Faculty Of Information Technology
Islamic University Of Gaza - Palestine

Faculty Of Computers and Information Technology
Al-Aqsa University - Gaza - Palestine

PICICT 2021

المؤتمر الفلسطيني الدولي لتكنولوجيا المعلومات والاتصالات
The Palestinian International Conference on Information and Communication Technology

28-29 SEPTEMPER 2021

Sponsored by

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الاتصالات
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PICICT 2021 General Chair's Message

Dr. Iyad M. Alagha
Associate professor of Computer Science
Faculty of Information Technology
Islamic University of Gaza

Dr. Mohammed A. Awadallah
Associate professor of Artificial Intelligence
Faculty of Computers and Information Technology
Al-Aqsa University

It is a great pleasure for us to welcome you to the Palestinian International Conference on Information and Communication Technology (PICICT 2021), September 28-29, 2021. PICICT 2021 is jointly organized by the Faculty of Information Technology at the Islamic University of Gaza (IUG), and the Faculty of Computers and Information Technology at Al-Aqsa University (AQU). PICICT 2021 aims to unify the efforts of the two faculties to attract the best researchers in Palestine and the region. This is the third conference in the PICICT series after the previous two conferences held in 2013 and 2017, but it is the first to be held in partnership between two Palestinian universities. The PICICT Conference has succeeded in creating a forum that brings together researchers from Palestine and the world with the aim of exchanging information and advancing research in information and communication technologies.

This year, the conference received 62 submissions from 8 countries. About 46 reviewers participated in the review process, whereas only 30 papers were accepted for publication by the end of the review process. Our technical program is rich and varies with 2 keynote speeches and 30 technical papers split over 6 presentation sessions during two days of conference. The presentation sessions will be held in person, taking into account the safety and social distancing measures. Meanwhile, the presentations, the opening and the closing sessions will be broadcasted online for those who are unable to attend in person.

PICICT 2021 would not have been possible without the support of our sponsors: The Ministry of Telecom and Information Technology, the Palestinian Telecommunications Company (Paltel), and the Palestine Cellular Communications Company (Jawwal). Thank you so much for your generosity and continued support to the research community in Palestine.

We would like also to thank all colleagues who have contributed in the success of the conference including the members of the organizing committee, the logistics committee, the technical support committee, and the scientific committee. Our thanks also go to all the authors, especially those who submitted papers from abroad and were not able to come to Palestine due to COVID-19 pandemic. We are looking forward to meeting you all, and sharing new and exciting innovations in information and communication technologies.

PICICT 2021 Organizing Committee Chair's Message

On behalf of the organizing committee would like to warmly welcome all the participants of the Palestinian International Conference on Information and Communication Technology (PICICT 2021).

Last year we announced the conference details, and during the process, our work was interrupted by the COVID19 pandemic; which led us to delay the conference. Due to the continuation of the pandemic, The Faculty of Information Technology, at the Islamic University of Gaza, Palestine, in partnership with the Faculty of Computers and Information Technology, Al-Aqsa University, Palestine, decided to organize PICICT 2021 as a two-day hybrid program (Sep 28th to 29th, 2021): It combines an online program with options of remote access to the full materials and sessions, and an in-person program that takes into account safety measures.

PICICT 2021 provides a high-quality forum for scientists and engineers to present and discuss their latest research findings in rapidly changing fields: Information and Communication Technology (ICT) within the world and Palestine in particular.

This year's program includes two keynote speakers: Dr Mustafa Jarrar, Professor Computer Science, Birzeit University and Dr. Shadi Albarqouni, Investigator Group Leader at Helmholtz Center Munich, and TUM Junior Fellow at Technical University Munich, Germany. I am extremely grateful to both of them for accepting our invitation to address the latest research and developments related to building lexical databases for Standard and Colloquial languages, and deep federated learning in lealthcare.

I am pleased that we have a rich list of accepted papers from Arab , regional and global countries. This gives a boost to the content that will be published in IEEE Xplore. The program committee will also award the best paper award.

Last but not least, I would like to express our appreciation to all authors of submitted papers, program committee members, and reviewers for their valuable efforts and contribution toward the success of this conference. I hope that you will enjoy a fruitful conference and have a pleasant stay in Gaza, Palestine.

Dr. Tawfiq S. Barhoom
Associate Professor of Applied Computer Applications
Organizing Committee Chair of PICICT 2021
Faculty of Information Technology, Islamic University of Gaza
http://site.iugaza.edu.ps/tbarhoom

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PICICT 2021 Scientific Committee Chair's Message

On behalf of the conference scientific committees, it is our pleasure to welcome you to Palestine for the Third Palestinian International Conference on Information and Communication Technology 2021 (PICICT 2021) which will be held in the conference halls at Islamic University of Gaza (IUG) and Al-Aqsa University (AQU) on September 28-29, 2021.

In fact, we received 62 research papers from different countries including Turkey, Malaysia, Algeria, Iraq, Palestine, United Arab Emirates, Bahrain, Jordan, India and Saudi Arabia. Around 46 reviewers from several research universities and institutes around the world contribute in the reviewing process and enrich the submitted papers with their valuable comments. Due to the limitations in the conference venue and the increased amount of competition, 30 papers are selected for publication. The accepted research papers explore and cover several research topics including optimization techniques, Artificial Intelligence (AI), communication systems, microcontrollers, web technology, localization and tracking, Internet of Things (IoT), data and networks security, e-learning, and wired and wireless networks. The accepted papers will be either physically, or remotely presented in the conference venues. Furthermore, two keynote speakers are invited for scientific speeches about recent research topics.

We are very grateful to the authors for their contributions and participation in the scientific research, the reviewers for their highly valuable comments, the members of the scientific committee for their huge efforts in the reviewing process, and finally our thankfulness for the conference general chairs and all other conference committees. Hope you enjoy the conference and that it could present you with wonderful memories.

With our warmest regards,

Dr. Eng. Yousef E. M. Hamouda
Chair of Scientific Committee for PICICT2021
Associate Professor in Electronic Engineering and Computer Science
Faculty of Computing and Information Technology
Al Aqsa University.

Committees

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Dr. Zaher Haddad, Faculty of Computers and Information Technology, Al-Aqsa University, Gaza, Palestine.

Dr. Zaid Alyasseri, University of Kufa, Iraq.

Program at a Glance

🕐 Tuesday, 28 Sep 2021	📍 Roots hotel, conference hall
Keynote Talk 1 نحو بناء قواعد البيانات المعجمية للفصحى والعامية	بروفيسور مصطفى جرار
Session 1: Artificial Intelligence and Machine Learning (1)	**Chair: Prof. Alaa El-Halees**
High- Performance Printed Arabic Optical Character Recognition System Using ANN Classifier	Basheer Al-Sadawi, Ahmed Hussain, Nabeel Salih Ali
Forecasting of Covid-19 Using Time Series Regression Models	Akram M. Radwan
Online Recruitment Fraud Detection using ANN	Ibrahim M. Nasser, Amjad H. Alzaanin, Ashraf Yunis Maghari
Document Classification Based on Metadata and Keywords Extraction	Rebhi S. Baraka, Eman Y. Rezqa
The use of Machine Translation to Provide Resources for Under-Resourced Languages - Image Captioning Task	Basem Ahmed, Motaz saad
Session 2: Optimization	**Chair: Dr. Bassem Alijla**
Solving Truss Structures Problem by Size Optimizing using Red Deer Algorithm	Lamees Mohammad Dalbah, Hend Salem Alshamsi, Mohammed Azmi Al-Betar, Mohammed A. Awadallah
Improving Classification Performance for Diabetes with LDA and GA	Abbas F. H. Alharan, Zahraa M. Algelal, Nabeel Salih Ali, Nora Al-Garaawi
Solving 0-1 Knapsack Problems Using Sine-Cosine Algorithm	Khaled Mahfouz, Sharaz Ali, Mohammed Azmi Al-Betar, Mohammed A. Awadallah
Experimenting with Evolutionary Algorithms to Reduce Feature Model Configuration Steps	Dalia Owdeh, Abdel Salam Sayad
Binary Harris Hawks Optimization Filter Based Approach for Feature Selection	Ruba Abu Khurma, Mohammed A. Awadallah, and Ibrahim Aljarah
Session 3: Communications and Networks (1)	**Chair : Dr. Hala El Khozondar**
Wearable Healthcare System Based on Internet of Things	Salam Al-Khammasi, Nabeel Salih Ali
RSS Certainty: An Efficient Solution for RSS Variation due to Device Heterogeneity in WLAN Fingerprinting-based Indoor Positioning System	Iyad H Alshami, Noor Azurati Ahmad, Shamsul Sahibuddin
Smart Health using IOT: Challenges and Solutions	Afia M. Muhammad, Azhar M. Alsunbul, Ahmed M. Zeki

Wind Driven Optimization With Smart Home Battery for Power Scheduling Problem in Smart Home	Sharif Naser Makhadmeh, Mohammed Azmi Al-Betar, Ammar Kamal Abasi, Mohammed A. Awadallah, Zaid Abdi Alkareem Alyasseri, Osama Ahmad Alomari
Pointing Error Angle Effect on the Performance of 10 Gbps Ultra-Long Satellite Optical Wireless Communication	GHALI Fodil, FASSI Benattou, DRIZ Samia

🕐 Wednesday, 29 Sep 2021	📍 Roots hotel, conference hall
Keynote Talk 2 **Towards Deep Federated Learning in Healthcare**	**Dr. Shadi Albarqouni**
Session 4: Artificial Intelligence and Machine Learning (2)	**Chair: Dr. Basem Ahmed**
Extracting Information from Medical Reports	Alaa El-Halees, Maali ELhaj
EEG Feature Fusion for Person Identification Using Efficient Machine Learning Approach	Zaid Abdi Alkareem Alyasseri, Mohammed Azmi Al-Betar, Mohammed A. Awadallah, Sharif Naser Makhadme, Osama Ahmad Alomari, Ammar Kamal Abasi, Iyad Abu Doush
Applying Deep Learning and Natural Language Processing in Cancer: A Survey	Aiman Ahmad AbuSamra, Areej M. R. Al-Madhoun
Detecting and Counting People's Faces in Images Using Convolutional Neural Networks	Yehea Al Atrash, Motaz saad, Iyad Alshami
Noise-Robust Least-Squares Method in TDOA Estimation of a Source Location	Ahmed Waleed Al-Asadi, Nabeel Salih Ali
Session 5: Communications and Networks (2)	**Chair: Dr. Wajdi Halabi**
The Comparative performance of 16 QAM /BPSK -OFDM Scheme over Frequency selective Known and unkown multipath besidess AWGN channel	Mohammed Abdulzahra Ahmed Al-Dulaimi
Development and Characterisation of Compact Wide-band Rejection Metamaterial Filters Using Triangular and Elliptic Split-Ring Resonators	Hichem Boubakar, Mehadji Abri, Mohamed Benaissa

Power and Subcarrier Allocation in Downlink NOMA Systems: Equal Power Allocation and DC Programing Approach	Hafeezul Haq, Necmi Taşpınar
Capacity of FBMC/OQAM Transceiver System with SRRC Filter and Intrinsic Interference for 5G Wireless Communication System	Imad A A Shaheen, Loai Afana
Usage of Intelligent Optimization Techniques for Estimation of Pareto Optimal Front of Spectral Efficiency-Energy Efficiency Trade-off in Massive MIMO Systems	Burak Kürşat Gül, Necmi Taşpınar
Session 6: Security and Software Engineering	**Chair: Dr. Hazem Elbaz**
Mitigating Web Scrapers using Markup Randomization	Noor Khalid Bolbol, Tawfiq S. Barhoom
Alpha-Channel Based Indicator For Robustness Forward-Backward LSB Steganography	Laila AlFaqawi, Tawfiq S. Barhoom, Mohamed J. AbuHaya
Test Cases Prioritization for Component-Based Front End Technologies	Hiba Ghannam, Abdel Salam Sayad
The Effects of Biotechnology Virtual Labs Approach for Enhancing of Understanding 1st Year University Students	Bashaer Abbuod Kareem Musawi, Salmiza Salih, Jabbar Alaridhi, Zaid Abdi Alkarrem Alyasseri

Distinguished Keynote Speakers

بروفيسور دكتور مصطفى جرار Professor , Computer Science, Birzeit University

ملخص

تعــرض المحاضــرة المصــادر اللغويــة التــي تــم تطويرهــا بجامعــة في جامعــة بيرزيــت، وكيفيــة اســتخدام هــذه المصــادر في حوسبة اللغة.
أولا: الأنطولوجيــا العربيــة والتــي صممــت لتســتعمل (Formal Arabic WordNet) حيــث تــم تصنيــف وتعريــف معانــي الكلمــات العربيــة بالإضافــة الــى تجميــع لعــدد كبيــر مــن المترادفــات.
ثانيـاً: أضخــم قاعــدة بيانــات معجميــة للعربية، حيــث تــم حوسبة 150 معجــم وتوحيدهــا في قاعــدة بيانــات واحــدة.
ثالثا: مدونات عامية تم توسيمها وربطها بقواعد بيانات للفصحى.

نبذة

أســتاذ في دائــرة علــم الحاســوب بجامعــة بيرزيــت في فلسطين منــذ عــام 2009. نــال درجــة الدكتــوراه مــن جامعــة بروكســل الحــرة عــام 2005 وعمــل فيهــا كباحــث رئيســي لأربعــة أعــوام أخــرى. حصــل بعــد ذلــك على منحــة الزمالــة «مــاري كــوري» والتــي قضاهــا في جامعــة قبــرص مــا بيــن 2007 و2009. عمــل أســتاذاً زائــراً في كليــة الطــب بجامعــة نيويــورك في بافالــو بالولايــات المتحــدة الأمريكيــة عــام 2017. حــاز على عــدة جوائــز مرموقــة، منهــا: جائــزة عبــد الحميد شــومان للباحثيــن العــرب، وجائــزة محمــد بــن راشــد للغــة العربيــة، ومنحــة غوغــل للأكاديميــين. لديــه أكثــر مــن ســبعين بحثــاً علميــاً محكمــاً في مجــالات الــذكاء الصناعــي، وحوسبة اللغــات، وهندســة البيانــات، والحَوكمــة الالكترونيــة. نظّــم مــا يزيــد عــن عشــرين مؤتمــراً ونــدوةً دوليــة. عضــو في العديــد مــن اللجــان العلميــة الدوليــة مثــل لجنــة IFIP لقواعــد البيانــات ولجنــة الويــب الدّلالــي، ولجنــة IEEE للتعليــم الإلكترونــي، وكان عضــواً في مجلــس محافظــي مركــز الاســكوا في الأمــم المتحــدة لتكنولوجيــا المعلومــات لعــدة ســنوات. مديــر وباحــث رئيســي لأكثــر مــن عشــرين مشــروعاً دوليــاً. أســس معهــد ابــن ســينا لهندسة المعرفــة والتقنيــات العربيــة بجامعــة بيرزيــت وأداره لعــدة ســنوات، كمــا أســس أكاديميــة فلســطين للحَوكمــة الإلكترونيــة، وعمــل مستشــاراً لعــدة مؤسســات دوليــة مثــل الاتحــاد الأوروبــي، والأمــم المتحــدة. ووزارة الاتصــالات الفلســطينية، حيــث قــام بتطويــر إطــار التبــادل البينــي الفلســطيني للحَكومــة الإلكترونيــة المعــروف بزنــار. يعمــل حاليــاً على حوسبة وربــط المعاجــم وبنــاء أنطولوجيــا للغــة العربيــة، حيث أطلــق مؤخــراً محــرك بحــث للمعاجــم العربيــة، وهــو الأول مــن نوعــه عالميــاً.

Keynote Speeech 2: Towards Deep Federated Learning in Healthcare

Dr. Shadi Albarqouni, Associate Professor, Helmholtz AI Young Investigator Group Leader at Helmholtz Center Munich, TUM Junior Fellow at Technical University Munich, Germany

Abstract:

Deep Learning (DL) has emerged as a leading technology in computer science for accomplishing many challenging tasks. This technology shows an outstanding performance in a broad range of computer vision and medical applications. However, this success comes at the cost of collecting and processing a massive amount of data, which are in healthcare often inaccessible due to privacy issues. Federated Learning is a new technology that allows training DL models without sharing the data. Using Federated Learning, DL models at local hospitals share only the trained parameters with a centralized DL model, which is, in return, responsible for updating the local DL models as well. Yet, a couple of well-known challenges in the medical imaging community, e.g., heterogeneity, domain shift, scarify of labeled data and handling multi-modal data, might hinder the utilization of Federated Learning. In this talk, a couple of proposed methods, to tackle the challenges above, will be presented paving the way to researchers to integrate such methods into the privacy-preserved federated learning.

Short Bio:

Shadi Albarqouni is an AI Young Investigator Group Leader at Helmholtz AI and TUM Junior Fellow at TU Munich. Previously, he worked as a Visiting Scientist at Imperial College London and ETH Zurich, and as a Senior Research Scientist & Team Lead at the Technical University of Munich (TUM). Shadi has more than 100 publications (Citations > 2500, h-index: 16) in Medical Imaging Computing, Computer Vision, and Machine Learning published in MedIA, IEEE TMI, IEEE JBHI, IPMI, MICCAI, MIDL, ISBI, ICCV, ECCV, BMVC, and ICML. He serves as a reviewer for many journals such as MedIA, IEEE TMI, IEEE JBHI, and Nature Communication. Shadi has served as a PC and OC member for a couple of MICCAI and NeurIPS workshops. Since 2019, he has been serving as an Area Chair at MICCAI. His current research interests include Interpretable ML, Robustness, Uncertainty quantification, and recently Federated Learning. He is also interested in Entrepreneurship and Startups for Innovative Medical Solutions, in particular, knowledge transfer to developing and emerging countries.
Details can be found here: https://albarqouni.github.io/

Abstracts
of accepted papers

High- Performance Printed Arabic Optical Character Recognition System Using ANN Classifier

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Abstract: Optical Character Recognition (OCR) systems were developed with high accuracy to facilitate transactions and increase human-computer interaction in most levels of government and commerce sectors. OCR has adopted for diverse languages, but there are a few efforts have been conducted in Arabic characters mainly, and it has suffered weakness in the Arabic language. Thus, a new Arabic Optical Character Recognition (AOCR) system is proposed to achieve high-performance functions. AOCR implemented via python language and included several steps such as image preprocessing, segmentation (line, words, and character), feature extraction and classification. The AOCR results have shown accuracy with %95 with different quality document images (spatial resolution) besides the system was effective to resist the degradation of the documents, compared to other commercial systems in the literature.

Keywords: OCR, AOCR, ANN, Horizontal Projection, Vertical Projection

Forecasting of Covid19- Using Time Series Regression Models

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Abstract: *The novel coronavirus (COVID19-) pandemic is a major global health threat that is spreading very fast around the world. In the current study, we present a new forecasting model to estimate the number of confirmed cases of COVID19 in the next two weeks based on the previously confirmed cases recorded for 62 countries around the world. The cumulative cases of these countries represents about %96 of the total global up to the date of data gathering. Seven regression models have been used for two rounds of predictions based on the data collected between February 21,2020 and August 2020 ,31. We selected five feature sets using various feature-engineering methods to convert time series problem into a supervised learning problem and then build regression models. The performance of the models was evaluated using Root Mean Squared Log Error (RMSLE). The findings show a good performance and reduce the error about %70. In particular, XGB and LGBM models have demonstrated their efficiency over other models.*

Keywords: *COVID19-, Forecasting, Predictive Analytics, Machine Learning, Regression Model, Time Series.*

Online Recruitment Fraud Detection using ANN

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Abstract: *Online recruitment provides job-seekers an efficient search and reach for jobs. It also helps recruiters searching for qualified candidates which improves the recruitment process. However, employment scam has emerged as a critical issue. Some job posts are legitimate, and others are fraud. In this paper, an Artificial Neural Network based model is proposed to detect fraud job posts. The public Employment Scam Aegean Dataset (EMSCAD) is used with proper text preprocessing techniques for training and testing the proposed model. The results show that the proposed ANNbased model outperforms similar existing models in detectingfraud jobs.*

Keywords: *Fraud Detection, Text Classification, ANN*

Document Classification Based on Metadata and Keywords Extraction

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Abstract:*We present a model for automatic extraction of metadata and keywords to be used in the classification of scientific documents. The model mainly consists of metadata extraction, keywords extraction and documents classification. At the metadata extraction stage, various metadata items are extracted from research documents in the domain of commerce such title of the thesis/research article, author/s, advisor/s, year, publisher, type, and abstract. At the keywords extraction stage, Latent Semantic Indexing (LSI) is used to extract the underlying topics from these documents. At the classification stage which depends on the metadata and keywords extraction stages, three classification algorithms are used which are Stochastic Gradient Descent (SGD), Linear Support Vector (LSVC) and K-Nearest Neighbor (KNN). SGD has achieved the highest classification accuracy (%80.5) compared to LSVC and KNN when applied to Arabic document corpus. LSVC has achieved the highest classification accuracy (%81.5) compared to SGD and KNN when applied to the English document corpus.*

Keywords: *metadata extraction, keyword extraction, Arabic classification, research repository, machine learning.*

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The use of Machine Translation to Provide Resources for Under-Resourced Languages - Image Captioning Task

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Abstract: *Image captioning is an NLP task that has many applications such as image search and retrieval. This Task is a challenging task and it needs a lot of data (image data and their text captions), which might not be available for some languages. In this work, we investigate the use of a machine translation system to provide resources for a low-resourced language (Arabic) for the imaging captioning task. We train a model on captions automatically translated using Google machine translation service. The performance is measured using the BLEU, ROUGE, CIDEr, METEOR metrics. We compare to English model›s performance. We also evaluate the generated captions on manually translated captions. The results show that machine translation can be good enough for creating resources for low-resourced languages for the image captioning task, and translating training data and building a new model is better than translating the model's output.*

Keywords*: Image captioning, computer vision, natural language processing, NLP.*

Solving Truss Structures Problem by Size Optimizing using Red Deer Algorithm

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Abstract: This paper presents an approach to minimize the truss structures weights with discrete and continuous variables using Red Deer Algorithm (RDA). The RDA is one of the most recent meta-heuristic algorithms presented to solve optimization problems by in 2016 by Amir and Mostafa. This algorithm mimics the breeding season of Scottish red deer animal, starting from roaring and ending with mating. In this paper, the RDA has been evaluated on three truss structure problems and has been compared with other six meta-heuristic algorithms. The results conclude that the RDA had a good performance for the -10bar truss structure, and could enhance the compatibility equivalence constraints to minimize the weight of the bar design, and accelerate the convergence rate effectively. On the other hand, the study demonstrates that the RDA algorithm was effectively used to achieve a good enough solution for the -25 bar problem, and ranked as the fifth algorithm for the -72bar truss structure.

Keywords: Red Deer Algorithm, metaheuristics, optimization, truss structures.

Improving Classification Performance for Diabetes with LDA and GA

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Abstract: *In the modern-day, Diabetic disease is one of the most chronic and appalling diseases humanity is facing. There are 463 million people had Diabetes worldwide and it caused approximately 4.2 million deaths, according to the IDF Diabetes Atlas Ninth edition 2019. Therefore diabetic patients need stateof-the-art healthcare against such diseases and propose early prediction of such diseases to help decrease the risks related to such diseases. In this context, this research, a diabetes diagnosis system has proposed to analyze two different diabetes datasets, namely PIMA Indian Diabetes and data of Dr. John Schorling. Linear Discriminant Analysis (LDA) and Genetic algorithm (GA) methods used for feature selection and four techniques implemented to evaluate the classification are Bagging algorithm, Random forest, Logistic Model Tree (LMT), and JRip algorithm. The results have shown a random forest classifier using LDA and GA obtained better accuracy (%90.89) in DatasetI, while DatasetII is better compared with GA in Random forest, random forest-LDA, JRip-LDA classifiers (%91.4439).*

Keywords: *Diabetes, dimensionality reduction, Classification, LDA, GA.*

Solving 1-0 Knapsack Problems Using Sine-Cosine Algorithm

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Abstract: The task of optimization is no easy task and from a computational point of view, it often involves scanning a large search space to find the best solution that adheres to all the constraints and desired specifications. Designing a customized algorithm to solve several optimization problems is also a challenging task, therefore scientists and engineers utilize metaheuristic algorithms that can provide an optimal solution within a reasonable time. This optimal solution may or may not be the best solution in the search space, but it is usually good enough to satisfy the requirements without spending a lot of computational resources or time. The 1-0 knapsack problem is an constraintbased optimization problem in which a number of items have to be packed into a container by maximizing the value of the items in the container while also adhering to the weight limit of the container. In this paper, sine-cosine algorithm (SCA) is adopted to solve 1-0 knapsack problems. The proposed algorithm is called binary sine-cosine algorithm (BSCA). Due to the binary nature of 1-0 knapsack problem, the SCA is manipulated using a mapping function. The performance of the proposed BSCA is evaluated using 15 well-known datasets. Furthermore, the performance of the proposed BSCA is compared with other comparative algorithms (i.e., GA, PSO, and BFPA) from the literature using the same datasets. It can be observed from the results that the performance of the proposed BSCA is similar to other algorithms by obtaining the optimal results on 10 datasets. While the results of the proposed BSCA are convergent with others for the remaining five datasets.

Keywords: Optimization, Constrained optimization, SineCosine Algorithm, Meta-heuristic, Population-based algorithm,
Knapsack problem

Experimenting with Evolutionary Algorithms to Reduce Feature Model Configuration Steps

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Abstract: *In the software engineering world, software product lines constitute an approach to building reliable software systems. These use feature models to capture, develop, and document shared software for a base system. One of the main challenges when using feature models to derive new products configuration is a way of selecting a configuration that takes under consideration the minimum number of steps and minimum decision-making cost, taking into account resource constraints. To satisfy the challenges of optimizing the configuration selection technique, in this paper, we present an assessment approach that makes use of genetic algorithms to generate the best product configurations from feature models. Our empirical outcomes reveal the effectiveness of the proposed approach in obtaining product configurations that meet the feature model constraints with minimum steps and decision cost, consequently, assist customers in selecting the product configuration that fits their requirements.*

Keywords: *Software engineering, software product line, feature model, product configuration, genetic algorithm.*

Binary Harris Hawks Optimisation Filter Based Approach for Feature Selection

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Abstract: *Feature Selection (FS) is a technique to preprocess huge datasets with irrelevant and redundant features. The main objective of FS is to reduce the dimensionality of a dataset to enhance the performance of the data mining tasks. Meta-heuristic algorithms are promising search engines to be used for traversing the feature space to find a (near) optimal feature subset. Harris hawks optimization (HHO) algorithm is a recently developed meta-heuristic algorithm which is inspired from the hunting strategy of hawk in nature. HHO simulates the intelligent hunting patterns of hawks and the escaping patterns of a prey. The main contribution of this paper is that it proposes two new filter based methods for applying FS in classification problems. The methods integrate the information theory with an HHO algorithm. The first method applies the HHO with the mutual information between any two features. The second method applies the HHO with the entropy of each group of features. The adopted fitness function enhances the performance based on both the number of selected features and the classification accuracy. It gives different weights for relevance and redundancy. The experiments use a decision tree (DT) classifier to evaluate the selected feature subset for the testing parts of five public benchmark software defect datasets. The results show that with proper weights, the two proposed methods can significantly reduce the number of selected features and achieve a higher classification accuracy in most of the datasets. The first method usually selects a smaller feature subset, while the second method can achieve higher classification accuracy.*

Keywords: *Feature Selection, Classification, Harris hawks optimisation, Mutual information, Entropy.*

Wearable Healthcare System Based on Internet of Things

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Abstract: The proposed system aims to make people life easy by reducing human resources more efficiently. Healthcare is one of the important IoT applications and to increase its efficiency, we need to improve patient monitoring tools. At the present time, healthcare is facing many issues, the most important of which is that the patient is in the hospital and is bound by wire mesh for examination. The electronic circuit and database required its choice of several criteria including low cost, easy to program and availability. Hardware components include NodeMCU, Pulse sensor, temperature sensor, and OLED display. In addition, the software components required Arduino program, Visual Studio Code and the web server. This proposed system provides the opportunity for doctors, patients, elderly and their families to be in constant contact with each other, allowing the elderly families and doctors in hospitals to monitor the heartbeat, temperature patient parameters and locate their position by pressing a push button in the wearable device.

Keywords: Healthcare; Monitoring; Sensor; Internet of things (IoT).

RSS Certainty: An Efficient Solution for RSS Variation due to Device Heterogeneity in WLAN Fingerprinting-based Indoor Positioning System

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Abstract: *Fingerprinting method has been adopted widely for WLAN-based indoor positioning because of its effectiveness and the low-cost infrastructure of WLAN. However, the WLAN fingerprinting, based on the received signal strength (RSS), accuracy will be declined due to mobile devices heterogeneity since each device reads RSS differently even at the same location and the same time. This paper presents RSS Certainty (RSC) as an efficient solution for received signal strength variation because of device heterogeneity. The efficiency of RSC has been proved theoretically and experimentally it increases the positioning accuracy by more than %10. RSC-based positioning performance evaluated against the most recent literatures which were proposed to handle the effect of the device heterogeneity such as Weight-RSS (wRSS); Signal Strength Difference (SSD) and Hyperbolic Location Fingerprinting (HLF), and the results show that RSC-based positioning has the best accuracy.*

Smart Health using IOT: Challenges and Solutions

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Abstract: *The importance of the Internet of Things in any field cannot be neglected, its tightening the whole world with the thread of Internet ranges from a small thing to a giant hierarchal structural organization as it is showing its performance in different sectors, smart health is one from them. While discussing the importance of IOT smart health, key contributions of different techniques are discussed in this paper. This research paper covers the contribution of different techniques under the umbrella of smart health. Moreover, critical overview is been highlighted along with gaps in the form of conclusion. On the basis of current status, future is also depicted.*

Keywords: *Internet of things, smart health, privacy, health sensors, biometric, healthcare monitoring system.*

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Wind Driven Optimization With Smart Home Battery for Power Scheduling Problem in Smart Home

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Abstract: The power scheduling problem in smart home (PSPSH) refers to schedule smart appliances at suitable times in accordance with pricing system(s). Smart appliances can be rearranged and scheduled and rearranged by moving their operation times from one period to another. Such a process aims to decrease the electricity bill and the power demand at peak periods and improve user satisfaction. Different optimization approaches were proposed to address PSPSH, where metaheuristics are the most common methods. In this paper, wind-driven optimization (WDO) is adapted to handle PSPSH and optimize its objectives. Smart home battery (SHB) is modelled and used to improve the schedules by storing power at off-peak periods and using the stored power at peak periods. In the simulation results, the proposed approach proves its efficiency in reducing electricity bills and improving user satisfaction. In addition, WDO is compared with bacterial foraging optimization algorithm (BFOA) to evaluate and investigate its performance. WDO outperforms BFOA in optimizing PSPSH objectives.

Keywords: Optimization, Power Scheduling Problem in Smart Home, Wind Driven Optimization, Smart Home Battery.

Pointing Error Angle Effect on the Performance of 10 Gbps Ultra-Long Satellite Optical Wireless Communication

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Abstract: This paper presents the performance analysis of 10 Gbps Low Earth Orbit (LEO) Inter-satellite Optical Wireless Communication (Is-OWC) system. In such systems, the propagation of light (visible or infrared) takes place in Free Space Optics (FSO), in order to transmit data between satellites in the same or different orbits. It is one of the important applications of FSO technology which will be widely deployed in the world in the future due to its many advantages offering high bandwidth, high data rate, small weight, low power and cost compared to the existing microwave satellite communications. However, the limit of this type of link is the difficulty of precise pointing between the transmitters and receivers due to satellites vibrations, which can cause a failure of reception of the laser beam. Here, the effect of pointing error angle on LEO satellite transmission performance as a function of transmitter output power, line coding techniques (Non Return to Zero, NRZ ; Return to Zero, RZ) and intersatellite distance was analyzed using OptiSystem software simulation. The outcomes showed that the proposed system can accomplishes successfully transmission up to 4500 Km with an acceptable Bit Error Rate (BER) threshold.

Keywords: Optical Wireless Communication (OWC), Inter satellite-OWC (Is-OWC), Low Earth Orbit (LEO), Pointing error angle, BER, OptiSystem.

Extracting Information from Medical Reports

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Abstract: *This paper aims to present an Information Extraction (IE) system for extracting knowledge from medical records. We gathered medical records from Gaza hospitals that were written in both Arabic and English. Then, we defined a model for converting unstructured medical text into structured form. Furthermore, association rules were used to create useful rules from structured data. These rules can be used to assist medical personnel in detecting hidden relationships between medical data and making decisions that can enhance patient care. We proposed two approaches to assess our work: objective and subjective. For the objective assessment of association rules, we used support and confidence measures. We used a questionnaire to evaluate the produced rules by medical experts for subjective evaluation. The produced rules were found to be useful by %87 of the medical experts.*

Keywords: *Text Mining, Arabic Information Extraction, Association rules, medical records.*

EEG Feature Fusion for Person Identification Using Efficient Machine Learning Approach

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Abstract: *Recently, the electroencephalogram (EEG) signal presents an excellent potential for a new person identification technique. This paper proposed a new method for EEG feature extraction based on fusing different EEG features. In general, EEG feature extraction can be categorized into three types which are time domain, frequency domain, and time-frequency domain features. This paper also applied several supervised learning approaches to select the efficient classifier for EEGbased person identification. The performance of the proposed method is tested using standard EEG datasets, namely, EEG Motor Movement/Imagery Dataset. The results are evaluated using four common criteria which are: accuracy rate (AccEEG), sensitivity (SenEEG), specif icity(SpeEEG) and F-score (F sEEG). The experiment results show that the fusion approach achieves better results compared with a traditional EEG feature extraction approach. The proposed fusion feature method is recommended to apply in more challenging signal problem instances, such as user authentication or early detection of epilepsy based on EEG signals.*

Applying Deep Learning and Natural Language Processing in Cancer: A Survey

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Abstract: *Artificial intelligence (AI) tools significantly bolstered and facilitated the complexity of forecasting dangers, catching cancer earlier, and predicting the survival after treatment. They are emerging as an adjunct for clinical and medical approaches. In this survey, our concentration was on deep learning, natural language processing, and text mining. These aim to scan, diagnose, and reduce any future negativities of cancer and oncology generally. Moreover, those give a strong variety of structural, systematic analysis and review on such applied techniques.*

Keywords: *Cancer, Oncology, Artificial intelligence (AI), deep learning (DL), natural language processing (NLP), electronic health record (EHR), electronic medical record (EMR), colorectal cancer (CRC)*

Detecting and Counting People's Faces in Images Using Convolutional Neural Networks

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Abstract: *Computer Vision (CV) has so many applications such as but not limited to object recognition, which is a collection of computer vision tasks that involves identifying objects in images. One of CV applications is People counting, and it is useful for automatically counting the number of persons in a class or in a ceremony or in an event. People counting is based on face detection is a challenging task and still an open problem in computer vision. This research investigates two object detection models for detecting and counting people›s faces. The first model is based on Faster-RCNN and second one is based on SSD. These models are deep neural networks which are trained on object detection tasks. In this work, we train Faster-RCNN and SSD models on Wider-Face dataset, which is composed of faces in a variety of conditions relating to occlusion, illumination, expression, pose and scale. The evaluation result on the test part of the wider face dataset is 0.5 of accuracy for Faster-RCNN and SSD, also the Mean Relative Error for the Faster-RCNN is 0.3 and the SSD is 0.4. The Mean Absolute Error for the Faster-RCNN is 7.5 and the SSD is 8.6.*

Noise-Robust Least-Squares Method in TDOA Estimation of a Source Location

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Abstract: *The determination of the target position between a sensor and signal arrival is an essential factor in various spheres of life, including telecommunication and military sectors. In this case, several sensors for detecting sound or other signals in space are used to estimate the position of a source emitting a signal. Typical methods for determining the location of a target often encounter problems when there is noise in the place of the sensors. This paper proposes the least-squares error method that applies the concept of correntropy. The process can robustly detect distortion in the position of the sensors as well as noise produced by it and could thus be used to estimate the target location. Experiments suggest that the method proposed here is superior to the standard least-squares method. Therefore, the innovations implemented include the provision of a new cost function that uses the concept of correntropy by the term exp, which results in higher resistance to noise in the transmitted data and the positions of the sensors. The performance of the technique could be enhanced as a result of the presented method based on convergence rate and reduction of errors. The proposed approach is applicable to signal and instrumentation calculation noises that broaden the sound output time difference.*

Keywords: *Least squares error; Localization; noise; Outliers; Correntropy; TDOA.*

The Comparative performance of 16 QAM /BPSK -OFDM Scheme over Frequency selective Known and unkown multipath besidess AWGN channel

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Abstract: *In this paper, the communication Wireless channel is simulated comprehensively with utilizing orthogonal frequency division multiplexing (OFDM) technique for two different modulation scheme which are Binary Phase shift keying (BPSK) and Quadrature amplitude modulation (16 QAM) .Also the bit error rate (BER) performance of different types of wireless communication channels were observed and evaluated. The simulation is basically carried out by MATLAB where , a wireless communication system with transmitter, channel and receiver are built and coded by. At transmitter side, 16 QAM modulation and OFDM technique were used to modify the input digital signal. Thus, the demodulator of 16 QAM and equalizer of OFDM technique were applied at receiver to recover the signal. Three different types of channel which are Additive White Gaussian Noise (AWGN) channel, known multipath channel and unknown multipath channel were used whose BER performance was obtained and evaluated . The BER is key point to indicate the performance of system is good or not. Moreover, the theoretical results of the BER under different channel were calculated and compared with the simulation results to make sure the simulation is correct. Hence, wireless communication system could have the best performance under AWGN channel among three channels. Also based on this observation, it would always be best to try and have a known multipath channel as a significantly better error performance can be made and the data rate does not necessarily have to suffer. In all the study carried out , there was a significant accuracies of %100 are investigated as all results came out as intended and an accurate positive analysis was able to be made as a result.*

Keywords: *4G, 5G Mobile communication, , OFDM, Wireless communication, Telecommunication.*

Development and Characterisation of Compact Wide-band Rejection Metamaterial Filters Using Triangular and Elliptic Split-Ring Resonators

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Abstract: *Because of its remarkable electromagnetic properties, the artificial substance known as metamaterial has led to important advancements in designing microwave components. In communications systems, filters are extremely essential. As a result, innovative band-stop microwave filters are suggested in this article. These filters are based on microstrip technology and split-ring resonators (SRR) with triangular, and elliptic geometrical forms, where the metamaterial effect can be established using this process. Furthermore, these filters are considered using one, two, and three SRRs cells, in order to have different bandstop widths. Because of its simplicity, edge coupling is the feeding technique chosen for this study. these structures are engineered and configured to operate within the S-band. The simulation findings reveal that changing the geometrical shape of the loops has a significant impact on the filter›s features. to further study, these impacts a quantitative comparison involving the two shapes and the use of a different number of SRRs cells conducted. The findings show that these filters are well suited to a wide range of wireless communication systems depending on the wanted filter size, the range of the rejection band, and the electromagnetic properties.*

Keywords: *Metamaterial, Bandstop filter, split ring resonators, SRR.*

Power and Subcarrier Allocation in Downlink NOMA Systems: Equal Power Allocation and DC Programing Approach

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Abstract: *Recently Non-Orthogonal Multiple Access (NOMA) has emerged as a suitable candidate for 5G systems due to its high spectral efficiency and potential to support the highly demanded massive connectivity for Future Radio Access networks. The main concept and difference of NOMA is to transmit multiple user›s signal on the same sources such as frequency or time and differentiate the user›s signals by splitting into power domain. Power allocation and subcarrier assignment are two main issues in NOMA. In this article, for maximization of the system total sum rate a joint subcarrier assignment and power allocation problem is contemplated. Our aim is to improve the system total throughput and also to maintain a high level of fairness between the users. The total bandwidth of the system is split into subcarriers and only two users are allocated to every subcarrier to minimize the complexity of the system. Two methods are investigated for power assignments to users. In the first methods total power is distributed equally to sub channels as well as power on each sub channel is equally divided into uses on that sub channel, whereas in second method, an algorithm based on Difference of Convex (DC) programing is proposed for power allocation. At last simulation results are observed and compared for the performance of the proposed methods.*

Capacity of FBMC/OQAM Transceiver System with SRRC Filter and Intrinsic Interference for 5G Wireless Communication System

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Abstract: *Filter Bank Multicarrier with Offset Quadrature Amplitude Modulation (FBMC/OQAM) has become the most widely adopted technology in next generation wireless communication system(5G). Moreover, The FBMC/OQAM system supports high data rate, low impulse noise and high bandwidth efficiency. In this paper, capacity of FBMC/OQAM transceiver system using square root raised cosine filter (SRRC) pulse shaping is analyzed through information theoretic. The FBMC systems adopt proper pulse shaping with good time and frequency localization properties to avoid interference and maintain orthogonally in the real field among subcarriers. Moreover, our analytical model is further extended in order to gain insight into the effect of the intrinsic interference in the performance of our system. Furthermore, the spectral efficiency of FBMC/OQAM system is analyzed when the effect of Intersymbol Interference (ISI) and Inter-Carrier Interference (ICI) is considered.*

Keywords: FBMC/OQAM, intersymbol Interference, Inter-Carrier Interference, intrinsic interference, SRRC

Usage of Intelligent Optimization Techniques for Estimation of Pareto Optimal Front of Spectral Efficiency-Energy Efficiency Trade-off in Massive MIMO Systems

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Abstract: Energy saving is gaining importance since the deficiency of resources become more critical day by day. This situation brings high energy efficiency to the agenda in the field of cellular communication, as in many other fields. However, the increase in energy efficiency leads to a decrease in the spectral efficiency, thus reducing the area throughput, which is extremely important for cell communication. One of the solutions suggested to this problem is spectral efficiency-energy efficiency optimizations in massive multi-input multi-output systems. In this paper, the optimum values of the parameters that play a key role for the aforementioned trade-off have been tried to be determined by using three different intelligent optimization techniques. The sample values obtained by optimizations have been compared with true Pareto Optimal Front.

Keywords: massive MIMO; intelligent optimization techniques; energy efficiency; spectral efficiency

Mitigating Web Scrapers using Markup Randomization

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Abstract: Web Scraping is the technique of extracting desired data in an automated way by scanning the internal links and content of a website, this activity usually performed by systematically programmed bots. This paper explains our proposed solution to protect the blog content from theft and from being copied to other destinations by mitigating the scraping bots. To achieve our purpose we applied two steps in two levels, the first one, on the main blog page level, mitigated the work of crawler bots by adding extra empty articles anchors among real articles, and the next step, on the article page level, we add a random number of empty and hidden spans with randomly generated text among the article's body. To assess this solution we apply it to a local project developed using PHP language in Laravel framework, and put four criteria that measure the effectiveness. The results show that the changes in the file size before and after the application do not affect it, also, the processing time increased by few milliseconds which still in the acceptable range. And by using the HTML-similarity tool we get very good results that show the symmetric over style, with a few bit changes over the structure. Finally, to assess the effects on the bots, scraper bot reused and get the expected results from the programmed middleware. These results show that the solution is feasible to be adopted and use to protect blogs content.

Alpha-Channel Based Indicator For Robustness Forward-Backward LSB Steganography

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Abstract: Steganography is important technique for protecting confidential media (text, image, audio, etc.) by embedding it on another media object calling a cover or carrier, subject to no one can discovered. There is a conflict between the developers of Steganography and Steganalysis (detecting hidden messages), Therefore, there must be a rapid development in the creation of complex algorithms to hide information in a way that is difficult to analyze and access. This research introduces a new image steganography technique, Alpha Channel Based Steganography, that differently others algorithms by hiding secret information depending on Alpha Channel where using RGB channels as search space and alpha channel as an indicator for hiding and retrieving confidential data. two least significance bits in alpha channel using to indicate which RGB channel have the secret bit and other two to indicate the rounds number and type (forward and backward search) until secret message end. Using Alpha Channel in the introduced algorithm increase robustness against Steganalysis. Moreover, the capacity of hidden information has also increased due to the quadrupling of the search field in one image, where no visual attack can detect stego image even with maximum hiding capacity. After testing, evaluating and comparing with other algorithms, the proposed algorithm scoring %0 in MSE test, infinite in PSNR test, and 1 for SSIM test, the result of testing indicate that the proposed algorithm achieves the best results according to steganography aspects: imperceptibility, capacity and robustness.

Keywords: Steganography, image, Alpha channel

Test Cases Prioritization for Component-Based Front End Technologies

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Abstract: *Test cases prioritization is an important action that has to be done during the testing phase within the software development life cycle. It helps to add more focus on test cases that have high priority. In addition, it helps to discover defects in early stages therefore cost and time will be managed in an effective way. Recently, for building web applications, component-based architecture frontend frameworks are the most popular used technologies. Hence new test cases prioritization could be connected with frontend components depending on components reusability and their business requirements. In previous research, several solutions were proposed for test cases prioritization. The gap here, that most of these solutions were built for regression testing. Few proposed solutions were generated for new test cases, while these solutions didn't consider the new frontend technologies like React or Angular. This research presented a framework as an automated solution for prioritization of new test cases. Where those test cases represent a web application that is going to be developed using component-based architecture frontend frameworks. The prioritization problem in this research was considered as a multi objective optimization problem where tradeoff has to be done between different objectives. Therefore, the proposed solution considered four genetic algorithms: NSGA-II, IBEA, MOCell and SPEA2. During this research, five datasets were created since there are no available datasets. First one was created manually, while the others were created using a random approach. The randomly generated datasets were created to generate different dataset sizes. This provided an opportunity to study the impact of dataset size on results. This proposed random approach for creating datasets, can help researchers to create any dataset with any required size for testing any similar problem.*

Several experiments were done during this research and using the five datasets. Results for all datasets approved that 30 seconds as a minimum execution time is enough to all mentioned algorithms. In addition, the quality is close to all algorithms. The results also approved that having limited time for testing generates a high-quality solution in less than 30 seconds as execution time for any mentioned algorithm. On the other hand, more available time for testing leads to a more complex problem that reduces the solutions quality.

Keywords: *software testing, prioritization, frontend, React, multi objective optimization, genetic algorithms, new test cases, component based architecture*

The Effects of Biotechnology Virtual Labs Approach for Enhancing of Understanding 1st Year University Students

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Abstract: *Recently, the emphasis on developing laboratory teaching skills for university classes has increased. Past researchers had mainly focused on the need to improve teaching methods to transfer from the teacher is the center of the learning to the student is the center of the learning. Therefore, the main purpose of this paper is to investigate the effects of a biotechnology virtual labs approach to improve the understanding of 1st year students. The sampling of the research selected from the biology department faculty of the education university of KufaIraq has been selected using a purposive sampling technique with a total sample size of 120 students. A standard instrument tool is used to measure the students' understanding of cell biology class which is named the understanding cell biology virtual lab test (UCBVLT). Data obtained from research instruments were then analyzed using SPSS. Independent sample t-test analyses revealed a significant difference in terms of 1st year university student understanding of cell Biology between those who are exposed to biotechnology virtual labs and those who followed the conventional lab activities. In conclusion, the proposed teaching approach (BVL) achieved better results for students' understanding of cell biology. The research is recommended to implement the BVL approach for cell biology class and other science classes. Another important point, the proposed teaching approach (BVL), The proposed learning method can play a crucial role in teaching several sciences classes and be an alternative to traditional education in cases of necessity, as happened at the time of the COVID19- pandemic.*

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