PANDIAN SARASWATHI YADAV ENGINEERING COLLEGE
(Approved by AICTE & Affiliated to Anna University, Chennai)
Madurai - Sivagangai Highway, Arasanoor, Thirumansolai Post, Sivagangai Dt. - 630 561, Tamilnadu
Mobile : 9842102628, 7373002628 Email: info@psyec.edu.in Website : www.psyec.edu.in
City Office : 10, Pandian Saraswathi St, Sivagami Nagar, Narayanapuram, Madurai - 625 014. Telefax- 0452 2682338, Mobile : 98423-02628

Number of M.E Communication Systems Student Undertaking Projects/Field Work/ Internship for the Academic Year 2022-23

Programme Name &Code: Communication Systems &403

Sl. No	Register Number	Name of The Students	Project Title
1	912021403001	BHAVADHARANI A	DESIGN OF FACULT TOLERANTN ADDER USING QCA
2	912021403002	EVANJALIN NIRMALA R	DESIGN OF HYBRID MULTIPLIER FOR LOW-COST CONVOLUTIONAL NEURAL NETWORK (CNN) ACCELERATORS
3	912021403003	KARTHIKA J	MINIATURIZED HIGH GAIN ARRAY ANTENNA FOR 5G SMART PHONE APPLICATIONS
4	912021403004	KURSHIDHA BEGAM P	AN EFFICIENT TECHNIQUE FOR DETECTING CURRENCY COUNTERFEIT USING IMAGE PROCESSING
5	912021403005	MAHESWARI R	DETECTION OF DENTAL CARIES USING NIR IMAGES
6	912021403007	MALINI M	PARTICLE SWARM OPTIMIZATION BASED TAMPER DETECTION
7	912021403008	PREMAVATHI P	HYBRID HONEY BATCHER OPTIMIZATION BASED EEG SIGNAL PROCESSING FOR ALZHIEMER DETECTION
8	912021403009	SOUNDARYA C	THE CHEETAH OPTIMIZER BASED SENSOR NODE LOCALIZATION WITH MINIMAL ERROR RATES

R RAJA Digitally signed by R RAJA Date: 2024.06.29 21:17:10 +05'30'

DESIGN OF QCA BASED ENERGY EFFICIENT ERROR TOLERANT ADDER USING MAJORITY GATE

PHASE II REPORT

Submitted by

A.BHAVADHARANI(912021403001)

in partial fulfilment for the award of the degree of

MASTER OF ENGINEERING IN COMMUNICATION SYSTEMS

PANDIAN SARAWATHI YADAV ENGINEERING COLLEGE

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ANNA UNIVERSITY: CHENNAI 600025

OCTOBER 2023

ANNA UNIVERSITY, CHENNAI

BONAFIDE CERTIFICATE

Certified that this Report titled **"DESIGN OF QCA BASED ENERGY EFFICIENT ERROR TOLERANT ADDER USING MAJORITY GATE"** is the bonafide work of **A.BHAVADHARANI (912021403001)** who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

SIGNATURE
Mrs.P.PADMASRI M.E.,
ASSISTANT PROFESSOR,
OF THE DEPARTMENT
DEPARTMENT OF ECE,
PSYEC
ANNA UNIVERSITY
CHENNAI 600025

SIGNATURE
Mrs.M.NILOBHAR M.E.,
ASSISTANT PROFESSOR, HEAD
SUPERVISOR
DEPARTMENT OF ECE,
PSYEC
ANNA UNIVERSITY
CHENNAI 600025

Submitted for the project vivo voice examination held on 09.10.2023

INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

The field of electronics has undergone significant advancements with the use of CMOS technology in integrated circuits. However, the current CMOS technology is unable to sustain the expected growth levels in the semiconductor industry. To address this challenge and meet the growing demand for faster and denser integrated circuits, nanotechnology has emerged as a promising solution. Quantum dot-Cellular Automata technology (QCA) has gained attention as an effective alternative to CMOS-VLSI, offering advantages such as reduced power dissipation. In this study, we propose an approximate adder implemented with QCA based on majority logic, where the inversion of carry is utilized as the sum for approximate computation. Adders are fundamental components in various applications, and our novel approximate adder aims to reduce circuit complexity, time delay, and achieve a low error rate. The proposed adder achieves circuit complexity reduction by minimizing the number of majority gates in the adder circuit. To validate the operation of QCA circuits, we simulate and verify their functionality using QCA Designer bistable vector simulation.

CHAPTER-6

CONCLUSION

Quantum dot-cellular automata (QCA) emerge as a research area to design nanometre scale logic circuit. In this work , a new QCA based approximate adder's design to perform arithmetic operations is developed. The complete simulation is achieved by different clocking scheme using QCA layout to perform approximate adder operations. The simulation results achieved with minimum cells, area and latency. The comparative study shows reduced delay, latency, power consumption.

DESIGN OF HYBRID MULTIPLIER FOR LOW-COST CONVOLUTIONAL NEURAL NETWORK (CNN) ACCELERATORS

PHASE II REPORT

Submitted by

R.EVANJALIN NIRMALA (912021403002)

in partial fulfilment for the award of the degree of

MASTER OF ENGINEERING IN COMMUNICATION SYSTEMS

PANDIAN SARAWATHI YADAV ENGINEERING COLLEGE

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ANNA UNIVERSITY: CHENNAI - 600025

OCTOBER 2023

R RAJA Digitally signed by R RAJA Date: 2024.07.08 13:25:25 +05'30'

ANNA UNIVERSITY, CHENNAI

BONAFIDE CERTIFICATE

Certified that this Report titled **"DESIGN OF HYBRID MULTIPLIER FOR LOW-COST CONVOLUTIONAL NEURAL NETWORK (CNN) ACCELERATORS"** is the bonafide work of **R.EVANJALIN NIRMALA (912021403002)** who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

SIGNATURE

Mrs.P.PADMASRI M.E.,
ASSISTANT PROFESSOR,
HEAD OF THE DEPARTMENT
DEPARTMENT OF ECE,
PSYEC
ANNA UNIVERSITY
CHENNAI - 600025

SIGNATURE

Mrs.K.THILAGA MEENA M.E.,
ASSISTANT PROFESSOR,
SUPERVISOR
DEPARTMENT OF ECE,
PSYEC
ANNA UNIVERSITY
CHENNAI - 600025

Submitted for the project vivo voice examination held on 09.10.23

INTERNAL EXAMINER

9/10/23
EXTERNAL EXAMINER

ABSTRACT

This work proposes boosting the multiplication performance for convolutional neural network (CNN) accelerators using hybrid multiplier which controls various precision approximate multipliers. Previously, utilizing approximate multipliers for CNN accelerators was proposed to enhance the power, speed, and area at a cost of a tolerable drop in the accuracy. Low precision approximate multipliers can achieve massive performance gains; however, utilizing them is not feasible due to the large accuracy loss they cause. To maximize the multiplication performance gains while minimizing the accuracy loss, this article proposes hybrid parallel adder-based multiplier to improve the speed of multiplication compared to the existing technique. In this technique the partial products of, two consecutive bits (multiplicands), are added simultaneously with the help of a hybrid adder (Hancarlson, Weinberger and Ling adder). The proposed architecture is synthesized and simulated using Xilinx ISE 12.1 with various FPGA boards.

CONCLUSION

In this project a hybrid Toom Cook Multiplier is proposed for CNN accelerators using Hancarlson adder, ling adder, Weinberger adder and BEC circuit. To reduce the delay and area of the multiplier, the final product of multiplier is calculated by each two consecutive multiplicand bits of partial products added simultaneously using different-sized hybrid adders. The simulation is carried out in Xilinx ISE 12.1 using Verilog HDL. The results shows that speed of the proposed multiplier in Spartan 3 FPGA implementation is improved when compared to other multipliers.

MINIATURIZED HIGH GAIN INFINITY STRUCTURE BASEDMIMO ANTENNA FOR 5G SMART PHONE APPLICATIONS

PHASE II REPORT

Submitted by

J. KARTHIKA (912021403003)

in partial fulfilment for the award of the degree of

MASTER OF ENGINEERING IN COMMUNICATION SYSTEMS

PANDIAN SARASWATHI YADAV ENGINEERING COLLEGE

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ANNA UNIVERSITY: CHENNAI 600025

OCTOBER 2023

ANNA UNIVERSITY, CHENNAI

BONAFIDE CERTIFICATE

Certified that this Report titled **"MINIATURIZED HIGH GAIN INFINITY STRUCTURE BASED MIMO ANTENNA FOR 5G SMART PHONE APPLICATIONS"** is the bonafide work of **J. KARTHIKA (912021403003)** who carried out the work under my supervision. Certified furtherthat to the best of my knowledge the work reported herein does not form part of any other the sisor dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

SIGNATURE

Mrs.P.PADMASRI M.E.,

ASSISTANT PROFESSOR,
HEAD OF THE DEPARTMENT
DEPARTMENT OF ECE,
PSYEC
ANNA UNIVERSITY
CHENNAI 600025

SIGNATURE

Mrs.S.JAGARATHUL JALILA M.E.,

ASSISTANT PROFESSOR,
SUPERVISOR
DEPARTMENT OF ECE,
PSYEC
ANNA UNIVERSITY
CHENNAI 600025

Submitted for project vivo voice examination held on 09-10-2023

9/10/23

INTERNAL EXAMINER

9/10/23

EXTERNAL EXAMINER

ABSTRACT

In this work, a novel single layer hexagonal Multiple Input–Multiple Output (MIMO) antenna for Fifth-Generation (5G) 23 GHz frequency band applications is proposed and investigated. The proposed MIMO antenna operates in the Ka-band, which is the most desirable frequency band for 5G mm-wave communication. The dielectric material is a Rogers-5880 with a relative permittivity, thickness and loss tangent of 2.2, 0.56 mm and 0.0009, respectively, in the proposed antenna design. The proposed MIMO configuration antenna element consists of triplet circular shaped rings surrounded by an infinity-shaped shell. The simulated gain achieved by the proposed design is 6.1 dBi, while the measured gain is 5.5 dBi. Furthermore, the measured and simulated antenna efficiency is 90% and 92%, respectively. One of the MIMO performance metrics i.e., the Envelope Correlation Coefficient (ECC) is also analyzed and found to be less than 0.16 for the entire operating bandwidth. The proposed MIMO design operates efficiently with a low ECC, better efficiency and a satisfactory gain, showing that the proposed design is a potential candidate for mm-wave communication.

CHAPTER 7

CONCLUSION

In this work, a novel hexagonal-shaped MIMO antenna is presented that resonates at 23 GHz in the mm-wave band for future 5G communication devices. The proposed MIMO antenna consists of four antenna elements which are arranged with a shift of 90◦. Each antenna element radiating portion consists of four circle-shaped ring patches, which contribute mostly to achieve the operation in the desired frequency band. Furthermore, these four circle-shaped rings surround another circle located at the center; above the feed line in the case of each antenna element, respectively. The isolation achieved for the operating bandwidth is better than −29 dB, demonstrating low mutual coupling. Moreover, the peak gain and total efficiency obtained are 6.1dBi and 92%, respectively, for the operating bandwidth of the proposed MIMO antenna.

AN EFFICIENT TECHNIQUE FOR DETECTING CURRENCY COUNTERFEIT USING IMAGE PROCESSING

PHASE II REPORT

Submitted by

KURSHIDHA BEGAM P (912021403004)

In partial fulfillment for the award of the degree of

MASTER OF ENGINEERING

IN

COMMUNICATION SYSTEM

PANDIAN SARASWATHI YADAV ENGINEERING COLLEGE

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ANNA UNIVERSITY: CHENNAI 600 025

OCTOBER 2023

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this Thesis titled **"AN EFFICIENT TECHNIQUE FOR DETECTING CURRENCY COUNTERFEIT USING IMAGE PROCESSING"** is the bonafide work of **KURSHIDHA BEGAM P (912021403004)** who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported here in does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

SIGNATURE

Mrs. P. Padmasri, M.E
ASSISTANT PROFESSOR
HEAD OF THE DEPARTMENT
Department of ECE
Pandian Saraswathi Yadav
Engineering College,
Arasanoor, Sivagangai-630 561

SIGNATURE

Mrs. M. Nilobhar, M.E
ASSISTANT PROFESSOR
SUPERVISOR
Department of ECE
Pandian Saraswathi Yadav
Engineering College,
Arasanoor, Sivagangai-630 561

Submitted for the project viva voce examination held on 09.10.2023

INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

Finding a fake currency in any countries financial system is always a challenging one. The Reserve Bank is the one which issue bank notes in India. Reserve Bank changes the design of Bank notes for time to time. The Reserve Bank uses several techniques to detect fake currency. Currency circulation brings many problems among peoples like detecting whether the currency is fake or legitimate. Suppose a common people take few of fake currency without his/her knowledge to bank, in this case he/she has to take the blame as banks will not help that person. The government does not give authority to Counterfeit currency. The appearance of the legitimate currency is affected directly, by copying the currency in a manner similar to the reality. The main objective of the project is to identify the fake Indian currency based on the features present in the real note and fake currency by classifying the image of the currency weather it is fake or genuine. The problem of counterfeit currency increasing in our day to day life because of development of modern technology like scanning and color printing. In India to reduce fake paper currency notes of 100, 500, 2000 rupees etc, there is a need or necessary to detect fake currency. MATLAB Coding and Jupyter Notebook software is used to extract the features of the note. The proposed system has got advantages like simplicity and high performance speed.

CHAPTER 10

CONCLUSION

In this paper, an efficient approach is introduced to extract the features of Indian currency notes and recognize it. The paper also contains the fake currency detection and authentication. Our future work will be concentrated on fast and more accurate fake currency detection using advanced image processing techniques. Our future scope will be conversion of currency denomination. Finding the best approach to detect and recognize counterfeit money is a problem that is becoming worse for the scientific world.

This is a Python based system for automatic recognition for fake and genuine Indian currency. This is a low-cost system, using effective and efficient image processing techniques, provide accurate and reliable results at good throughput. The developed code works for detection of all Indian currencies and for fake detection it works with Rs.500, RS 200 etc.

ENCODER MODIFIED U-NET AND FEATURE PYRAMID NETWORK BASED DETECTION OF DENTAL CARIES USING NIR IMAGES

PHASE II REPORT

Submitted by

R.MAHESWARI(912021403005)

in partial fulfillment for the award of the degree of

MASTER OF ENGINEERING IN COMMUNICATION SYSTEM

PANDIAN SARASWATHI YADAV ENGINEERING COLLEGE

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ANNA UNIVERSITY: CHENNAI 600 025

OCTOBER 2023

ANNA UNIVERSITY, CHENNAI

BONAFIDE CERTIFICATE

Certified that this Thesis titled **"ENCODER MODIFIED U-NET AND FEATURE PYRAMID NETWORK BASED DETECTION OF DENTAL CARIES USING NIR IMAGES"** is the bonafide work of **R.MAHESWARI(912021403005)** who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

Mrs.P.Padmasri M.E
Head of the Department
Department of Electronics
and Communication Engineering

Mrs.K.Thilaga Meena M.E
Assistant Professor
Department of Electronics
and Communication Engineering

Submitted for the project viva voce examination held on 09/10/2023

Internal Examiner

External Examiner

R RAJA
Digitally signed by R RAJA
Date: 2024.07.08 13:28:30 +05'30'

ABSTRACT

The automated process for dental caries detection draws increasing attention with the technological innovation in machine learning methods. This is a core issue in dental diseases especially in the detection of caries as it leads to serious health ailments. This work takes an effort to adequately segment and identify dental diseases. The novel technique of segmentation with Encoder modified U-Net with Feature pyramid network is proposed in this work. UNet is the most popular network in medical image segmentation. The encoder-decoder architecture and skip-connection in UNet can capture multi-scale information in medical images.The initial segmentation result of the first stage is used to crop out the ROI region and the ROI is fed to the second UNet. The input image for the second stage keeps the original resolution as much as possible, which can improve the segmentation performance. The proposed model has been implemented using MATLAB and compared against existing algorithm in terms of accuracy, F-score , precision and recall rates.

CHAPTER 7

CONCLUSION

The research work proposes a novel methodology to recognize the cavity from dental images. The proposed strategy has been executed utilizing conventional image processing techniques, by performing segmentation, after image enhancement and illustrate contour for teeth to complete the segmentation step. Moreover, we extracted some features of dental images using EM-UNet-FPN. Extracted data can be performing to get the teeth measurements for dental diagnosis systems. This method is focused on viable classification or diagnosis of dental caries from the images. The acquired outcomes demonstrate a satisfied accuracy of cavity detection in the proposed technique.

AN EFFECTIVE LOW POWER HALFTONING BASED AUTHENTICATION AND SELF-RECOVERY OF TAMPERED IMAGES

PHASE II REPORT

Submitted by

M.MALINI(912021403007)

in partial fulfilment for the award of the degree of

MASTER OF ENGINEERING IN COMMUNICATION SYSTEMS

PANDIAN SARAWATHI YADAV ENGINEERING COLLEGE

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ANNA UNIVERSITY: CHENNAI 600025

OCTOBER 2023

ANNA UNIVERSITY, CHENNAI

BONAFIDE CERTIFICATE

Certified that this Report titled **"AN EFFECTIVE LOW POWER HALFTONING BASED AUTHENTICATION AND SELF RECOVERY OF TAMPERED IMAGES"** is the bonafide work of **M.MALINI (912021403007)** who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

SIGNATURE

Mrs.P.PADMASRI M.E.,
ASSISTANT PROFESSOR,
HEAD OF THE DEPARTMENT
DEPARTMENT OF ECE,
PSYEC
ANNA UNIVERSITY
600025

SIGNATURE

Mrs.M.NILOBHAR M.E.,
ASSISTANT PROFESSOR,
SUPERVISOR
DEPARTMENT OF ECE,
PSYEC
ANNA UNIVERSITY CHENN
CHENNAI 600025

Submitted for the project vivo voice examination held on 09-10-2023

INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

Copy-move forgery is one of the most commonly used manipulations for tampering digital images. Keypoint - based detection methods have been reported to be very effective in revealing copy-move evidences, due to their robustness against various attacks, such as large-scale geometric transformations. However, these methods fail to handle the cases when copy-move forgeries only involve small or smooth regions, where the number of keypoints is very limited. This project proposes a new fragile watermarking based scheme for image authentication and self-recovery for image applications. The proposed scheme locates image tampering as well as recovers the original image. A host image is broken into 4×4 blocks and QR decomposition is applied by inserting the traces of block wise QR into the least significant bit (LSB) of the image pixels to figure out the transformation in the original image. Two authentication bits namely block authentication and self-recovery bits are used to survive the vector quantization attack. The location of authentication bits identified using Particle swarm optimization. The insertion of self-recovery bits is determined with Arnold transformation, which recovers the original image even after a high tampering rate. QR-based watermarking information improves the image authentication and provides a way to detect different attacked area of the watermarked image. The proposed scheme is tested against different types of attacks such as text removal attack, text insertion attack, and copy and paste attack. Compared to the state-other art methods, the proposed scheme greatly improves both tamper localization accuracy and the Peak Signal to Noise Ratio (PSNR) of self-recovered image.

CHAPTER 8

CONCLUSION

In this work, we have proposed a fast and effective keypoint-based copy-move forgery detection and localization technique. This project presents a QR based fragile watermarking scheme using grouped block method to offer more security and provide a supplementary way to locate the attacked areas inside different medical images. PSO utilized to identify best location for embedding authentication bits. Two authentication bits namely block authentication and self-recovery bits were used to survive the vector quantization attack. The usage of Arnold transform makes it possible to recover the tampered region from the neighboring blocks, which ultimately increases the NCC and PSNR of the recovered host.

HYBRID HONEY BATCHER OPTIMIZATION BASED EEG SIGNAL PROCESSING FOR ALZHIEMER DETECTION

PHASE II REPORT

Submitted by

P. PREMAVATHI (912021403008)

in partial fulfilment for the award of the degree of

MASTER OF ENGINEERING IN COMMUNICATION SYSTEMS

PANDIAN SARAWATHI YADAV ENGINEERING COLLEGE

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ANNA UNIVERSITY: CHENNAI 600025

OCTOBER 2023

R RAJA

Digitally signed by R RAJA
Date: 2024.07.08 13:30:05 +05'30'

ANNAUNIVERSITY, CHENNAI

BONAFIDE CERTIFICATE

Certified that this Report titled **"HYBRID HONEY BATCHER OPTIMIZATION BASED EEG SIGNAL PROCESSING FOR ALZHIEMER DETECTION" is the bonafide work of P.PREMAVATHI (912021403008)** who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

SIGNATURE

Mrs. P PADMASRI M.E.,
ASSISTANT PROFESSOR,
HEAD OF THE DEPARTMENT,
DEPARTMENT OF ECE,
PSYEC,
ANNA UNIVERSITY
CHENNAI 600025

SIGNATURE

Mrs. K. THILAGA MEENA M.E.,
ASSISTANT PROFESSOR,
SUPERVISOR,
DEPARTMENT OF ECE,
PSYEC,
ANNA UNIVERSITY
CHENNAI 600025

Submitted for the project viva voce examination held on 09/10/2023

Internal Examiner

External Examiner

R RAJA Digitally signed by R RAJA
Date: 2024.07.08 13:30:21 +05'30'

ABSTRACT

Accurate identification of Alzheimer's disease (AD) with electroencephalograph (EEG) is crucial in clinical diagnosis of neurological disorders. However, the effectiveness and accuracy of manually labeling EEG signals is barely satisfactory, due to lacking effective biomarkers. In this work, we propose a deep learning network-based method for AD identification, which employs the FFT based feature extraction. With the construction of functional network of AD subjects, the topological features of weighted and unweighted networks are extracted. Taken the network parameters as independent inputs, Deep Echo State Networks (DeepESN) -based model is established and further trained to identify AD EEG signals. The metaheuristic algorithm for honey badger optimization is used for parameter tuning to get a higher accuracy. Experimental results of MATLAB demonstrate the effectiveness of the proposed scheme in AD identification and ability of ESN system. This work provides a potential tool for identifying neurological disorders from the perspective of functional networks with EEG signal, especially contributing to the diagnosis and identification of AD.

CHAPTER-7

CONCLUSION AND FUTURE WORK

CONCLUSION

Diagnosis of AD is an important clinical problem. Since EEG is a non-invasive, imple, relatively inexpensive, and potentially mobile brain imaging technologywith high temporal resolution, it seems to be a natural candidate as diagnostictool for AD. Numerous studies indeed confirm the great potential of EEG for diagnosing AD; moreover, some studies show promising results for MCI ("predementia"), which is the stage before AD. However, many crucial issues will need to be addressed before EEG can enter clinical practice for diagnosing AD. The present work explores a novel method of alzimer detection using ESN optimization . These findings suggest that our approach provides new ideas for automatically identify neurological diseases from the perspective of functional networks using MATLAB.

Future , the hybrid model is proposed, A hybrid model for signal classification combines two or more different models to improve the accuracy and robustness of signal classification. The hybrid model takes advantage of the strengths of each individual model to overcome their weaknesses.

THE CHEETAH OPTIMIZER BASED SENSOR NODE LOCALIZATION WITH JENKS NATURAL BREAKS DATA FUSION

PHASE II REPORT

Submitted by

C.SOUNDARYA(912021403009)

in partial fulfilment for the award of the degree of

MASTER OF ENGINEERING IN COMMUNICATION SYSTEMS

PANDIAN SARAWATHI YADAV ENGINEERING COLLEGE

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ANNA UNIVERSITY: CHENNAI 600025

OCTOBER 2023

R RAJA Digitally signed by R RAJA Date: 2024.07.08 13:31:07 +05'30'

ANNA UNIVERSITY, CHENNAI

BONAFIDE CERTIFICATE

Certified that this Report titled **"THE CHEETAH OPTIMIZER BASED SENSOR NODE LOCALIZATION WITH JENKS NATURAL BREAKS DATA FUSION "** is the bonafide work of **C.SOUNDARYA (912021403009)** who carried out the work undermy supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

SIGNATURE

Mrs.P.PADMASRI M.E.,
ASSISTANT PROFESSOR,
HEAD OF THE DEPARTMENT
DEPARTMENT OF ECE,
PSYEC
ANNA UNIVERSITY
CHENNAI 600025

SIGNATURE

Mrs.S.JAGARATHUL JALILA M.E.,
ASSISTANT PROFESSOR,
SUPERVISOR
DEPARTMENT OF ECE,
PSYEC
ANNA UNIVERSITY
CHENNAI 600025

Submitted for the project vivo voice examination held on 09-10-2023

INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

Accurate localization of sensor nodes has a strong influence on the performance of a wireless sensor network. In this work, a node localization scheme using the application of nature-inspired metaheuristic algorithm, i.e., cheetah optimization algorithm, is proposed. In order to validate the proposed scheme, it is simulated on different sizes of sensor networks ranging from 25 to 150 nodes whose distance measurements are corrupted by gaussian noise. The performance of the proposed novel scheme is compared with performance of some well-known schemes such as particle swarm optimization (PSO) algorithmand genetic algorithm. Additionally, the incorporation of the Jenks Natural Breaks algorithm improves the classification of data into distinct classes, leading to better localization accuracy. The simulation results indicate that the proposed scheme demonstrates more consistent and accurate location of nodes than the existing PSO- and FA-based node localization schemes.

CHAPTER-6

CONCLUSION

In conclusion, the proposed node localization scheme utilizing the cheetah optimization algorithm and Jenks Natural Breaks algorithm has shown promising results in accurately and consistently locating sensor nodes in a wireless sensor network. By comparing it to well-known schemes like the PSO and GA, it has been demonstrated that the proposed scheme outperforms them in terms of accuracy and consistency, even in the presence of gaussian noise. The use of the Jenks Natural Breaks algorithm has also helped in reducing the localization error and improving the performance of the scheme. The proposed scheme can have a significant impact on the performance and efficiency of wireless sensor networks, and can be further improved and extended in future research.