Abstract - ID: 44

Author(s):	Hind Al-Yahya **(Presenter)**, Imam Abdulrahman Bin Faisal University AlHanouf AlZamil, Imam Abdualrhman Bin Faisal University fatimah Al-Alaiwy, Imam Abdulrahman bin Faisal University Fatimah Al- Janubi, Imam abdulrahman bin faisal university Wafaa Mohammed, Imam Abdulrahman bin Faisal University
Are you an invited speaker/presenter to ICRM2018?:	No

Title: Microwave Imaging System Using Ultra-Wideband Antenna for Intracerebral Hemorrhagic Stroke Detection

Abstract:

Stroke is an impeded blood supply to some parts of the brain. The main types of stroke are ischemic and hemorrhagic. In Saudi Arabia, 31% of stroke patients are diagnosed with hemorrhagic stroke. Computed tomography (CT) and Magnetic Resonance Imaging (MRI) are widely used for stroke detection. However, CT could be harmful with its high radiation dose over a long-period of time. Moreover, the time-consuming process and low sensitivity of MRI to identify intracerebral hemorrhagic (ICH) in earlier stage place actual limitations on its performance. In contrary, microwave imaging systems could be considered as an alternative or assistive tool to diagnose stroke. In this work, we adopt an Ultra-wideband (UWB) antenna for microwave imaging as it features compact size, low cost for implementation, and low power consumption. The aim of this project is to design a system using UWB antenna with a frequency range of 1- 4 GHz. The proposed system will be designed and tested to detect the ICH stroke using CST ® software. Preliminary results show the possibility to design such an antenna. Currently, we are optimizing the geometrical dimensions in order to minimize the return loss. Later on, a realistic head phantom will be fabricated to test the validation of the designed antenna experimentally. The measurement data will be used to reconstruct the image using MATLAB ® software. A comprehensive systematic study will be carried out regarding the sensitivity and the spatial resolution. In future, such a system is expected to overcome the limitations of the current modalities.

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Please provide details:	it is our senior design project in partial fulfillment of the requirements for the award of the degree of Bachelor of Science in Biomedical Engineering.
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Abstract - ID: 54

Author(s):	Nahed Solouma **(Presenter)**, King Faisal university Hadeel Al-Humam, King Faisal university
Are you an invited speaker/presenter to ICRM2018?:	No
Title:	Diffuse Optical Imaging for Medical Applications

Abstract:

Diffuse optical imaging is a recent modality that has been adverted for research one decade ago. This technique is based on measuring the absorption and scattering coefficients of biological tissues after excitation by near infrared spectrum. The values of these parameters differ markedly by different spatial distribution of physiological molecules and hence the ability to reconstruct an image. The absorption coefficient and scattering coefficients of biological tissues are considerably large, so data are collected from diffuse light to get information about their differential nature.

The aim of diffuse optical imaging is to produce a spatially-resolved images that reveals structural as well as functional information based on the optical tissue parameters. Diffuse optical imaging (DOI) is now widely investigated for different applications such as brain tumor diagnosis. The DOI is assumed to outperform other imaging modalities such as MRI, and CT because of its safety and foreseen efficiency. Recently, the DOI technique provides two different imaging schemes tomographic and topographic. Using tomographic scheme, a 3D image can be produced that is very important for proper diagnosis and treatment planning. The topographic scheme produces 2D images indicating the structural features of the tissue.

With DOI, the image is reconstructed using different mathematical methods such as the back projection methods used for CT image reconstruction. The aim of this work is to provide an extensive review about the work previously done in the area of diffuse optical imaging. A plan for proposing modified techniques for data detection and image reconstruction is also proposed.

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Abstract - ID: 60

Author(s):	Mohammed Hanash **(Presenter)**, King Abdulaziz University
Are you an invited speaker/presenter to ICRM2018?:	No

Title: Optimized image features for computer-aided diagnosis of breast cancer from digital mammograms

Abstract:

With the fast growth of screening mammography, the task of radiologic examination of the large volume of images produced by radiologists available is overwhelming. Therefore, the use of computer-aided diagnosis (CAD) systems has gained popularity for use as a second reader to enhance diagnostic accuracy and lower workload on radiologists. In this work, we report the methodology, implementation details and results of a new CAD system aimed to detect early signs of breast cancer from digital mammograms. The proposed system has four major stages. First, image preprocessing is implemented to enhance the peripheral region of the breast for density compensation and then a region of interest (ROI) is extracted by using a window of size 32×32 pixels. Then, an extensive set of quantitative textural features comprising over 700 quantitative attributes are extracted. The features considered included statistical, spectral, wavelet transform, and Zernike moment based features. Subsequently, such features are carefully examined to find the most relevant features using seven different feature selection methods to remove irrelevant and redundant features. Finally, several classification methods are utilized to reach a diagnosis based on the optimized set of features including k-nearest neighbor, support vector Machines, discriminant analysis, as well as artificial neural networks. The proposed system was applied to 144 images obtained from the dataset of the Mammographic Image Analysis Society (miniMIAS), divided into independent training and testing sets. The experimental results showed correct diagnosis for all images in the testing set and suggest the potential of the new approach for clinical utility.

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Abstract - ID: 65

Author(s):	Maryam Bushra **(Presenter)**, King Faisal University Maymounah Alshajajeer, King Faisal University Noura Alsady, King Faisal University Nahed Solouma, King Faisal university
Are you an invited speaker/presenter to ICRM2018?:	No

Title: Computer-Aided Diagnosis of Brian Tumors from MR Images

Abstract:

Computer-aided diagnosis/detection (CAD) systems and technology can assist radiologists in interpreting medical images by using dedicated computer systems. This would improve their diagnostic capabilities in addition to reducing the time required for accurate diagnosis. Because of its attractive features (non-invasiveness, no use of harmful radiations) and ability to provide multispectral image data of the same subject, magnetic resonance imaging has proven to be the most suitable mode of image acquisition in case of brain tumor detection. The generic methodology of CAD system integrates two major steps: feature extraction and classification. To extract features from images, those images should be pre-processed first for noise removal and enhancement. Image segmentation may also be required for better feature extraction. Dimensionality reduction is then applied to the obtained features to get the most discriminant set. The classification algorithms can then be applied to the set of discriminant features to classify the images accordingly and suggest a diagnosis. Recently, the integration between feature extraction and dimensionality reduction algorithms and the use of hybrid intelligent systems for classifier design led to developing robust CAD schemes with clinically acceptable accuracy and higher detection success rates. Because of its importance for the workers in the healthcare community, we aim to present an extensive review of the CAD systems as applied to automatic detection of brain tumors. This is foreseen to help plan for future work that improves the quality and efficiency of CAD systems.

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Abstract - ID: 502

Author(s):	hadeel al afif **(Presenter)**, IMAM ABDULRAHMAN BIN FAISAL UNIVERSITY IJLAL ATEEQ, Imam Abdulrahman Bin faisal University wala'a al swiket , University of Dammam maryam Al alawi , . Zahra Al Rabie, . Fatimah Alshafei, . Gameel Saleh, Department of Biomedical Engineering, College of Engineering, Imam Abdulrahman Bin Faisal University

Are you an invited speaker/presenter to ICRM2018?:	No
Title:	WIRELESS BLOOD PRESSURE SELF-MONITORING SYSTEM

Abstract:

Mobile phone technology using wireless monitoring tools are now widely available and can positively affect healthcare awareness and clinical improvement. This project is designed specially to help individuals aware about their blood pressure level by giving an alarm in abnormal conditions. In addition, the measurements are sensed non-invasively, and the result are presented in phone application and transmitted via wireless technology. The main stages are analog signal circuit, microcontroller circuit, and transmission circuit. The first stage is designing a detection device, attached to individual's arm through a cuff, consist of detecting unit, sensing instrument, and a control unit. The detecting unit is implemented by simulating the analog signal circuit using Multisim software. The processes of blood pressure measurement start from sensing and gathering a physiological signal from the user. Then, the signal is filtered by a Butterworth bandpass filter with a frequency range of 0.8-38 Hz. After that, the filtered signal is sent to a pulse rate trigger circuit for generating trigger pulses, which is sent to a microcontroller unit in the second stage. The microcontroller circuit would be implemented to control motors, record results, and alarm users. In the last stage, the results would be transmitted via wireless technology to a mobile phone. In conclusion, the discussed approach of the design integrates the users' health and safety into high accuracy and low-cost systems.

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Abstract - ID: 503

Author(s):	Rehab Al Zhrani **(Presenter)**, Imam Abdulrahman Bin Faisal University Reem Alfadhli, IAU Alaa Elesh, Imam Abdulrahman bin faisal university Eman Almusywel, Imam Abdulrahman Bin Faisal university Haneen Mauqtari, Imam Abdulrahman Bin Faisal university
Are you an invited speaker/presenter to ICRM2018?:	No

Title: Wireless Periodic Diagnosis of Some Vital Signs for Chronic Patients Using HARRE Drone System

Abstract:

Chronic disease is a persistent disease such as diabetes, hypertension, and heart failure. These kinds of diseases need a periodic examination so, the patient needs to go to the hospital every three months for the diagnosis. With time, hospital visits for periodic diagnosis become tiring to the patients. Also, other patients may forget their appointment or have transportation problems. Therefore, this project which is called HARRE system has been designed to find a faster and easier way for a periodic examination of chronic disease patients. HARRE system is a wireless periodic diagnosis system which will be built inside a box attached to the bottom of the drone. This system is used as a communication bridge between chronic disease patients and doctors. Furthermore, HARRE system has 3 main parts: wireless periodic monitoring circuit, drone, and a medical phone application. The wireless periodic monitoring circuit will measure some physiological parameters which include: ECG, temperature, SpO2 and heart rate. This report will explain the details used to construct HARRE system and highlight its features.

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Abstract - ID: 504

Author(s):	Sara Alatrash **(Presenter)**, Imam abdulrahman Bin Faisal University Layla Alawwad, IA university Alaa Al Saeed, Imam Abdulrahman Bin Faisal University Fatimah Almughalleq, Imam Abdulrahman Bin Faisal University Ala'a AL-abdrabalnabi, Imam Abdulrahman Bin Faisal University
Are you an invited speaker/presenter to ICRM2018?:	No

Title: Automated Closed-loop Intravenous Anesthesia Delivery Model using proportional-integral-derivative (PID) Controller

Abstract:

Anesthesia is applied to the patient by the anesthesiologist during the surgery to provide a temporary state of unconsciousness for the patient. Applying the anesthesia by the intravenous method is extremely critical and may result in severe complications if done improperly. Many of these complications can be avoided by applying and maintaining the correct drug dose. Therefore, in this project, a design for an automated closed-loop intravenous-anesthesia delivery model is proposed. The main objective of this project is to ensure that the dose is within acceptable confidence interval from a set point. A Proportional, Integral, and Derivative (PID) controller is used to automatically control the delivery of the propofol anesthetic drug leading to the regulation of the depth of hypnosis state of anesthesia based on the patient's consciousness feedback from a bispectral (BIS) monitor.

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Abstract - ID: 505

Author(s):	Reema Althabit **(Presenter)**, Imam abdulrahman bin faisal Fatimah Al-Filfil, Imam Abdulrahman Bin Faisal University Hussah Alateeq, Imam abdulrahman bin faisal university
Are you an invited speaker/presenter to ICRM2018?:	No

Title:	Design and Implementation of Electrooculogram EOG Based Prototype System

Abstract:

Electrooculogram signal acquired from a bi-channel signal acquisition system and processed for its use in biomedical instrumentation systems. EOG signal has weak amplitude varies from 10 – 200 microV, with frequency ranges from DC to 25Hz, which makes it very difficult to be acquired and processed. Moreover, the signal is interfered by many sources of noises surrounding the eyes such as face muscles, eyelid movement and blinking. Therefor, filtering and amplification was applied in order to get clear usable signal. In this project, we aim to empower people with disabilities, by enabling them to control their environment, using the movement of their eyes. Multisim and Arduino are used to simulate and process the signal.

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Abstract - ID: 517

Author(s):	Meernah Al-Abdullah, Imam Abdulrahman Fisal Dana Alotaibi, Imam Abdulrahman bin Faisal University Fatimah Alsafwani **(Presenter)**, Imam abdulrahaman bin faisal university Mona Alhawaj, Imam Abdulrahman Bin Faisal University Noor Alhawaj, Imam Abdullrahman bin Faisal University Mahbubunnabi Tamal, Imam Abdulrahman bin Faisal University Maram Alqarni, Saudi Arabia
Are you an invited speaker/presenter to ICRM2018?:	No

Title:	Smart phone: a cost-effective point-of-care (POC) medical device for non-invasive diagnosis of anemia.

Abstract:

Anemia is a condition that is generally caused by a lack of iron in the human body which leads to a reduction in the number of red blood cells. If untreated, iron deficiency anemia can make the body more susceptible to illness and infection since lack of iron affects the body's natural defense system (the immune system). It is thus important to treat anemia at relatively manageable stage before it can lead to more serious complication specially for pregnant women, babies and elderly people. The first step of managing anemia is to detect it as early as possible. At present, for detection and monitoring anemia, patients need to visit hospital or health care clinic to provide blood through the puncture of the skin at regular intervals which is invasive and painful. To facilitate the process of detecting and monitoring anemia as and whenever required, a point-of-care (POC) device for anemia detection using smart phone camera is proposed in this work. It is based on the principle that reflected monochrome lights with various wavelengths directed towards finger tips can be correlated with the blood hemoglobin concentration. One of the major limitations of the smart phone camera to be widely used as a point-of-care (POC) medical device for anemia detection is that each phone provides different colorimetric measurements. This proposed work also aims to address this issue by incorporating a chromatic calibration factor for each individual smart phone that would enable each smart phone model to non-invasively detect anemia accurately and precisely.

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Please provide details:	It's a senior design project (SDP) by students from Imam Abdulrahman Bin Faisal University, engineering college, biomedical department.
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Abstract - ID: 521

Author(s):	Najla Alashban **(Presenter)**, King Fahad Specialist Hospital Fatima Sibaii, Mechanical & Materials Engineering, College of Engineering, University of Nebraska Lincoln Haneen Alkhateeb, Department of Biomedical Engineering, College of Engineering, Imam Abdulrahman Bin Faisal University, P.O. Box 1982 Fatma Hegazi, Department of Biomedical Engineering, College of Engineering, Imam Abdulrahman Bin Faisal University, P.O. Box 1982 Mariam Hegazi, Department of Biomedical Engineering, College of Engineering, Imam Abdulrahman Bin Faisal University, P.O. Box 1982 Gameel Saleh, Department of Biomedical Engineering, College of Engineering, Imam Abdulrahman Bin Faisal University
Are you an invited speaker/presenter to ICRM2018?:	Yes

Title: The Enhanced Meander Dipole Radiofrequency Coil for 7 Tesla Magnetic Resonance Imaging Machines

Abstract:

In this paper, the meanders lengths, widths and separations of a well-established meander dipole Radiofrequency (RF) coil/antenna that is used for 7 Tesla MRI applications was investigated and improved. The magnetic (H) and electric (E) fields measurements of all changes in meander parameters were taken 30 mm above the coil, in a horizontal plane 10 mm inside a rectangular homogeneous phantom. The phantom emulates the human body tissues, and is placed 20 mm above the coil. The H-field to E-field ratio (H/E), in A/V, is used as a figure of merit (FoM). For all changes in meanders lengths, widths, and separations, the FoMs is calculated and compared to determine the efficient design that maximizes the H-field and/or minimize the E-field. Maximizing the H-field will improve the quality of the scanned images, and minimizing the E-field will reduce the specific energy absorption rate SAR inside the phantom and assure the health and safety design constraint. Using the optimal coil parameters, the E-field reduced (improved) from 49.5 V/m in the reference coil to 42.7 V/m in the enhanced meander coil design. Though the H-field decreased from 1.03 A/m in the reference coil to 0.988 A/m in the enhanced design, the FoM value in the enhanced coil exhibited an improvement compared to the reference coil by an amount reached to 11.3%. The peak SAR of the enhanced meander dipole RF coil achieved 1.32 W/kg, which is within the FDA and IEC limits.

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