge pump is a kind of DC to DC converter that uses capacitors as energy storage elements to create a higher or lower voltage power source. Charge pumps make use of switching devices for controlling the connection of voltage to the capacitor. The use of charge transfer switches (CTSs) can improve the voltage pumping gain. Applying dynamic control to the CTSs can reduce reverse currents. This paper includes voltage and power analysis of various charge pump circuits. And a comparison is drawn between the three charge pumps analyzed.

Keywords: Charge Pump, Charge Transfer Switch, DC-DC Converter, Dickson Charge Pump, Dynamic Charge Pump, Static Charge Pump.

I. INTRODUCTION

Charge Pump (CP) is an electronic circuit that converts the supply voltage V_{in} to a DC output voltage V_{OUT} that is several times higher than V_{in} (i.e., it is a DC-DC converter whose input voltage is lower than the output one). Unlike the other traditional DC-DC converters, which employ inductors, CPs are only made of capacitors and switches (or diodes), thereby allowing integration on silicon [1]–[2]. CPs were originally used in smart power ICs[3]–[6] and nonvolatile memories [7]–[13] and, given the continuous scaling down of ICs power supplies, they have also been employed in a vast variety of integrated systems such as switched capacitor circuits, operational amplifiers, voltage regulators, SRAMs, LCD drivers, piezoelectric actuators, RF antenna switch controllers, etc. [14]–[23]. Charge pumps usually operate at high frequency level in order to increase their output power within a optimum size of total capacitance used for charge transfer. This operating frequency is adjusted by compensating for changes in the power requirements and saving the energy delivered to the charge pump.

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DESIGN, IMPLEMENTATION AND COMPARISON OF VARIOUS CMOS CHARGE PUMPS

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Life Estimation of a Steam Turbine Blade Using Low Cycle Fatigue Analysis ☆

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Abstract

This work is primarily focused in utilising a technique to assess low cycle fatigue life of steam turbine blade. Two approaches are employed here, first is based on the linear elastic finite element analysis. Fictive elastic results are recalculated using Neuber's rule. Second approach is based on elastic-plastic Finite Element analysis (FEA). Strain amplitude approach is followed through Universal slope method and Coffin-Manson equation to determine the number of start-up and shut down cycles

Proper blade design with conservative stress levels is important for reliability in rotor blade design. Finite Element Analysis based fatigue tools enable reliable fatigue life calculations to be done at the design stage of a development process and a proper design methodology is important to predict the catastrophic failure of turbine blade due to fatigue.

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Keywords

Low cycle fatigue; Steam turbine blade; Fatigue life estimation; Universal slope method (USM)

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The scanning of paper documents followed by the storage, retrieval, display, and management of the resulting electronic images, is known as document image processing, which is a subfield of Digital Image Processing. The main objective of the document image analysis is to recognize the text and graphics components in the images. Optical Character Recognition [OCR] is the process of converting the image obtained by scanning a text or a document into machine-editable format. OCR has practical potential applications in writer identification, forensic analysis handwriting, health care, legal, banking, postal services, etc. Recently, handwriting recognition is now gain spread lot of importance due to sources such as paper documents, photographs, touch-screens and other devices. In this paper we study the impact of grid based approach in offline handwritten Kannada word recognition. Popular subspace learning method, i.e. Principal Component Analysis is used for better representation of the given input word. The study is experimented on handwritten word comprising of 28 district names of Karnataka state. The experiment suggest grid based approach outperforms the standard global based approach.

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Stereo for Robotic Application in Spacecraft

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Abstract— In the areas like Robotic navigation of rover on unknown environment, Robotic gripper/Arm navigation, 3D reconstruction is required. The scene in the real world captured using camera constricts the 3D information of the scene to 2D information of the image due to its projection on the 2D image plane. In computer vision 3D reconstruction is one of the major problem. Stereo is one of the method for 3D reconstruction from 2D image. Correspondence problem is one of the major problem in stereo vision, the searching of correspondence matching pixel can be either 1D search or 2D search, but the former will reduce the time consumption and complexity. Thus, in this paper rectification is performed on uncalibrated stereo images and converted to calibrated stereo images. Disparity is estimated using Hierarchical method and intermediate disparity is estimated using Mutual information method (MI). MI is less sensitive to intensity variation between stereo images as compared to Sum of absolute differences (SAD), Sum of squared differences (SSD) and Normalised cross correlation (NCC) disparity estimation methods.

Keywords— Disparity, Rectification, Hierarchical disparity estimation method, Mutual information (MI).

I. INTRODUCTION

The actual information of the scene in the real world is 3D, projection of 3D information of the scene on 2D image plane when it is captured using camera, it always contracts 3D information of scene to 2D information of the image. One of the major problem in the computer vision is reconstruction of the 3D information, in this paper stereo images are used to reconstruct the 3D information by estimating the disparity. The disparity estimation using the stereo images is shown in the Fig. (1) below,[1][8]. And also the disparity which is estimated using stereo images is related to the depth (Z), Z is the 3rd co-ordinate which is missing when the scene is captured using camera. The relation between the disparity and 3rd co-ordinate which is missing is shown in the formula (1)

$$Z = \frac{(b \cdot f)}{(x_l - x_r)} \quad (1)$$

Where,

b = the baseline distance (distance between the axis of two cameras)

f = focal length of the cameras

z = depth to be computed and

d = x_l-x_r is the calculated disparity

x_l = Distance of point projection in left Image plane from left camera axis

x_r = Distance of point projection in right Image plane from right camera axis
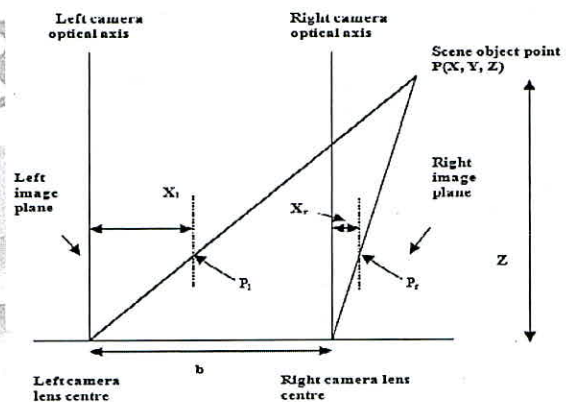

Fig 1. Disparity estimation from a stereo system

Reconstructed 3D information is used in Robotic navigation of rover on unknown environment, Robotic gripper/Arm navigation (Docking/space debris removal), robotic navigation for bomb deactivation, Biomedical/Industrial instrumentation etc.

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