VIETNAM NATIONAL UNIVERSITY HO CHI MINH CITY
UNIVERSITY OF SCIENCE
FACULTY OF PHYSICS AND ENGINEERING PHYSICS

GRADUATION THESIS/ SEMINAR INFORMATION

Thesis/ Seminar title: Controlling Telescope by using internet
Major: Physics
Speciality: Physics and Computer Science
Name of Student 1: Phan Vinh Nghi
Student ID: 18130095
Name of Student 2: Nguyen Truong Phat
Student ID: 18130109
Academic year: 2018 - 2022
Supervisor: TS. Nguyen Huynh Tuan Anh
Thesis/ seminar abstract:

The thesis “Controlling telescope by using internet” is making a controlling telescope that can be controlled through the internet by smartphone or computer. Firstly, we need to learn and understand the knowledge about telescope such as structure and operation to design a telescope. To reduce the costs, we using some basic materials to design refractive telescope like water pipe, curon rope, joint. Secondly, we design an mobile app using Blynk structure to control the telescope. The application contains 6 button to control 3 motor step and a stream video. Arduino connect the wifi module(ESP8266) , the camera module (ESP32 Camera AI Thinker) and motor step together. The button on the app is setting to control telescope such as rotate up-down, left-righ or change focal length. According to the user’s descretion, the application will control the motor and display what the telescope is seeing.Finally, the wifi module will connect motor will the app through the application after connected to internet and the camera module after connect to the internet will output the stream link then we add that stream link to the stream video on the app. That’s how our thesis work.

Keywords: (3-5 words)
Camera, telescope, app.

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FACULTY OF PHYSICS AND ENGINEERING PHYSICS

GRADUATION THESIS/ SEMINAR INFORMATION

Thesis/ Seminar title: NEURAL NETWORKS IN DIAGNOSTIC MAMMOGRAPHY
Major: Physics
Speciality: Physics and Computer Science
Name of Student 1: Cao Nguyễn Ánh Ngân
Student ID 1: 18130092
Name of Student 2: Vũ Ngô Gia Nghĩa
Student ID 2: 18130096
Academic year: 2018 - 2022
Supervisor 1: MsC. Hứa Thị Hoàng Yến
Thesis/ seminar abstract:
Breast cancer is a major cause of death in women and can be identified and treated early with diagnostic mammography. The thesis focuses on research goals and solutions to help detect signs of cancer on mammograms. The group has systematized the theoretical basis of breast cancer pathology and stage of disease development; Summary of the benefits and drawbacks of mammography. From there, the theoretical basis of neural network is given, and the proposed method is convolutional neural network (CNN), AlexNet, etc. to divide the data into three categories including normal, benign and malignant. The team used two databases including MIAS and DDSM with 1000 images to train improving the diagnostic efficiency of breast tumors. With three training cases of original image, single-enhanced image and double-enhanced image, the results show that the best accuracy is 75.5% in double-enhanced mammography. However, the thesis is also not immune to limitations: The neural network that runs the experiment is still relatively simple, so it has not fully shown the overall nature of the deep learning network. The exact location and size of the tumor has not been determined.
Keywords: (3-5 words)
Neural networks, breast cancer, mammography, normal, benign, malignant.

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FACULTY OF PHYSICS AND ENGINEERING PHYSICS

GRADUATION THESIS/ SEMINAR INFORMATION

Thesis/ Seminar title: Designing Line Detected Car Which Follows Color Signals
Major: Physics
Speciality: Physics of Computer Science
Name of Student: Ma Ngoc Thanh Ngan
Hua Minh Tri
Student ID: 18130094
18130149
Academic year: 2018 – 2022
Supervisor 1: Dr. Nguyen Chi Linh
Thesis/ seminar abstract:

Nowadays, when technology is developed and constantly innovated, automatic systems are being popularized and used widely, from the manufacturing sector to home appliances. Especially in production, automatication helps to increase productivity, reduce error and ensure safety at work. However, the construction of an automatic freight device is a new challenge in the field of logistics. One of those challenges is the ability to track the direction of the established signals of the device. In this work, a car model was designed with two modes: manual control and automatic control mode. An Arduino was used to process the signals received from the HC-05 bluetooth module or the single line sensor and color sensor. With manual control mode, two applications Arduino Bluetooth Controller and Bluetooth RC Controller were applied to compare advantages and disadvantages. As well as the automatic mode, the TCS3200 and TCS3472 color sensors were both used for the car to compare the accuracy when the vehicle is moving.
Keywords: Arduino Uno, sensor, Bluetooth, control.

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UNIVERSITY OF SCIENCE
FACULTY OF PHYSICS AND ENGINEERING PHYSICS

GRADUATION THESIS INFORMATION

Thesis title: Apply machine learning to determine material thickness by gamma scattering technique.
Major: Physics
Speciality: Physics and Computer Science
Name of Student 1: Nguyen Thi Thanh Tra
Student ID 1: 18130147
Name of Student 2: Huynh Thi Thanh Ngan
Student ID 2: 18130093
Academic year: 2018
Supervisor 1: M.S. Huynh Thanh Nhan
Supervisor 2: M.S. Nguyen Duy Thong
Thesis abstract:

Measuring the thickness of material using gamma backward diffusion is widely studied but is not strongly applicable in practice due to the difficulty and the cost to do the measurement under optimal conditions. Therefore, MCNP simulation software is utilized for purpose of supporting the measurement process. In this thesis, we will use MCNP simulation software to measure the thickness of steel (C45) based on MCNP simulation, the measurement system used a NaI(Tl) detector, a radioactive source 137Cs, and the scattering targets were steel pipes with an outer diameter of 273 mm, a scattering angle of 120^o. This study aimed to use the total scattering intensity to determine the thickness of the material. In experimental measurements, the total scattering intensity can be determined directly without spectrum processing, thereby shortening the sample inspection time. To calculate the thickness of the material, the total scattering intensity ratio $R = I_x/I_{Ref}$ was used. A standard curve of R against the material thickness was built from simulation data using MCNP6. Based on the standard curve of R, the thickness of the real steel pipes was determined by experimental gamma scattering.
Keywords: MCNP (Monte Carlo N – Particle)

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GRADUATION THESIS/ SEMINAR INFORMATION

Thesis/ Seminar title: NEURAL NETWORKS IN DIAGNOSTIC MAMMOGRAPHY
Major: Physics
Speciality: Physics and Computer Science
Name of Student 1: Cao Nguyễn Ánh Ngân
Student ID 1: 18130092
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Student ID 2: 18130096
Academic year: 2018 - 2022
Supervisor 1: MsC. Hứa Thị Hoàng Yến
Thesis/ seminar abstract:
Breast cancer is a major cause of death in women and can be identified and treated early with diagnostic mammography. The thesis focuses on research goals and solutions to help detect signs of cancer on mammograms. The group has systematized the theoretical basis of breast cancer pathology and stage of disease development; Summary of the benefits and drawbacks of mammography. From there, the theoretical basis of neural network is given, and the proposed method is convolutional neural network (CNN), AlexNet, etc. to divide the data into three categories including normal, benign and malignant. The team used two databases including MIAS and DDSM with 1000 images to train improving the diagnostic efficiency of breast tumors. With three training cases of original image, single-enhanced image and double-enhanced image, the results show that the best accuracy is 75.5% in double-enhanced mammography. However, the thesis is also not immune to limitations: The neural network that runs the experiment is still relatively simple, so it has not fully shown the overall nature of the deep learning network. The exact location and size of the tumor has not been determined.
Keywords: (3-5 words)
Neural networks, breast cancer, mammography, normal, benign, malignant.

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FACULTY OF PHYSICS AND ENGINEERING PHYSICS

GRADUATION THESIS/ SEMINAR INFORMATION

Thesis/ Seminar title: Taking care Covid-19 Patient WEB Application
Major: Physics
Speciality: Physics and Computer Science
Name of Student: Vuong Thi Hong Na 18130089
Nguyen Pham Quynh Chau 18130027
Academic year: 2018
Supervisor: Master Nguyen Anh Thu
Thesis/ seminar abstract:

In the previous years, the Covid-19 pandemic has been spread and caused pain for mankind. Lots of patients don't have the ability (such as time, money, …) to go to the hospital or the hospital has been overloaded, so they have to take care of themselves at home. For those reasons, we decided to launch a web application to take care of the Covid-19 patients. Graduation thesis "Taking care Covid-19 Patient WEB Application" project is a web building in the model of MVC (Model – View - Controller) with two main parts: Front-end and Back-end. Front-end: Using programming languages such as JavaScript, HTML (HyperText Makeup Language), CSS (Cascading Style Sheets), template engine Handlebars, framework Bootstrap, jQuery library to design the interface of the application. Back-end: Using JavaScript in the Nodejs environment, framework Express, and some libraries (moment, pdfmake, socket.io, passport.js, …) to create features of the application. Database: Using MongoDB and some libraries such as mongoose, cloudinary, … The purpose of the project is providing for the customer with a utility application on the website. By using our web application, customers can make an appointment with doctors at suitable times, doctors can give the patient a prescription, and chat-realtime with doctors to discuss their symptoms.

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FACULTY OF PHYSICS AND ENGINEERING PHYSICS

GRADUATION THESIS/ SEMINAR INFORMATION

Thesis/ Seminar title: Automatic Coil Winding machine design for toroidal transformer
Major: Physics
Speciality: Physics & Computer Science
Name of Student: Le Ngoc Anh Student ID: 18130013
Tran Duc Minh Student ID: 18130085
Academic year: 2018
Supervisor: PhD. Nguyen Huynh Tuan Anh
Thesis/ seminar abstract:

Today, industry 4.0 is developing in all areas of our lives, electric energy is also one of the critical and necessary factors. The transformer is an important device used to change the voltage, it is used in almost all electrical appliances from industrial to household. Our country is currently in the process of modernization - industrialization, so it is necessary to replace human power with automatic machines to increase productivity. The demand for transformers is increasing, seeing this we have researched and designed an automatic toroidal transformer winding machine. The topic "Designing an automatic toroidal transformer winding machine" combines many factors such as mechanics, control, and programming,… to create hardware (mechanical part) and software (control part and design). The software will use the knowledge of Microcontrollers, C programming techniques, etc. Learn and learn more about design software like Solidworks... and code support software like Arduino IDE, while the hardware will use Knowledge of mechanics and transmission systems. The product obtained after designing and completing the transformer winding machine will have close, uniform winding lines and can wrap many frame sizes. The interface is easy to tousle with the user to enter parameters such as copper wire diameter, number of turns, transformer core size to be wound, etc.

Keywords: Toroidal transformer, Automatic Coil Winding machine,...

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FACULTY OF PHYSICS AND ENGINEERING PHYSICS

GRADUATION THESIS/ SEMINAR INFORMATION

Thesis/ Seminar title: Application Of Machine Learning - Deep Learning To Classify Emotion Via Eeg Signals
Major: Physics
Speciality: Physics and Computer Science
Name of Student: Nguyen Thi Tuyet Hoa - Student ID: 18130054
Name of Student: Tran Van Khanh - Student ID: 18130065
Academic year: K2018
Supervisor 1: Assoc.Prof. Huynh Van Tuan
Supervisor 2: MSc. Vo Hoang Thuy Tien
Thesis/ seminar abstract:

Advertising campaigns are frequently used to advertise and promote a wide range of consumer goods to increase sales and public awareness. In essence, this increases the revenue of a producing unit. Items are frequently reproduced based on a range of variables, such as market demand, reviewer response, ratings, etc. The study of consumer preference for behavior prediction and decision-making for the best usage of a product, on the other hand, is known as neuromarketing. In this thesis, we provide a predictive modeling paradigm that identifies client preferences for and objections to online transactions using EEG data. Volunteers of all ages and genders had their EEG signals analyzed as the participants browsed a variety of consumer products. The investigations make use of a dataset made up of various consumer products. To assess the decision prediction's accuracy, the Convolutional Neural Network algorithm was applied. In our study, we used footwear products as an example and found that the identification accuracy of product likes or dislikes in two datasets reached 97.17% and 55.89%. The results of EEG-based like-or-dislike prediction will be compared to product sales, self-reports, and other variables in future studies.
Keywords: Neuromarketing, emotion, EEG, Deep Learning, Convolutional Neural Network.

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GRADUATION THESIS/ SEMINAR INFORMATION

Thesis/ Seminar title: Application of Machine learning - Deep learning to classify Emotion via EEG signals
Major: Physics
Speciality: Physics and Computer Science
Name of Student: Nguyen Thi Tuyet Hoa - Student ID: 18130054
Name of Student: Tran Van Khanh - Student ID: 18130065
Academic year: 2018
Supervisor 1: Assoc.Prof. Huynh Van Tuan
Supervisor 2: MSc. Vo Hoang Thuy Tien
Thesis/ seminar abstract:

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GRADUATION THESIS/ SEMINAR INFORMATION

Thesis/ Seminar title: Methods of Electromechanical signal classification
Major: Physics
Speciality: Physics and Computer Science
Name of Student 1: Tran Chau Phuong Dung
Student ID 1: 18130040
Name of Student 2: Do Tran Duc Duy
Student ID 2: 18130041
Academic year: 2018
Supervisor 1: Assoc. Prof. Huynh Van Tuan
Supervisor 2: MSc. Phan Nguyet Thuan
Thesis/ seminar abstract:
This thesis focused on understanding in detail the process of classifying electromechanical signals, then selected a number of methods and algorithms to conduct the survey. Then, the most optimal classification model was proposed to effectively classify the hand movements. The dataset includes hand movements such as grasping spherical objects, small and thin tools, etc. used in this study to compare the effectiveness of the proposed models. This study re-investigated the preprocessing and classification process by other algorithms on the dataset with the aim of making the most objective comparisons and evaluations of the results. The thesis was limited to certain methods such as: using overlapping windowing technique, time-domain features, and classification methods such as ANN (Artificial Neural Network) algorithm, RanDom Forest, kNN (k-Nearest Neighbor), and SVM (Support Vector Machine). The results built classification models of simple hand movements based on electromechanical signals. The research results of this thesis were compared with the results from scientific articles using the same data set.

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GRADUATION THESIS/ SEMINAR INFORMATION

Thesis/ Seminar title: Taking care Covid-19 Patient WEB Application
Major: Physics
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Name of Student: Vuong Thi Hong Na 18130089
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Academic year: 2018
Supervisor: Master Nguyen Anh Thu

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GRADUATION THESIS/ SEMINAR INFORMATION

Thesis/ Seminar title: Automatic Coil Winding machine design for toroidal transformer
Major: Physics
Speciality: Physics & Computer Science
Name of Student: Le Ngoc Anh Student ID: 18130013
Tran Duc Minh Student ID: 18130085
Academic year: 2018
Supervisor: PhD. Nguyen Huynh Tuan Anh
Thesis/ seminar abstract:

Today, industry 4.0 is developing in all areas of our lives, electric energy is also one of the critical and necessary factors. The transformer is an important device used to change the voltage, it is used in almost all electrical appliances from industrial to household. Our country is currently in the process of modernization - industrialization, so it is necessary to replace human power with automatic machines to increase productivity. The demand for transformers is increasing, seeing this we have researched and designed an automatic toroidal transformer winding machine. The topic "Designing an automatic toroidal transformer winding machine" combines many factors such as mechanics, control, and programming,… to create hardware (mechanical part) and software (control part and design). The software will use the knowledge of Microcontrollers, C programming techniques, etc. Learn and learn more about design software like Solidworks... and code support software like Arduino IDE, while the hardware will use Knowledge of mechanics and transmission systems. The product obtained after designing and completing the transformer winding machine will have close, uniform winding lines and can wrap many frame sizes. The interface is easy to tousle with the user to enter parameters such as copper wire diameter, number of turns, transformer core size to be wound, etc.

Keywords: Toroidal transformer, Automatic Coil Winding machine,...

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GRADUATION THESIS/ SEMINAR INFORMATION

Thesis/ Seminar title: Designing Line Detected Car Which Follows Color Signals
Major: Physics
Speciality: Physics of Computer Science
Name of Student: Ma Ngoc Thanh Ngan
Hua Minh Tri
Student ID: 18130094
18130149
Academic year: 2018 – 2022
Supervisor: Dr. Nguyen Chi Linh
Thesis/ seminar abstract:

Nowadays, when technology is developed and constantly innovated, automatic systems are being popularized and used widely, from the manufacturing sector to home appliances. Especially in production, automatication helps to increase productivity, reduce error and ensure safety at work. However, the construction of an automatic freight device is a new challenge in the field of logistics. One of those challenges is the ability to track the direction of the established signals of the device. In this work, a car model was designed with two modes: manual control and automatic control mode. An Arduino was used to process the signals received from the HC-05 bluetooth module or the single line sensor and color sensor. With manual control mode, two applications Arduino Bluetooth Controller and Bluetooth RC Controller were applied to compare advantages and disadvantages. As well as the automatic mode, the TCS3200 and TCS3472 color sensors were both used for the car to compare the accuracy when the vehicle is moving.
Keywords: Arduino Uno, sensor, Bluetooth, control.

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GRADUATION THESIS INFORMATION

Thesis title: Apply machine learning to determine material thickness by gamma scattering technique.
Major: Physics
Speciality: Physics and Computer Science
Name of Student 1: Nguyen Thi Thanh Tra
Student ID 1: 18130147
Name of Student 2: Huynh Thi Thanh Ngan
Student ID 2: 18130093
Academic year: 2018
Supervisor 1: M.S. Huynh Thanh Nhan
Supervisor 2: M.S. Nguyen Duy Thong
Thesis abstract:

Measuring the thickness of material using gamma backward diffusion is widely studied but is not strongly applicable in practice due to the difficulty and the cost to do the measurement under optimal conditions. Therefore, MCNP simulation software is utilized for purpose of supporting the measurement process. In this thesis, we will use MCNP simulation software to measure the thickness of steel (C45) based on MCNP simulation, the measurement system used a NaI(Tl) detector, a radioactive source 137Cs, and the scattering targets were steel pipes with an outer diameter of 273 mm, a scattering angle of 120^o. This study aimed to use the total scattering intensity to determine the thickness of the material. In experimental measurements, the total scattering intensity can be determined directly without spectrum processing, thereby shortening the sample inspection time. To calculate the thickness of the material, the total scattering intensity ratio $R = I_x/I_{Ref}$ was used. A standard curve of R against the material thickness was built from simulation data using MCNP6. Based on the standard curve of R, the thickness of the real steel pipes was determined by experimental gamma scattering.
Keywords: MCNP (Monte Carlo N – Particle)

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FACULTY OF PHYSICS AND ENGINEERING PHYSICS

GRADUATION THESIS/ SEMINAR INFORMATION

Thesis/ Seminar title: Study on Intrinsic Spin Hall Conductivity of Heavy Metal Materials using BPHASE Code
Major: Physics
Speciality: Physics and Computer Science
Name of Student: Lê Văn Thái
Student ID: 18130129
Academic year: 2018
Supervisor: PhD. Đỗ Đức Cường
Thesis abstract:

Spin Hall effect (SHE) is a generation of transverse pure spin current by applying a longitudinal electric field in an absence of external magnetic field. SHE plays a particular role in which it allows one to generate and detect spin current, an indispensable component to realize the next generation of spintronics: spintronics without magnetism. However, generation of large pure spin current is a big challenge because it is different from a charge current, spin current is not conversed. Therefore, to realize the new spintronic devices, the design of new class of materials which have large spin Hall conductivity play an importantly technological role. In design new materials, simulation methods play an important role, and design a new spin Hall material is always necessary. In this thesis, we present a method allowing us to calculate the intrinsic spin Hall conductivity of materials by the combination ab initio method and tight binding method. This method is integrated in the one tight binding code so called BPHASE code. All properties and analysis such as **k** resolved SHC, spin Berry curvature (SBC), … are built in this code allowing us to analyze and understand the detail contribution to spin Hall conductivity of materials. Therefore, the thesis plays a certain significance to build a basic method and pathway for the future study research on spin Hall conductivity of materials.
Keywords: Heavy Metal Materials, Spin Hall, tight binding, Bphase

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GRADUATION THESIS/ SEMINAR INFORMATION

Thesis/ Seminar title: Classification of Taste Quality Based on Electroencephalogram Signals
Major: Physics
Speciality: Physics and Computer Science
Name of Student: Pham Truc Quynh
Student ID: 18130126
Academic year: 2018
Supervisor 1: Assoc. Prof. Huynh Van Tuan
Supervisor 2: MSc. Vo Hoang Thuy Tien
Thesis/ seminar abstract:
The topic "Classification of taste quality based on EEG signals" provides a general study of the identification of taste buds based on electroencephalogram signals. This course surveyed and categorized four basic types of taste buds: sweet, salty, sour, and bitter. This thesis mainly focused on the step of collecting data sets and preprocessing collected data. The dataset was collected from a group of 15 volunteers and used a receiver called the 14-channel EmotivEPOC headset. The dataset has a total of 1200 samples. The Independent Component Analysis (ICA) was used to remove the types of interference present in the raw signals. The noise-removed movement went through the Butterworth filter to separate the EEG signal into five basic frequency bands. To classify taste, the average energy feature of the EEG signals and the initialization of the 1200x70 matrix called the feature matrix were the classification model's inputs. In this topic, five neural network models were used to classify and record accuracy. From the survey of classification, each person's conclusion concludes that each person's taste perception is specialized. The highest result was 29.6% for raw data.
Keywords: electroencephalogram, taste, ICA, Butterworth, artificial neural network, classification

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GRADUATION THESIS/ SEMINAR INFORMATION

Thesis/ Seminar title: Sign language classification using machine learning algorithms
Major: Physics
Speciality: Physics and Computer Science
Name of Student: Nguyen Thanh Phuoc
Student ID: 18130115
Academic year: 2018
Supervisor 1: Assoc. Prof. Huynh Van Tuan
Supervisor 2: MSc. Huynh Quoc Viet
Thesis/ seminar abstract:

This thesis focused on building optimal models for classifying sign language through both images and videos. The models classified the 26 letters in the Irish alphabet represented by hand gestures. The thesis used a variety of algorithms extracting features and classification models to compare, improve and draw the most effective method. In addition, the pre-processing step was also investigated. Specifically, for data sets in the form of images, processing processes including resizing, and blurring the input images were surveyed to create the best input dataset for the classification algorithm. For the form of video data, instead of using the original data, the thesis extracted the videos into the frames that carry the most important information. Then those frames were extracted features as well as classified. In addition, the thesis also compared classification results between two different models (machine learning and deep learning). The results of the classification of the hand gestures surveyed were compared to previous relevant studies. The best results for image data are 99.9%, with video data at 100%.
Keywords: sign language, image processing, video processing, machine learning, deep learning

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GRADUATION THESIS INFORMATION

Thesis title: Using machine learning to predict the material type by the reverse gamma-ray method.
Major: Physics
Speciality: Physics and computer sience
Name of Student: Mai Le Hang, Nguyen Thi Thanh Thao
Student ID: 19130155, 19130228
Academic year: 2019
Supervisor: M.Sc. Huynh Thanh Nhan
Thesis abstract:
The thisis discusses the use of the reverse gamma scattering method combined with the MCNP simulation program to construct two models for determining the thickness and material type of 10 samples (Al, Fe, Ca, Si, Ti, Mn, C45, Cu, Zn, Co) with thickness ranging from 1 mm to 50 mm. After calculating the R ratio, it will be used in the training of the first model to determine the thickness of the material using the Linear Regression algorithm. The results are accurate for materials (Al, Ca, Si, Ti), while for other materials, only thicknesses from 1mm to 20 mm can be determined. Next, the 10 samples will be classified based on the R ratio and thickness as input data and the material type as output data, yielding results showing that the model can classify up to 90% with an accuracy of 0.1% or higher. Then, a survey of composite samples will be conducted with ratios ranging from 1 to 9, including Al-Fe, Al-Cu, and three types of steel: C45, CT3, P20.
Keywords: MCNP (Monte Carlo N-Particle).

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GRADUATION THESIS INFORMATION

Thesis title: Classification of Parkinson's Disease Based on EEG Signals Using Machine Learning and Deep Learning.
Major: Physics
Speciality: Physics and Computer Science
Name of Student: Nguyen Minh Khoi
Student ID: 19130178
Academic year: 2019
Supervisor 1: MSc. Vo Hoang Thuy Tien
Supervisor 2: BSc. Nguyen Thi Nhu Quynh
Thesis abstract:

The topic "Classification of Parkinson's Disease Based on EEG Signals Using Machine Learning and Deep Learning" aims to learn in detail the process of classification Parkinson's disease based on EEG signals. Construct classification models using machine learning and deep learning using EEG recordings of the UNM dataset of 27 Parkinson's patients and 27 healthy controls. The process of performing classification includes raw data preprocessing, and feature extraction; machine learning and deep learning algorithms such as support vector machine (SVM), K nearest neighbor (KNN), Ensemble; Convolutional neural networks (CNN) are used for classification. Thereby evaluating and comparing the results of the classification model.

Keywords: EEG (Electroencephalogram), Support Vector Machine (SVM), K Nearest Neighbor (KNN), Convolutional Neural Network (CNN), Parkinson's disease (PD), University of New Mexico (UNM).

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GRADUATION THESIS INFORMATION

Thesis title: Survey Of Mammography Enhancement Algorithm
Major: Physics
Speciality: Physics and Computer Science
Name of Student: Nguyen Quynh My
Student ID: 19130193
Academic year: 2019
Supervisor 1: Hua Thi Hoang Yen
Thesis abstract:

Thesis "Survey of Mammogram Enhancement Algorithms" focuses on researching and analyzing mammogram enhancement algorithms. The objective of the thesis is to understand and evaluate existing mammogram enhancement methods, and consequently, identify the most suitable algorithms that align with the thesis's purpose.

The thesis begins by presenting fundamental concepts related to cancer and breast cancer. It also introduces concepts related to mammography and image enhancement techniques. Various popular image enhancement methods will be implemented and analyzed, including methods based on grayscale transformation such as Histogram equalization, Contrast Stretching, Contrast limited adaptive Histogram equalization, noise reduction such as Adaptive Median filter, Wavelet based-on Enhancement and morphological transformations such as dilation, erosion, closing, opening and two transformations combined are Top-hat transformation and Bottom-hat transformation.

Subsequently, the thesis will execute and assess the algorithms on sample image datasets (MIAS). It will extract the advantages and limitations of each evaluated method, have some evaluation metric such as Peak Signal-to-Noise Ratio, Structural Similarity Index Metric, Universal Image Quality Index, Normalized Correlation Coefficient, Discrete Entropy and compare the mammogram enhancement algorithms to identify the most optimal and appropriate enhancement technique.

Finally, the graduation thesis concludes by summarizing the research findings and proposing further directions for development in the field of image enhancement.

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GRADUATION THESIS INFORMATION

Thesis title: Survey of edge detection methods in image processing
Major: Physics
Speciality: Physic Computer Science
Name of Student: Dang Nguyen Yen Nhi
Student ID: 19130203
Academic year: 2019
Supervisor 1: Associate Professors Doctor Dang Van Liet
Thesis abstract:

Edge are the basic features, the most obvious part of objects, so the edge represents the main structure of the object in the image; Therefore, edge detection is an important technique in image processing and feature extraction. That's why we chose: "Survey of edge detection methods in image processing" as the thesis topic with the aim of learning about edge detection methods, demonstrating edge detection and comparing the results of other methods.

The course content includes the following chapters:

Chapter 1: Overview of image processing.

Chapter 2: Some methods of edge detection.

Chapter 3: Edge detection by K – means method.

Chapter 4: Experimental part.

The thesis analyzes and evaluates four images by five methods Sobel, Prewitt, Roberts, Canny and K – means through a demarcation interface designed by Matlab's GUI tool. The comparison results partly show the advantages and disadvantages of each method based on sensory and image quality evaluation quantities PSNR/MSE and Entropy.

Keywords: edge detection

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GRADUATION THESIS INFORMATION

Thesis title: Building a 3D survival game with Unity
Major: Physics
Specialization: Physics and Computer Science
Student's name: Do Minh Quan
Student ID: 19130214
Student's name: Nguyen Thi Tuyet Nhi
Student ID: 19130205
Training course: 2019
Instructor: MSc. Nguyen Anh Thu
Thesis abstract:

The topic "Building a 3D Survival Game with Unity" aims to learn about the process of building a complete 3D game. Using Unity software with C# programming language as the main engine, build a 3D survival game with maps like jungle, hilly area, desert area and snowy mountain area. Each area will have different features from the scenery, animals and plants, day and night cycles and weather that increase the game's vibrancy. Build game functions such as moving characters, interacting with the surrounding environment such as gathering resources, eating, making different tools, fighting with animals for the purpose of living. exist.

Keywords: 3D games, survival games, 3D game programming, making games with Unity.

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GRADUATION THESIS INFORMATION

Thesis title: Design a line maze solving robot
Major: Physics
Speciality: Physics and Computer Science
Name of Student: Vo Van Hung
Student ID: 19130168
Name of Student: Ho Quoc Toan
Student ID: 19130237
Academic year: 2019
Supervisor: PhD. Nguyen Chi Linh
Thesis abstract:

Nowadays, Robot has many outstanding development, and was widely applied in industrial production. Benefits of robots, especially self-propelled robots, will become increasingly necessary and help a lot in human life. Therefore, the research topic focuses on manufacturing robots capable of self-propelled in any maze. Base on the wall tracking algorithm, the line detection algorithm and the shortest path finding algorithm, the thesis tests the sensors and robot in the whole maze. Initial results have been satisfactory. The robot is capable of performing the correct action with a rate of 70% or more and has a completion rate of 80% when It's scanning the entire maze. Finally, achieving the original goal of completing the maze.

Keywords: Robot, self-propelled.

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GRADUATION THESIS INFORMATION

Thesis title: Design a test set to measure magnetic force by weighing method.
Major: Physics
Specialty: Physics and Computer Science
Name of Student: Nguyen Thi My Duyen
Student ID: 19130150
Name of Student: Nguyen Tuyen Nhat
Student ID: 19130202
Academic year: 2019
Supervisor: MSc. Ho Van Binh
Thesis abstract:

1. **Purpose and meaning:**

   The topic "Designing a set of experiments to measure magnetic force by weighing method" aims to learn in general about magnetic force measurement methods and algorithms to calculate the magnitude of magnetic force, magnetic induction to serve the Practical luggage 2. Specifically with this topic is to study the magnetic force acting on the current flowing in the straight wire placed in the magnetic field through the investigation of the relationship between: Direction, direction of magnetic force with direction, direction of amperage and induction, the magnitude of the magnetic force depends on the magnitude of the amperage, depends on the angle between the induction vector and the amperage vector, and depends on the length of the wire.

2. **Method:**

   With this topic, we will have two main processes: assembling the experimental set and investigating the magnetic force. After assembling the complete set of experiments, we will conduct a survey of the magnetic force according to the cases mentioned in Section 1. Then calculate and establish the formula for calculating the magnetic force F, the magnetic induction B.

   Result:

   - Building a complete set of experiments.
   - Understand wiring and understand measurement methods.
   - Determine magnitude B.
   - Better understanding of magnetic field theory.

Keywords: magnetic field, magnetic force, magnetic induction B, Ampere's law, left hand rule....

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GRADUATION THESIS INFORMATION

Thesis title: Design experiments to study about the laws of dynamics on the Atwood's machine
Major: Physics
Speciality: Physics and Computer Science
Name of Student: Nguyen Duc Nghia, Nguyen Le Hung Dung
Student ID: 19130194, 19130038
Academic year: 2019
Supervisor : MSc. Ho Van Binh
Thesis abstract:

The main purpose of this thesis is designed an experiments on Atwood machine for the physics laboratory so that students of the subjects can do the experiments and get the basics knowledge of the laws of dynamics. The thesis consists of three main parts including overview, design and experimental. In the first part, an overview, giving the definitions of kinematics, Newton's laws, conservation laws, components, tools. In the second part, design, describing the process of researching, designing Atwood's chassis and electronic time measuring device. In the last part, experimental, presenting the experimental process and its result. After experiment, comparing the experimental results, the Atwood machine has accurate data with the actual theory. Thus, the Atwood machine has met the original goal. Besides, the thesis also has an experimental report form to guide students to conduct experiments and present experimental results when studying in the laboratory. In addition, the Atwood machine can be developed to perform another experiments such as free-fall experimentals, frictional force experimentals and viscosity measurements using the Stokes method.

Keywords: Atwood's Machine, the laws of dynamics, Physics experiments, ...

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GRADUATION THESIS INFORMATION

Thesis title: Image Smoothing Methods in Digital Image Processing
Major: Physics
Speciality: Physics and Computer Science
Name of Student: Nguyen Ngoc Khoi
Student ID: 19130179
Academic year: 2019
Supervisor 1: Assoc. Prof. Dang Van Liet
Thesis abstract:

The topic “Image Smoothing Methods in Digital Image Processing” focuses on exploring common types of digital images, various types of noise commonly encountered, and the utilization of the Fourier transform in applying smoothing filters in both the spatial and frequency domains. To perform denoising, Matlab is employed to construct a program interface.The objective of the research is to apply denoising techniques to grayscale images that have been corrupted by noise. After denoising, the images will undergo smoothing using filters in both the spatial and frequency domains, specifically for different types of noise such as Gaussian noise, salt-and-pepper noise, and speckle noise. The evaluation of image quality before and after denoising will be conducted using the Peak Signal-to-Noise Ratio (PSNR) metric. Subsequently, a comparison and assessment of the effectiveness of each filtering method for various types of noise will be conducted.

Keywords: Digital image processing, image smoothing methods, peak signal-to-noise ratio, denoising, Fourier transform.

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GRADUATION THESIS INFORMATION

Thesis title: U-Net Model for Medical Image Segmentation

Major: Physics

Speciality: Physics & Computer Science

Name of Student: Nguyen Duy Nhan

Student ID: 19130199

Academic year: 2020

Supervisor : MSc. Nguyen Anh Thư

Thesis abstract:

The primary objective of this thesis is to research and develop the U-Net model to perform segmentation of various pathologies in medical images, such as the segmentation of abnormal regions in human internal organs, specifically the stomach and rectum. Accurate segmentation of the regions of interest is highly significant, as it can provide valuable support for the diagnosis and treatment of various medical conditions.

The thesis focuses on investigating, analyzing, and utilizing the U-Net model on three medical image datasets: Kvasir Seg, CVC-Colon, and CVC-Clinic. The performance of the U-Net model is then compared to the U-Net++ variant, which is a derivative of the original U-Net model. Additionally, we have constructed a custom model called Mod U-Net, which is a modified and improved version of the original U-Net architecture, and it has shown promising results.

Comparing the U-Net model with the U-Net++ variant and the Mod U-Net model, the results indicate that:

The U-Net model demonstrates strong performance in medical image segmentation.

The Mod U-Net model outperforms the U-Net++ and the original U-Net models in terms of adaptability to new data.

The U-Net++ model exhibits strong resistance to overfitting, but inferior performance.

Keywords: Convolutional neural network, deep learning, image segmentation, U-Net.

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GRADUATION THESIS INFORMATION

Thesis title: Design of a model and build a management system for smart car parking

Major: Physics

Speciality: Physics and Computer Science

Name of Student: Le Tan Loc

Student ID: 20130101

Academic year: 2020

Supervisor: MSc. Huynh Quoc Viet

Thesis abstract:

The thesis aims to build a smart car parking model integrated with technology to serve the teaching of the PLC course. This model utilizes available hardware materials and supplements with additional devices such as T8 lead screws, reduction motors, stepper motors, infrared sensors, cameras, and an RFID card scanning module. The implementation process begins with research, design, and assembly of the intelligent tower parking model. Additionally, a management system for the parking lot is developed using C# for the user interface, connecting to a SQL Server database for data storage. This interface integrates card scanning, license plate recognition via camera, and signal transmission to the PLC for automated vehicle retrieval and parking. After completion, the model undergoes trial runs, with results recorded, evaluated, and conclusions drawn regarding achievements and limitations to refine the system and enhance its effectiveness.

Keywords: Smart car parking, RFID, License plate recognition, Windows Form C#, SQL Server.

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GRADUATION THESIS INFORMATION

Thesis title: Application of CX-One Software in the Control and Management of Automated Parking Systems

Major: Physics

Speciality: Physics and computer science

Name of Student: Do Hung Viet

Student ID: 20130145

Academic year: 2020

Supervisor: MSc. Huynh Quoc Viet

Thesis abstract:

The topic " Application of CX-One Software in the Control and Management of an Automated Parking System" focuses on developing an automated system to manage parking lots efficiently and conveniently. The primary objective of the project is to utilize the tools in CX-One to connect and control mechanical devices through PLC, while also designing a monitoring and control interface for the system during the parking and retrieval process. By applying control algorithms and calibrating technical parameters, the system is ensured to operate stably and efficiently. The outcome is an optimized parking lot model that meets the practical needs of users and supports the teaching and learning of PLC courses effectively.

Keywords: CX-One software, OMRON PLC, CX-Supervisor software, CX-Programmer software, automated parking lot.

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GRADUATION THESIS INFORMATION

Thesis title: Some medical image segmentation algorithms.

Major: Physics

Speciality: Physics and computer science

Name of Student: Huynh Thi Ngan Giang

Student ID: 20130073

Academic year: 2020

Supervisor 1: MSc. Hua Thi Hoang Yen

Thesis abstract:

Medical X-ray image segmentation is a crucial step in diagnosing and treating diseases, as it helps identify and highlight regions of interest, such as soft tissues, bones, or tumors. There are various segmentation methods, including: edge detection using operators like Sobel, Prewitt, and Canny, which are prone to noise; Watershed based on a terrain surface model, suitable for overlapping regions but sensitive to noise; thresholding, which is simple and fast but less effective for low-contrast images; region-growing, which expands regions from seed points, suitable for homogeneous images but dependent on the seed selection criteria; and K-Means clustering, which groups pixels by intensity, offering flexibility but requiring the number of clusters to be predefined. Each method can be combined or improved to suit specific types of X-ray images, enhancing the accuracy and efficiency of segmentation, thereby providing better support for diagnosis and treatment. The segmentation results on the dataset are relatively good.

Keywords: Segmentation method, thresholding, noise, region-growing, seed point, K-Means clustering, watershed, Sobel operator, Prewitt operator, Canny operator.

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GRADUATION THESIS INFORMATION

Thesis title: Several techniques focus on enhancing images to improve the quality of medical imaging.

Major: Physics

Speciality: Physics and Computer Science

Name of Student: Duong Thien Phu

Student ID: 20130113

Academic year: 2020

Supervisor 1: GVC. ThS. Hua Thi Hoang Yen

Thesis abstract: The project primarily focuses on enhancing medical image quality by reducing noise, notably in X-ray images. It examines two algorithms derived from fundamental transformations. The initial algorithm, a smoothing technique, employs a two-dimensional fast discrete wavelet transform alongside unique functions like wavefast, waveback, and wavezero. Despite producing slightly blurred images to reduce noise, this process may compromise image values and structure. The second algorithm involves grayscale image morphology reconstruction through morphological operations, effectively reducing noise, particularly in images affected by salt and pepper noise, while preserving the initial structure. Evaluation utilizing PSNR and SSIM metrics ensures a comprehensive assessment of processed images, emphasizing understanding the strengths and weaknesses of these algorithms.

Keywords: Noise, image denoising, X-ray images, discrete wavelet, fast wavelet, morphological structure, morphological transformation, PSNR, SSIM.

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GRADUATION THESIS INFORMATION

Thesis title: “Design and build an automatic sliding door control model for application in the Department of Physics and Computer Science”

Major: Physics

Speciality: Physics and Computer Science

Name of Student: Nguyen Phat Hau

Student ID: 20130076

Academic year: 2020

Supervisor 1: Ph.D. Do Duc Cuong

Thesis abstract: The purpose of the topic " Design and build an automatic sliding door control model for application in the Department of Physics and Computer Science " is to design and construct two models: first, an automatic sliding door model to support teaching, and second, a practical application model for the doors in the Department of Physics and Computer Science. Applying the knowledge, components, and microcontrollers, the project begins by constructing an automatic sliding door model with the main circuit being the Arduino UNO R3 to control a geared motor running forward or backward to open and close the door through signals from a Relay Module. The input signals for the circuit include a push button and an infrared motion sensor. After completion, the door is tested to check the stability and optimization of the door to meet the initial requirements. Subsequently, the control circuit is applied to

create a door-pulling model for direct application to the doors in the Department of Physics and Computer Science

Keywords: automatic sliding door, Arduino, automatic sliding door model,

door application model Department of Physics and Computer Science

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GRADUATION THESIS INFORMATION

Thesis title: Building a Monte Carlo integration program

Major: Physics

Speciality: Physics and Computer Science

Name of Student: Trần Thanh Vinh

Student ID: 20130147

Academic year: 2020

Supervisor: TS. Nguyễn Chí Linh

Thesis abstract:

The numerical integral solving program based on the VEGAS algorithm is designed to solve integral problems where functions have sharp and narrow peaks. The importance sampling algorithm is integrated into this program. In this, the integral region is partitioned into smaller regions such that the weight of each region is approximately equal. This helps reduce the error in estimating integrals using the Monte Carlo method. The thesis presents the basic theories of Monte Carlo, clarifies the main points, as well as the mathematical basis of the VEGAS algorithm. This serves as a foundation for developing a program that users can easily deploy and extend. Additionally, the program can be used to solve integrals in problems related to scattering cross-section calculations, decay, etc., in the field of particle physics.

Keywords: Monte Carlo, VEGAS