View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by Analisis Harga Pokok Produksi Rumah Pada

Abstract iMIT SIC

Proceedings

The 2nd International Indonesia-Malaysia-Thailand Symposium on Innovation and Creativity

"Cultivating Innovation and Creativity Culture"

iMIT SIC 2018

07 - 08th 2018 at Pusat Kegiatan Mahasiswa, Universitas Riau
Pekanbaru, INDONESIA

Editor Proceedings iMIT SIC 2018:

Saktioto
Sofia Anita
Suhardi
Romi Fadli Syahputra
Robi Ikhsan

THE 2nd INTERNATIONAL
MALAYSIA-INDONESIA-THAILAND SYMPOSIUM ON
INNOVATION AND CREATIVITY (iMIT SIC 2018)
"Cultivating Innovation And Creativity Culture"

Welcome Remarks by Rector Universitas Riau

Assalamualaikum Wr.Wb.

In the name of Allah, The Most Gracious and the Most Merciful.

On behalf of Universitas Riau, I welcome you to the 2nd International Malaysia-Indonesia-Thailand Symposium on Innovation and Creativity (iMIT SIC 2018): "Cultivating Innovation and Creativity Culture".

I would also like to extent our warmest greetings to all distinguished keynote speaker, participants and guests from Malaysia, Thailand and Indonesia that are here with us in our campus.

This symposium is focusing on creativity and innovation, which is bring together researchers, students, academic scientists to share their research results on all aspect of creativity and innovation. Creativity and innovation are the key drives to success. Nowadays, reality dictates that creative and innovative products will achieve sustainable competitive advantage in market place.

I hope that this symposium will prove to be a venue for future-oriented discussions of improving the research on innovation and creativity in developing countries. I also hope that this conference will serve as an opportunity for researchers and students to promote their research product, and I am confident that your expectations of this symposium will be fulfilled.

Our wish is that you will enjoy this symposium, contribute effectively toward it and take back with you knowledge, experiences, contacts and happy memories of this 2nd International Malaysia-Indonesia-Thailand Symposium on Innovation and Creativity (iMIT SIC 2018): "Cultivating Innovation and Creativity Culture"

Yours Sincerely

Prof. Dr. Ir. Aras Mulyadi, DEA
Rector

Message from Organizing Chairperson, IMIT-SIC 2018

It is with great pleasure that I extend a warm welcome to all participants of *The 2nd International Indonesia – Malaysia – Thailand Symposium on Innovation and Creativity (IMIT SIC) on* 6-8 August *2018*. This symposium being held for the second time, aim to focus on all aspects of *"Cultivating Innovation and Creativity Culture"* by bringing together professionals and experts to present and promote information exchange on the latest development in science, engineering, technology, civilazation and art.

I would also like to convey my sincere appreciation and congratulations to Universitas Riau, Universitas Islam Riau, Universitas Islam Negeri Suska Riau, Universitas Lancang Kuning, Universitas Tabrani Rab, Universitas Muhammadiyah Riau, Politeknik Caltex Riau, Physical Society of Indonesia and from abroad; Universiti Teknologi Mara Perlis, Malaysia, Princess of Naradhiwas University, Thailand and The Malaysian Solid State Science and Technology Society for supporting this symposium. This event will lead from fundamental to technology changes in how we live and interact with our environment. Academia, industry and policy makers must collaborate on teaching, research and service for commercialization of patentable ideas, processes, and products to harness technology's full potential.

Judging from the number of participants for posters, I believe this is one of the most successful events I had the privilege to be part of and I hope that we will gain latest insights and at the same time for us to realize the potential and importance of Innovation and Creativity in 21st Century and beyond.

I hope this symposium, which covers a broad range of scientific and technical aspect, will serve as a platform for researcher, scientists and industrialists from various fields to exchange their knowledge and further develop their visions on academic innovations and creativity culture that is able to tackle critical issue of our generation.

I wish all participants will be enjoyable and productive experience.

Thank you.

Prof. Dr. Saktioto, SSi MPhil
Chairperson

Content List

Page

Welcome Remarks by Rector Universitas Riau ii

Message from Organizing Chairperson, IMIT-SIC 2018 iii

Content List iv

Category A 1

Development of Integrated Home Security Surveillance with GSM Network 2
Afzanizam Alias and Nor Analiza Che Khalid

Smart Portable Notification System : A Trigger Tools 3
Afzanizam Alias, Nor Analiza Che Khalid, Nur Insyirah Aziela Azahar, Intan Noor Suzielawati Hamizi, and Mohd Helmy Abd Wahab

Manufacturing of Bimetallic Screws for Bone Fracture Fixation 4
Ahmad Kafrawi Nasution, Dato' Mohammed Rafiq bin Dato' Abdul Kadir, Mohd. Hasbullah Bin Hj. Idris, Syafiqah Binti Saidin, and Hendra Hermawan

Production of Activated Carbon from Rubber Seed Pericarp Using Microwave-Induced with $ZnCl_2$ as Activating Agent 5
Asnida Yanti Ani, Mohd Azlan Mohd Ishak, Noor Anis Deraman, Wan Izhan Nawawi Wan Ismail, and Khudzir Ismail

Feminism Interpretation by Indonesian Movie Audiences (Reception Analysis of Pekanbaru Society about 'Kartini' Movie) 6
Desliana Dwita, Desi Sommaliagustina, and Nora Anzellita

MEEFLS: Mobile Learning Implementation to Teaching and Learning in Kolej Poly-Tech MARA (KPTM) 7
Mohd Erwandi bin Marwan, Norfaiza binti Fuad, and Ahmad Rizal bin Madar

EEG-FeEx: EEG Features Extractor 8
Norfaiza binti Fuad, Mohd Nasir bin Taib, Rozita binti Jailani, Mohd Erwandi Marwan, and Engku Mohd Nasri bin Engku Mat Nasir

Survival Training and Entrepreneurship Program (STEP) 9
Mohamad Niza Md Nor, Nazalyyussma Yusop, Norhanani Ahmad, Fadlia Afida Ghazali, and Zurita Jaafar

SISerum – Natural Sacha Inchi Serum Formulated for Skin Treatment 10
Hamidah Jaafar Sidek, Noor Azura Zainuddin, and Mohamad Azhar Azman

Friendly March Finder 11
Mohamad Farhan Mohamad Mohsin, and Nur Rasyidah Azmi

One Click College System (OCCS) 12
Mohd Hairul Nazreen Jamil, Muhammad Hafiz Ismail, Ahmad Akmal Mohd Idris, Hairul Reazuan Asmayadi, and Mohd Daud Ahmad

Designing and developing a Reward-based Snakes & Ladder 13
Noraziah ChePa, Nur Azzah Abu Bakar, and Tee Li Hong

The Application of Analytical Hierarchy Process (AHP) in Measuring Green Financing Initiative in Islamic Banking 14
Okfalisa, Leny Nofianti, and Rifaldi Saputra

The Development of Learning Media for The Kinetic Theory of Gases with Augmented Reality Technology 15
Rifqa Gusmida S.B, Nur Islami, and Rizo Budi Prastowo

Gallus Preneur 16
Rosma Malini Md. Aus, Intan Nur

Mohd Radzi, and Muhamad Helmi Husaini Rusmidi

Facile Synthesis of Low Dimensional Sn:ZnO/SnO_2 Nanorods using Environmentally Friendly Materials: Improve the Efficiency of Gas Sensor 17
Ruziana Mohamed, Nurul Infaza Talalah Ramli, Wan Aizuddin Wan Razali, Hartini Rafaei, Syamsyir Akmal Senawi

Hybrid Particleboard: Acacia and Bamboo 18
Siti Zalifah Mahmud, Syarqiah Md Desa, Wan Mohd Nazri Wan Abdul Rahman, Mazlin Kusin, and Ainul Munirah Abdul Jalil

***Papan Sintok*: a Multisensory Tool to Help Dyslexic and Struggling Learners Spell and Read** 19
Zulikha Jamaludin and Husniza Husni

Today's Initiative for a Better Community and Future: a Rural Area Case Study 20
Zam Zam Syafurah Samsudin, Zurita Jaafar, Rosma Malini Md Aus, Fadlia Afida Ghazali, and Siti Nur Hidayatul Ashikin Ibrahim

Automated Fertilizer System for Hydrophonics Agriculture 21
Ahmad Alabqari M. R., Mohamad M, S., Muhammad Ilham S., Ahmad Faris S., Afif J., and Mohd Helmy A. W.

Category B

Student Motivation in Learning Physics through the Application of Cooperative Learning Model Jigsaw Type II
Agus Yoni Prasetyo Widodo, Nur Islami, Zuhdi Ma'ruf , and Yennita

Practicality Test Experimental Device Shear Modulus as a Medium of Learning Physics
Amelia Dwi Puspita, Nur Islami, Yennita, and Zuhdi Ma'ruf

Potential Breakthroughs in Solid Oxide Fuel Cells (SOFCs) Technology: the Era of Novel Structural Cathode Nanotubes Based on Templating Approach
Anisah Shafiqah Habiballah, Nafisah Osman, and Abdul Mutalib Md Jani

.Genetic Variation of Longkon (*Lansium domesticum* corr.) in Narathiwat Province using Random Amplified Polymorphic DNA (RAPD)
Chonticha Saengwiman, Sitiasma Hajibeuraheng, and Suchada Saengwiman

Antioxidant Activity and Toxicity from *Coleus hybridus* Extracts
Dede Indra Syari, Rudi Hendra, and Hilwan Yuda Teruna

Application of Contextual Learningto Improve Science Generic Skills
Dila Rizki Aryani, Nur Islami, Zuhdi Ma'ruf, and Zulhelmi

Motivation of Students in Learning Physics with Experiment Toolkit of Mechanics Wave
Eldwita Busri, Nur Islami, Hendar Sudrajat, and Zul Irfan

Activated Maredan Clay as Adsorbent of Free Fatty Acid in Crude Palm Oil
Elis Damayanti, Devi Karina Putri, Muhdarina Muhdarina, and Nurhayati Nurhayati

Application of The Zener Diode in The Power Supply Circuit
Elyan and M. Rahmad

Development of Gas Calorimeter Experiments as a Medium of Physics Learning
Fenny Suhartiwi, Nur Islami, Zul Irfan, and Hendar Sudrajat

Improving the Quality of Internship Program as a Form of Service-learning
Diong Fong Wei and Ong Sheau Wen

Automated Human Cortical Bone Analyzer
Muhammad Mahadi Abdul Jamil, Hadi Abdullah, Ijaz Khan, Faridah Mohd Nor, Radzi Ambar, Mohd Helmy Bin Abd Wahab, Md. Asri Bin Ngadi, and Johan Bin Mohamad Sharif

Polyester-Graphene Prımer Coatıngs for Structural and Corrosıon Protectıon
Zuliahani Ahmad, Hasniraaiman Abdul Hamid, Mohd Azlan Mohd Ishak, Munirah Onn, Azniwati Abd Aziz, and Wan Izhan Nawawi Wan Ismail

Pressure Sensor Pencil: A Solution for Children with Handwriting Problem
Hidayat and Zulikha Jamaludin

A Simple Qualitative Method for the Screening of Laccase Producers from the Filamentous Fungi *Trichoderma sp.*
Iga Mayola Pisacha, Yuana Nurulita, and Titania Tjandrawati Nugroho

Human Age at Death Estimation from Cortical Bone: An Automated System
Muhammad Mahadi Abdul Jamil, Ijaz Khan, Hadi Abdullah, Faridah Mohd Nor, Radzi Ambar, Mohd Helmy Bin Abd Wahab, Md. Asri Bin Ngadi, and Johan Bin Mohamad Sharif

Utilization of Agro Waste Wild Taro Stalk into High Performance Mesoporous Activated Carbon
M. S. Mohammed Yahya, Jeyashelly Andas, and Zaidi Ab Ghani

Self-Healing Coating from Waste Cooking Oil
Z. Baharom, T. C. Lee, M. I. Idris, H. Z. Abdullah

Nano-sized Hydroxyapatite extracted from Tilapia Scale as Bone Implant Materials
N. A. S. Mohd Pu'ad, H. Z. Abdullah, M. I. Idris, and T. C. Lee

Investigation of Pulse Electric Field Method for Breast Cancer Treatment
N. A. A Rahman, M. M. A. Jamil, M. N. Adon, R. Ambar, and M. H. A. Wahab

Rice Husk Silica Supported 0D AgCo Nanoparticles as Efficient Catalyst for Selective Oxidation of Cyclohexene
Nur Izzati Mohd Anuar, Jeyashelly Andas, and Muhammad Safwat Mohammed Yahya

'Co-Palm': A profitable energy resource in co-gasification
Razi Ahmad, Mohd Azlan Mohd Ishak, Khudzir Ismail, and Nur Nasulhah Kasim

Framing Chinese Primary Education in Malaysia: an Analysis of News Coverage by English-Language Newspaper
Ong Sheau Wen, Ihediwa Samuel Chibundu, and Diong Fong Wei

The Effects of Bed Moisture and Air Flow Rate on Laccase Production in Tray Bioreactor by *Trichoderma sp.*
Sri Helianty, Andi Dahliaty, Titania Tjandrawati Nugroho, Edy Saputra, and Ivanna Nurlianti

Investigation of Electroporation Method and Extract on Cervical Cancer Cell

Suhassni Ganeson, Muhammad Mahadi bin Abdul Jamil, Radzi bin Ambar, and Ridhwan Abdul Wahab

Category C

MiNOVEIN
Shameen Izwan Anthonysamy and Khairul Naim Abd Aziz

One-Pot Synthesis and Toxicity Assay of Pyrazoline Derivatives
Rahma Hayati, Ridwan Yahya, and Jasril

Activity Attendance Monitoring System
I. M. Ayub, S. S. M. Fauzi, R. A. JM Gining, M. N. F. Jamaluddin, S. S. Sulaiman, W. A. W. M. Sobri, and A. J. Suali

Disabled Parking System (DiParkSys v1.0)
M. N. M. Fuad, S. S. M. Fauzi, R. A. JM Gining, A. F. A. Hadi, M. N. F. Jamaluddin, W. A. W. M. Sobri, and A. .J. Suali

Solid Waste Management System
W. A. W. N. Azman, S. S. M. Fauzi, R. A. JM Gining, M. N. F. Jamaluddin, S. S. Sulaiman, W. A. W. M. Sobri, A. .J. Suali

Application Control and Monitoring of Light Usage in Smart Home Environment
Adryan Sudarman ,Akmar Efendi, and Apri Siswanto

Quantitative Methods for The Determination of Laccase Activity
Tengku Arief Buana Perkasa, Mahatir M. Tamher, Yessica Mariesta, Sarah F. Zaili, and Titania T. Nugroho

Molecular Identification of *Penicillium* sp. LBKURCC38 from the Secondary Peat Swamp Forest of Biosphere Reserve Giam Siak Kecil-Bukit Batu, Riau
Yessica Mariesta, Ade G. Gusti, Elfina Rahman, and Titania T. Nugroho

DNA Isolation and Amplification of The Ribosomal-DNA ITS Regions of Two *Penicillium* Sumatran Peat Swamp Forest Biosphere Reserve Strains
Yessica Mariesta, Ade G. Gusti, Elfina Rahman, and Titania T. Nugroho

Pattern Recognition on Human Blood Glucose Level by Using LSI Method
F. O. Putri, H. Shaufia, N. Anugrah, and Zulkarnain

M-learning: Atomic Orbital Viewer of Element for STEM
L. S. Ang, S. S. M. Fauzi, M .Umi Hanim, A. Amin Zhafran, and M. N. N. Najwa-Alyani

Thin Layer Chromatography Separation of Mangosteen Fruit Hull Polar Extract Compounds

Bayu Taufik Imanda, Yum Eryanti, and Titania Tjandrawati Nugroho

A Innovation Making Riau Sago Syrup (Sirup Sagu Riau/'Si Sari') by Harnessing Sago (*Metroxylonsp)* Pith as an Attempt to Overcome Food Crisis in Indonesia

Ibrahim Mukhlis and Syarifudin

INARCH-APPS: An Interactive Game Using Augmented Reality (Ar) For Supporting Students Learning About CPU-Parts & Component

Siti Nur Aqilah binti Mansor and Suhazlan bin Suhaimi

In-Situ Transesterification of Biodiesel from Rubber (*Hevea Brasiliensis*) Seeds using Calcium Oxide as a Catalyst

Asnida Yanti Ani, Muhammad Luqman Md Ali, Siti Kalthum Mohd Nakhrawi, Mohd Fauzi Abdullah, Mohd Azlan Mohd Ishak, Khudzir Ismail, and Farhana Othman

The Implementation of Peer Tutor Method to Improve Student Learning Outcomes in The Subject of Batik Tulis

Ahmad Husaini

The Development of Ar-Asc Binary Application: Learn Binary Addition, Subtraction and Conversion with Augmented Reality Technology

Nur Atika Binti Amat Ismail, Suhazlan Bin Suhaimi, Ahmad Nurzid Bin Rosli, Thineshwaran A/L Muniandy, Asma Hanee Binti Ariffin, Fatin Naiemah Binti Khairulanuar, and Nik ZahiraBinti Nik Muhamad Mustapha

MyPC-Kit: Mobile Personal Computer (PC) Hardware Kit

Thinesswaran A/L Muniandy, Suhazlan Bin Suhaimi, Ahmad Nurzid Bin Rosli, Asma Hanee Binti Ariffin, Nur Atika Binti Amat Ismail, and Fatin Naiemah Binti Khairulanuar

Tuba Spline 2.0

Sharir Aizat Kamaruddin, Shaidatul Najwa Zaınolabdin, Nurul Izzati Jamaludin, Nik Nurmazidayu Mazland, Mohammad Aidil Abdullah, Nur Fatihah Mohamad Sabri, and Muhammad Syahiran bin Mohd Zaki

Preliminary Study of Sound (Quran Verses, No Music and Heavy Metal) to Red Tilapia, *Oreochromis* sp.

Sharir Aizat Kamaruddin, Nur Syazwana Akmal Mohd Zohir, Aziani Ahmad, Zamzila Erdawati Zainol, Wan Muhammad Aniq Irfan Wan Hamat, Amirul Afif Ismadi, and Nur Hidayati Che Nat

Antimicrobial Activity of Growth Media of Local Isolate *Penicillium* sp. LBKURCC29

Nuryani Nenci, Yuharmen, and Yuana Nurulita

Merbok-IPM vs 1.0
Sharir Aizat Kamaruddin, Nurdamia' Yasmin Mustaffa Al-Bakri, Nur Hafizah Md Yusoff, Nik Nor Shafiqah Nik Aziz, Muhammad Dinie Akmal Zainuddin, Muhammad Hariz Adenan, Amir Asyraf Mohamad, and Shaidatul Najwa Zainolabdin

Isolation of Antimicrobial Secondary Metabolites from Fungi *Penicillium* sp. LBKURCC34
Annisa Fitri, Yum Eryanti, and Yuana Nurulita

Finite Element Characterization For Epoxidized Natural Rubber Filled Sepiolite In Determining Crack Criterion
Saiful Bahri Mohd Yasin, Nur Shafiueltywana Mohd Shafie, and Nabil Hayeemasae

FruvegeCC Spray-Biodegradable Coating for Fruits and Vegetables
Nur Khuzaimi Mohd Daud, Nor Athirah Noor Hadi, and Rizana Yusof

GrenEco Biodegradable Plastic
Nor Athirah Noor Hadi, Rizana Yusof, and Nur Khuzaimi Mohd Daud

Antioxidant Activity of Secondary Metabolite Compounds from *Davallia denticulata*
Muhammad Afham, Neri Sofiyanti, Hilwan Yuda Teruna, and Rudi Hendra

Antimicrobial Production from secondary methabolite of *Penicillium* sp. LBKURCC34 stimulated *Staphylococcus aureus*
Khairullinas, Citra Hardiyanti, and Ayu Putri Anugrah

NeeVeSpray – Multipurpose Natural Skin Protectant and Nourishment
Mohamad Azhar Azman and Hamidah Jaafar Sidek

SFLOD: Smart Flooding Detector for Housing Area
Annisa Permata Islami and Muhammad Zakki Islami

Isolation and Antioxidant Activity of Secondary Metabolite Compound from N-Hexane Extract of Miana Leaf (*Coleus scutellarioides*)
Valentio F. Prakoso, Hilwan Yuda Teruna, and Rudi Hendra

Isolation and Toxicity of Secondary Metabolite Compounds from N-Hexane Extract of Miana Leaf (*Coleus scutellarioides*)
Idan artianti, Hilwan Yuda Teruna, and Rudi Hendra

Isolation and Antioxidant Test of Secondary Metabolite from Pirdot Leaves Extract (*Saurauia vulcani* Korth.)
Nila Sari Br. Tompul, Yum Eryanti, Yuharmen, and Rudi Hendra

Isolation and Toxicity Test Secondary Metabolite Compounds from Extract Ethyl Asetat Leaves Pirdot (*Saurauia vulcani* Korth)
Lamhot Maria, Yum Eryanti, Yuharmen, and Rudi Hendra

Brainwave Monitor
Nur Fatimah Hani binti Abdull Mutalib, Norfaiza binti Fuad, Mohd Erwandi Marwan, and Tengku Mohd Nasri

Synthesis and Toxicity Assay of 1-(3,4-halosubstituted-benzylidena)-2-phenylhidrazine
Nur Afriana, Nurisma, and Jasril

Isolation and Toxicity Test of Secondary Metabolite from Ethyl Acetate Extract of Miana Merah Plant (*Coleus hybridus*)
Wiza Septia, Hilwan Yuda Teruna, Rudi Hendra, and M. Almurdani

Isolation of Secondary Metabolite Ethyl Acetate Extract from Leaves and Stems of Miana Merah (*Coleus hybridus*) and Toxicity Assay Against *Artemia salina* Leach
Ridha Aini, Hilwan Yuda Teruna, Rudi Hendra, and M. Almurdani

Isolation and Toxicity Test of Secondary Metabolite from Stem Bark Extract Pulai Basung (*Alstonia spatulata* Bl)
Herlina, Haiyul Fadhli, and Rudi Hendra

One-Pot Synthesis and Toxicity Test Pyrazoline Analogue 5-(3-Fluorophenyl)-3-(Naphthalene-2-yl)-1-Phenyl-4,5-Dihydro-Pyrazol
Vini Tri Anggriani and Jasril

Isolation and Antioxidant Activity Test of Secondary Metabolite of Stem Barks of *Alstonia spatulata* Blume Plant Extract
Yuyun Solifah, Haiyul Fadhli, and Yum Eryanti

Effectiveness Test Leaf Extract Flavonoids *Rizhopora apiculata* as Antibacterial *Aeromonas salmonicida* and Immunostimulan Farmers in Fish Farming
Okta Rianda Saputra, Martiti Silfia, Febrino Yudiananda, and Yuharmen

Turbidity and Acidity Coagulation of Siak River Water by Liquid Coagulant Based on Maredan Natural Clay
Veronika Siahaan, Widya Widya, Halimah Nur Fitriani, Sudarsono Sudarsono, and Muhdarina Muhdarina

Synthetis of Zeolite Throught Natural Clay Activated Sulfuric Acid by Reflux Method
Renny Yulivianti, Devi Ratnawati, and Muhdarina Muhdarina

INDOSTECH (Indonesian Security Technology)
Ghina Junia Syasmi, Khusnul Khotimah, Ridho Prasakti, Mohammad Giffari Anta Pradana, and Wahidya Difta Sunanda

Category D

Underwater friction stir welding of Semi-solid Metal 6061T6
Muhamad Tehyo, Nisida Utamarat, and Navawee Mahadung

Long Tail Boat Engine Modification Using E85
Prathan Srichai, Wasan palasai, and Patree Phoadek

The Innovative Smart Phone Holder
Izwan Nurazfar bin Mohd Erwandi, Izwan Nurwazif bin Mohd Erwandi, Azizah binti Abd Hamid, Norfaiza bin Fuad, Mohd Erwandi bin Marwan, and Engku Mohd Nasri bin Engku Mat Nasir

Category E

Portable Waste Hunter Surface Vehicle
Muhamad Qayyum Dahlan, Herdawatie Abdul Kadir, Khalid Isa, Mohd Helmy Abd Wahab, Mohd Hafiz A Jalil, Rohaiza Hamdan, Radzi bin Ambar, and Rafidah Ngadengon

Aquatic Weed Cleaning Robot
Muhd Ezzuddin Abdul Rani, Herdawatie Abdul Kadir, Mohd Helmy Abd Wahab, Khalid Isa, and Rafidah Ngadengon

Potential Breakthroughs in Solid Oxide Fuel Cells (SOFCs) Technology: The Era of Novel Structural Cathode Nanotubes Based on Templating Approach
Anisah Shafiqah Habiballah, Nafisah Osman, and Abdul Mutalib Md Jani

College Students' Financial Literacy: Determining Factors
Susnaningsih Muat and Fitriani

Internal Architecture of Electrolyte Sub-layer in the Development of Proton Conducting Fuel Cell
Nur Syafkeena Mohd Affandi, Noor Hidayah Aniza Zakaria, Oskar Hardinor Hassan, and Nafisah Osman

Thin Film Production and Characterization $Ba_{1-x}Sr_xTiO_3$ (x = 0.9) for Capacitor Applications
Rahmi Dewi, T. S. Luqman Husain S., Krisman, Zuhdi, and Hamdi

The Influence of Age and Sex on Work-Related Musculoskeletal Disorders Among Hospital Workers in Pekanbaru

Raihanatu Binqalbi Ruzain

Two-dimensional Depth Analysis of The Unconfined Aquifer in Rumbai Pesisir Kota Pekanbaru District
Riad Syech, Juandi M., and Antonius Surbakti

Development of Media *Lectora Inspire* Integrated with Imtaq on Basic Material of Body Defense System for High School Students Class XI
Siti Robiah and Agustina

ExpoUni: File Splitting Technique for Big Data
Rohaya Latip, Chong Mien May, and Hamidah Ibrahim

The Analysis of Economic Growth and Sector Base Development: Pekanbaru Case
Qomariah L. and Nurlasera

Cheap, Accurate and High Performance: A Geoelectrical Resistivity Equipment
Nur Islami

Palm Oil Fuel Ash (POFA) and Cockle Shell (CS): From Waste Materials to Partial Replacement of Portland Cement
Jeyashelly Andas, Nor Azmaziela Mohd Anuar, Nurul Maizatul Akhmar Jamaluddin, and Precella Joseph

Cost Effective Heterogeneous Catalyst Derived from Waste Chicken Bones for Biodiesel Synthesis from Waste Cooking Oil
Jeyashelly Andas and Nur Fazira Elyana Jusoh

Facilitating Learning and Empowering Learners via *Aplikasi Mudah Istilah Teknikal* (AMIT)
Kamisah Ariffin, Nur Asmaliza Mohd Noor, Asmidar Alias, and Anis Hasliza Abu Hashim

Fingerprint Authentication System in Smart Home Environment
Apri Siswanto and Ana Yulianti

The Ideology of the Tak Bai Dialect
Pasteera Chalongdet

Undergraduate Project Assessment Integrated System (U-PAIS): Efficient, Flexible and Practical Assessment
Syamsyir Akmal Senawi, Wan Aizuddin Wan Razali, Hendrie Johann Muhamad Ridzwan, Ruziana Mohamed, Fairudzah Ahmad Lofty, Azhan Hashim, Nurul InfazaTalalah Bt. Ramli

The Development Learning Media Based Traditional Culture Tool on Simple Machine

Fakhruddin Z.

Development of Electromotor Security System
Harisman, Delffika Canra, and Nur Islami

Improving The Innovation of The Stick for a Low Vision, Blind and Older Person
Korn Taksapattanakul

Conference Information Monitoring & Management System (CIMS)
Syamsyir Akmal Senawi, Hendrie Johann Muhamad Ridzwan, Wan Aizuddin Wan Razali, Ruziana Mohamed, Azhan Hashim, Nurul Infaza Talalah Ramli, Azman Kasim, and Fairudzah Ahmad Lofty

The Concept of a Robust Prosthetic Leg Using Topology Optimization
Saiful Bahri Mohd Yasin, Mohd Ashraf Zainol Abidin, Yoga Fernando, Edwin Sapri Kasim, Wan Nur Liyana Aziz, and Mohd Nor Azmi Ab Patar

MySign: A Wearable Sign Language Translation Device
Radzi Ambar, Tan Ching Phing, Mohd Helmy Abd Wahab, Afzanizam Alias, and Muhammad Mahadi Abd Jamil

A Strategy for Strengthening Higher Order Thinking Skills (HOTS) in the 21st Century Learning Model: A Case Study on Ulul Albab Model Tahfiz Kedah, Malaysia
Asma Hanee binti Ariffin, Marzita binti Mansor, Mohd Helmy bin Abd Wahab, Norshima binti Azmi, Rofidah binti Hussein, and Farizz Izzuan bin Busri

Modeling Subsurface Lithology Using Progress 3.0 Software from Geoelectric Data in Labuh Baru Area Pekanbaru City
Maksi Ginting, Juandi M., and Krisman

Interpretation of Unconfined Aquifer Potential by Using Cooper – Jacobs Method
Antonius Surbakti, Maksi Ginting, and Krisman

Analysis of Gaps between Expectations and Perceptions of Service Customer Care Center (C3) PTIPD Using E-Servqual
Elennuari and Megawati

The Application of K-Sharing System to Enhance The Value Propotion of Pharmacy Service
Utari Armila, Nadya Safitri Dongoran, Anga Efriansyah, and Okfalisa

Brand Image and Corporate Reputation in Sharia Banking: a Consumer Perspective
Julina and Fakhrurrozi

Human Resource Development Model of Small, Micro Enterprises Songket in Riau Province
Mahyarni, Astuti Meflinda, and Identiti

College Student's Financial Literacy: Determining Factors
Susnaningsih Muat and Fitriani

Category E: Other

Water Tank Level Detector for Overflow and Water Disruption
Mohamad Shafiq Naufal, Mohamad Shahmi Nidhal, Nurul Adha, and Suhazlan Suhaimi

The Connecting Method of JAWI Single Alphabetical using Augmented Reality
Nurul Adha and Suhazlan Suhaimi

The Innovative Smart Phone Holder
Izwan Nurazfar bin Mohd Erwandi, Izwan Nurwazif bin Mohd Erwandi, Azizah binti Abd Hamid, Norfaiza bin Fuad, Mohd Erwandi bin Marwan, and Engku Mohd Nasri bin Engku Mat Nasir

ISBN: 978-602-6879-97-4

Application of Nguyen Widrow Weight Initialization Algorithm and Backpropagation Neural Network Method to Diagnose Diabetes Mellitus Disease

Elvia Budianita[1], Okfalisa[2], Hidazri Dermawan[3]
[1,2,3]Departement of Informatics Engineering, Faculty of Science dan Technology, UIN Sultan Syarif Kasim Riau
Jl. HR. Soebrantas No. 155 Simpang Baru, Panam, Pekanbaru, 28293
Email: elvia.budianita@gmail.com, okfalisa@gmail.com, hidazri.dermawan@students.uin-suska.ac.id

Abstract - Diabetes Mellitus (DM) is a chronic disease caused by the body's inability to produce hormone insulin or due to ineffective inhibition of insulin production. This research applied the algorithm of Nguyen Widrow weight initialization and Backpropagation Neural Network (BPNN) method to diagnose and classifiythe disease into DM type I, type II, and DM Neuropathy. This used 150 clinical data from laboratory and parameter learning rate (α) in 0.01 to 0.09, epoch in 5 to 30, input, hidden, and output layer respectively [19; 19; 2], [19; 25; 30], [19; 30; 2], and data testing in scale 90: 10%, 80: 20%, 70: 30%. As the result, data testing in 90: 10%, α is 0.03, the epoch in 15 and hidden layer in 30 became the best accuracy with 93.33%. For testing, random weight provided the best accuracy with 66.67%. The combination of these methods has been successfully and effectively used in diagnosing DM disease.

Keywords: Backpropagation Neural Network; Diabetes Mellitus; Nguyen Widrow

1. Introduction

Diabetes Mellitus (DM) is a chronic disease caused by the body's inability to produce insulin hormone or due to ineffective inhibition of insulin production. The characterized by high levels of sugar in the blood. This disease requires care and treatment in a long time, both to prevent complications and in the treatment of pain. The main risk factors are unhealthy eating, obesity, lack of motion, smoking and lifestyle. Increased cases of Diabetes Mellitus is very rapid in the ASEAN region, including Indonesia. In Jakarta, the incidence of diabetes increased from 1.7 percent in the 1980s and rose again to 5.7 in the 1990s and rose again to 12.8 in 2000. Globally, in 2010 Indonesia was ranked 9th as a contributor to the case of diabetes. According to the International Diabetes Federation data in 2012, cases of diabetes in Indonesia has reached 7.6 million and in seventh. (Tribune, 2013). Therefore, it takes an application about DM disease that can help people to know the symptoms and types of DM disease experience. One application of technology that can be used for the classification between symptoms of the disease and the type of disease is Artificial Neural Network (ANN). ANN is a representative of the neural network that exists in the human brain so the neural network can work like a human mindset. ANN has the advantage of learning adaptive. Adaptive learning is the ability to learn how to do work based on data provided for initial training or experience and can create own organization or representation of the information it receives during the learning period. The research that has been conducted on ANN among others is research conducted by (Adha, 2017) about the classification of diabetes mellitus disease using Backpropagation Neural Network method. The research use initialization of random weight which yields accuracy equal to 86.67%. Further research by (Romanus, 2013) on the analysis of the use of the Nguyen Widrow algorithm in the backpropagation neural network in renal disease acquired 89.77% accuracy. In addition, research conducted by (Khushboo, et al, 2014) on image compression using Backpropagation method and Initialization Nguyen windrow, all weights in the network are adjusted in an identical way, thereby preventing and reducing function errors. While the weight on the backpropagation method usually initialized with the small random value. Therefore, conducted research on the application of weight initialization algorithm to diagnose diabetes mellitus using Backpropagation Neural Network (BPNN) method is used to determine the accuracy level and compare how much accuracy between initialization of random weight and Nguyen Widrow.

2. Material and Methods

2.1Artificial Neural Network (ANN)

 ISBN: 978-602-6879-97-4

Artificial Neural Network (ANN) is an information processing paradigm that is inspired by the biological system ofnerves, such as information processes in the human brain. A key element of this paradigm is the structure of an information processing system consisting of a large number of interconnected processing elements (neurons), working simultaneously to solve a particular problem. The workings of artificial neural networks such as the workings of humans, namely learning through example.

2.2 Backpropagation Neural Network (ANN)

The backpropagation ANN model is a development of perception model. This architecture was first proposed by Rumellhart and McClelland in 1986. The main feature of this neural network is the possession of three types of network layers are fully connected, namely: the input receiver network, hidden network, and output network. Network training is done by providing input vectors and output vectors (training datasets).In artificial neural networks, consists of several stages of learning and training process. In the learning process required training data. Training data in this case, DM disease has several variables such as age, sex, blood pressure, history of diabetes, diabetes complications, blood glucose during (GDS) (mg / dl), blood sugar (GDS) 1st day per 8 hours (mg / dl), insulin levels, HbA1c levels, HDL cholesterol (mm / dl), HDL cholesterol levels (mm / dl), triglyceride levels, Hb, leucocytes, platelets, hematocrit, potassium, sodium, and chloride. Target class isincluding DM type I, DM type II, and diabetic neuropathy.

2.3 Nguyen Widrow

Nguyen and Widrow (1990) developed the perception by introducing the rules of network training, known as the delta rule (or often called the small average squares). This rule will change the weights of perception if the output result does not match the desired target. The busy development discussed since the 1990s is the application of neural network models to solve real-world problems.Nguyen and Widrow proposed how to create weights initialization and biases to hidden units so resulting in faster accuracy and iteration. Nguyen-Widrow is used to initialize weights on the artificial neural network which commonly used random weights. The algorithm is as follows (Mishra, Khushboo, et al, 2014):

1. β interval [-0,5:0,5]
2. β = scale factor0,7 $\sqrt{n}$
3. Count $\|v_j\|=\sqrt{v_{1j}^2 + v_{2j}^2 + \ldots + v_{nj}^2}$
4. Weight used as initialization $v_{ij}=\frac{\beta v_{ij}(lama)}{\|v_{j\|}}$
5. Bias used as initializationv_{0j} =bilangan acak antara $-\beta$dan β
6. Bias used as initialization:

   voj = bilangan acak antara – β dan β.

3 Result and Discussion

3.1. Testing Result using Backpropagation Neural Network (BPNN) Parameters

The testing process was conducted by using BPNN parameter based on learning rate value. The difference between random weight and Nguyen Widrow weight was explained in Figure 1. The difference was showed in α = 0.01, 0.02, 0.03 where Nguyen Widrow performed well in 86.67% and 93.33% accuracy.

3.2 Testing Result of Nguyen Widrow Initialization Algorithm

Apart from the training data, the learning rate value is also required during the learning process. The limit value of learning rate is 0.01, 0.02, 0.03, 0.04, 0.05, 0.06, 0.07, 0.08, and 0.09. The maximum limit of Epoch obtained is Epoch 15. The threshold value for y_0 and y_1 used in the testing process is obtained from the test results of data learning process per learning rate and Epoch. It is done from the lowest Epoch which are Epoch 5, Epoch 10, Epoch 15, and the numbers of hidden

ISBN: 978-602-6879-97-4

layers are 19, 25 and 30. The ratio of training data and testing data used in this study are 70: 30, 80: 20, and 90: 10.

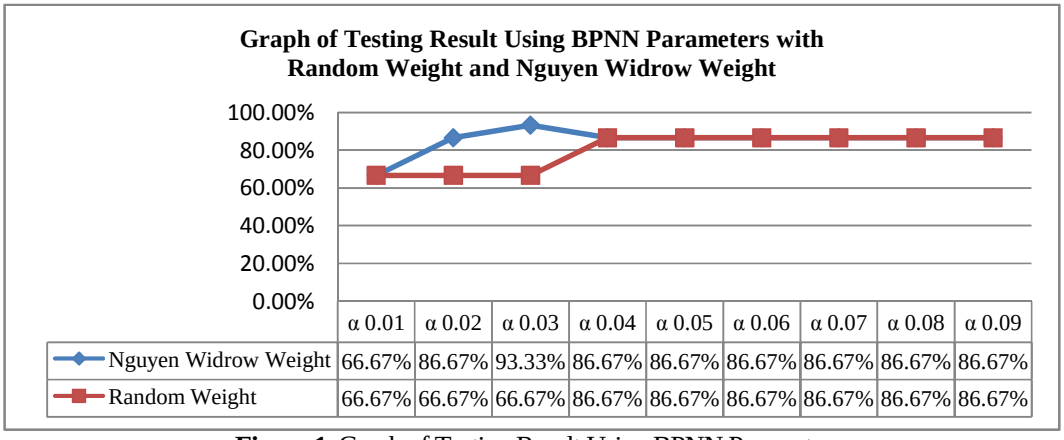

Figure 1. Graph of Testing Result Using BPNN Parameters

Table1. Tests using 90% training data and 10% testing data with 30 hidden layersand Nguyen Widrow weights initialization as follows:

The testing result of Nguyen Widrow initialization algorithm System to diagnose Diabetes Mellitus disease with BPNN method										
Data	15th Epoch with 30 hidden layers									Target
	α 0.01	α 0.02	α 0.03	α 0.04	α 0.05	α 0.06	α 0.07	α 0.08	α 0.09	
1	3	3	3	3	3	3	3	3	3	3
2	3	3	3	3	3	3	3	3	3	3
3	3	3	3	3	3	3	3	3	3	3
4	3	3	3	3	3	3	3	3	3	3
5	3	3	3	3	3	3	3	3	3	3
6	2	2	2	3	3	3	3	3	3	2
7	2	2	2	2	2	2	2	2	2	2
8	2	2	2	2	2	2	2	2	2	2
9	2	2	2	2	2	2	2	2	2	2
10	2	2	2	2	2	2	2	2	2	2
11	2	1	1	1	1	1	1	1	1	1
12	2	1	1	1	1	1	1	1	1	1
13	2	1	1	1	1	1	1	1	1	1
14	2	2	2	2	2	2	2	2	2	1
15	2	2	1	1	1	1	1	1	1	1
Accuracy	66.67 %	86.67 %	93.33 %	86.67 %	86.67 %	86.67 %	86.67 %	86.67 %	86.67 %	

Note :

= Results match the target

= Results do not match the target

 ISBN: 978-602-6879-97-4

Based on testing results using a learning rate from 0.01 to 0.09 in Table 1, the highest accuracy obtained is 93.33% with learning rate (α) 0.03. The testing using 90% training data and 10% testing data with 30 hidden layers and random weights initialization as follows

Table 2. Testing Result for data simulation 90:10

The testing result of Nguyen Widrow initialization algorithm System to diagnose Diabetes Mellitus disease with BPNN method										
Data	15th Epoch with 30 hidden layers									Target
	α 0.01	α 0.02	α 0.03	α 0.04	α 0.05	α 0.06	α 0.07	α 0.08	α 0.09	
1	3	3	3	3	3	3	3	3	3	3
2	3	3	3	3	3	3	3	3	3	3
3	3	3	3	3	3	3	3	3	3	3
4	3	3	3	3	3	3	3	3	3	3
5	3	3	3	3	3	3	3	3	3	3
6	2	2	2	3	3	3	3	3	3	2
7	2	2	2	2	2	2	2	2	2	2
8	2	2	2	2	2	2	2	2	2	2
9	2	2	2	2	2	2	2	2	2	2
10	2	2	2	2	2	2	2	2	2	2
11	2	1	2	1	1	1	1	1	1	1
12	2	1	2	1	1	1	1	1	1	1
13	2	1	2	1	1	1	1	1	1	1
14	2	2	2	2	2	2	2	2	2	1
15	2	2	2	1	1	1	1	1	1	1
Accuracy	66.67 %	66.67 %	66.67 %	86.67 %	86.67 %	86.67 %	86.67 %	86.67 %	86.67 %	

Note :

= Results do not match the target

= Results match the target

Based on the test results in Table 2, the accuracy obtained from learning rate 0.03 is 66.67% while the highest accuracy with learning rate 0.09 is 86.67%.

4. Conclusion

As the conclusion, Nguyen Widrow initialization algorithm System with BPNN method has been successfully applied in diagnosing diabetes mellitus disease. By using the maximum epoch (epoch -15) and learning rate (α: 0.01-0.09), the highest accuracy level is 93.33% in hidden layers 30 and in simulation data training 90:10 with learning rate in 0.03. Meanwhile, the testing result using Nguyen Widrow weight initialization in 30 hidden layers, simulation data trainning in 90:10, and learning rate in 0.03 provided the best accuracy in 93.33%, and Random weight initialization provided 66.67% accuracy. From this, we can conclude that the number of neurons hidden layer, the amount of training data, and the weight initialization can affect the accuracy level.

Acknowledgment

This acknowledgment is given to all parties contribution in this research. The doctor at Sari Medika Clinic, and the staff and lectures in Informatics Department UIN Suska Riau. Hopefully, this research can enrich the theoritical and practice of backpropagation network and initialization of Nguyen Widrow weight method.

ISBN: 978-602-6879-97-4

References

Adha, A, Mita, (2017) “Penerapan Metode Backpropagation Neural Network (BPNN) untuk Klasifikasi Diabetes Mellitus”.Tugas Akhir, Jurusan Teknik Informatika Universitas Islam Negeri Sultan Syarif Kasim, Riau.

Andrian, Y. (2011), “Jurnal Analisis Algoritma Inisialisasi Nguyen-Widrow Pada Proses Prediksi Curah Hujan Kota Medan Menggunakan Metode Backpropagation Neural Network”.

Budianita, E., Prijodiprodjo, W. (2013). “Penerapan Learning Vector Quantization (LVQ) untukKlasifikasi Status GiziAnak”.IJCCS, Vol.7, N0.2, Juli 2013.

Fausett. L, (1994),"Fundamentals Of Neural Network Architectures, Algorithms, and Application", Prentice-Hall, Inc: New Jersey.

Khushboo, M. (2014) "Image Compression Using Multilayer Feed-Forward Artificial Neural Network With Nguyen-Widrow Weight Initialization Method".

Soeryoko, Hero. (2011). 25 “Tanaman Obat Ampuh Penakluk Diabetes Mellitus”. Yogyakarta: Penerbit Andi.

Sriyanto, dan Sutedi. (2010). “Identifikasi Penyakit Diabetes Mellitus Menggunakan Jaringan Syaraf Tiruan Dengan Metode Perambatan-Balik (Backpropagation)”.Jurnal Informatika, Vol. 10, No. 2, Desember 2010, 79-94.

Sutojo, T., Mulyanto, E., dan Suhartono, D. (2010). “Kecerdasan Buatan”. Yogyakarta: Penerbit Andi.

 ISBN: 978-602-6879-97-4

Development of gas calorimeter experiments as a medium of physics learning

Fenny Suhartiwi, Nur Islami, Zul Irfan, Hendar Sudrajat
Faculty of Teacher Training and Education, University of Riau
E-mail: fenny.suhartiwi7874@grad.unri.ac.id

Abstract - Learning media is used to facilitate students in understanding learning materials that are abstract and facilitate the teacher when doing teaching and learning activities. This study aims to produce a suitable gas calorimeter experimental device used in instructional media. Subjects in *Research and Development (R and D)* studies are devices experiment consists of experimental tools and the use of guide books. Five physics education experts participated in the validation process. The data were analyzed descriptively by calculating the validity score of each instrument assessment instrument. The result showed that the average score of validity was 3.238 for experiments with high category and the average score 3.20 for manual of use with high category. The highest validity score is for and ease of indicators tools is 3.50. Of the five validators recommend that the gas calorimeter experimental device is valid used as a medium physics learning medium.

Keywords: Design and Validation, Research and Development, Gas Calorimeter Tools.

1. Introduction

Media is designed to facilitate students in understanding an abstract learning material and also facilitate teachers in conducting teaching and learning activities. And, teaching physics conventionally has been discontinued because it does not attract students, then made a more modern tool to be able to increase interest in physics learning (Bednavora, 2012: 328). Blanka (2013: 1786) in the study of physics requires an approach, both in learning strategies, learning styles, and also needed tools that can support the learning of physics.The development of media in the form of visual aids can improve the attitude of critical thinking and improve student learning outcomes (Hartati, 2010: 1). Karsumi (2012: 8) laboratory-based learning can improve students' reasoning skills in this way hence expected to increase learning outcomes.

A learning device is said to be worthy of use if it has passed the testing phase, either in the form of design and validation of the device (Ricka, 2017: 1). Paidi (2011: 185) some of the steps applied to validate experimental devices first step is design by looking for a problem and conducted preliminary studies, then preparation and manufacture of the device. Validity testing by experts and product revision in the second stage.Validation stage also made some improvements and improvements of the product so it is obtained that the value of the validity of experimental devices with high category and have good quality. Ali. M (2009: 11) the validation results of the electromagnetic field learning media has a very good category with an average score of 3.74 using a Likert scale that has a maximum score of 4. Device validation can also be calculated by using t test, friction force tool able to improve students' critical thinking skill with t value 5,389 with significance level of 0,05 and can increase learning result from 65,24 up to 70,63. So that it can be said that the appropriate friction force (valid) is used in learning, because it can improve critical thinking skills and student learning outcomes (Hartati, 2010: 128).

Trial tools are needed in learning activities. Abstract material in learning for example the heat that can't be seen by the eye of the process of releasing and receiving heat. With the gas calorimeter experiments, the students' understanding of receiving the caloric material is quicker and easier, and the students are also able to present and deduce a data from the experiments conducted. Gas calorimeter experimental devices are expected to be a viable learning medium used in high school physics.

 ISBN: 978-602-6879-97-4

2. Material and Methods

This research was conducted by using Research and Development (R & D) method by Sugiyono (2015).Research phase is divided into 2, namely design and validation of experimental devices. The design phase includes (1) preliminary study, in order to find a problem of literature study by searching related journals and conducting a short survey to find out the facts of learning problems that are in school environment. (2) Design the product, is the process of designing a gas calorimeter tool by sketching the image and preparing and taking into account the equipment used.(3) Construct the product, assembly of equipment is carried out by following the design process. The next stage of validation is divided into 2, (1) Validation, device testing performed to determine the functionality of the tool assessed by the validator. If there is still a shortage, then the improvement will be done until declared valid. (2) Revision, revisions made to follow up previous validation results that still have some deficiencies and then made improvements to fit the research objectives. The research phase can be seen in Figure 1.

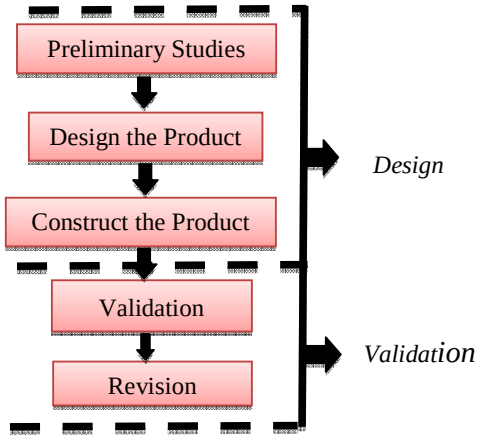

Figure 1. Stages of design research and validation of gas calorimeter experiments

The object of this research is experimental device of gas calorimeter. Validator that examines the object of this research consists of 3 lecturers and 2 high school teachers. Data collection is done by filling the instrument in the form of a questionnaire, then distributed to some validators to get an assessment. Data analysis technique used in this research is descriptive analysis. Assessment on validation questionnaires using Likert scale as shown in Table 1.

Table 1. Category of Validation Sheet Evaluation (Djaali and Pudji, 2004)

No	Category	Score
1	Strongly Agree	4
2	Agree	3
3	Disagree	2
4	Strongly Disagree	1

The average rating category of indicators based on the Likert scale on the experimental device can be seen in Table 2.

 ISBN: 978-602-6879-97-4

Table 2. Category of Validity

No	Average Score	Category	Value of Validity
1	$3{,}25 < S \leq 4$	Very High	Valid
2	$2{,}5 < S \leq 3{,}25$	High	Valid
3	$1{,}75 < S \leq 2{,}5$	Low	Invalid
4	$1 \leq S \leq 1{,}75$	Very Low	Invalid

3. Result and Discussion

Learning devices that have been made consist of gas calorimeter tools and guidebooks of gas calorimeter usage. The gas calorimeter apparatus has been validated by the validator and is declared valid. In Table 3 is a recapitulation of validation results of gas calorimeter tool consisting of seven indicators. Calorimeter tools can be said to be practical and easy to prepare, whether used or packaged after use, with a value of 3.50 with the category VH (very high). The safety of gas calorimeter tools is also categorized VH with the value of 3.33, the use of non-hazardous materials, is one of the advantages of gas calorimeter tool. Other indicators have less significant value differences. The functionality of this tool belongs to the category H (high) with a value of 3.20, equal to the value on the indicator of economic value, size, and accuracy of use. On the functioning of the tool, it can be said that the tool works well that shows the symptoms and phenomena to be observed. Tools and materials used can be easily obtained and have a price that is still affordable so that the high economic value of the tool. The size of the gas calorimeter tool is easily visible, and can be moved around, so it is easy to be re-packed. This tool shows the desired black principle phenomenon and changes in temperature and pressure so that the accuracy of the use of high-value tools. Not only in terms of usefulness but also the tool must also have aesthetic value, which makes the tool look attractive. From the results of the research conducted, validation of the gas calorimeter tool is considered valid shown in Table 3.

Table 3. Recapitulation of Validation Result of Gas Calorimeter Experiments Tool

No	Indicator	Average	Category
1	Functional	3.20	VH
2	Easiness	3.50	H
3	Safety	3.33	VH
4	Size	3.13	VH
5	Aesthetics	3.20	H
6	Accuracy	3.20	VH
7	Accuracy of use	3.20	H
Average Indicator		3.238	H

The manuals on the use of the gas calorimeter tool is part of the experimental device. So the value of the validity of the book must also be validated by the validator. Validate books have separate questionnaires with calorimeter tools. The indicators and results of the manual assessment can be seen in Table 4.

 ISBN: 978-602-6879-97-4

Table 4. Recapitulation of Validation Test Result of Gas Calorimeter Experiment Tool Manual

No.	Indicator	Average	Category
1	Accuracy of Content	3.20	H
2	Appearance	3.20	H
3	Easiness	3.20	H
	Average Indicator	3.20	H

The assessment of the manual is assessed simultaneously with the gas calorimeter tool. With category T the results of the average per indicator as well as each indicator. The average value is still in the H category. This value should be better and higher if some refinements are made. Some indicators on tools that show a value below 3.30 should be repaired again so that the gas calorimeter tool has a perfect value. Likewise with the validation of the gas calorimeter manual.

4. Conclusion

Gas calorimeter experimental devices designed and assembled and validated have been valid for use in teaching and learning in schools. The manufacturing process is in accordance with the Research & Development procedure. The gas calorimeter experimental device design consists of gas calorimeter experiments and a usage manual. Validation of gas calorimeter apparatus declared invalid with high category and manual of gas calorimeter usage also stated valid with high category. Thus, the gas calorimeter experimental device was declared as feasible to be used as a medium of learning for physics at school.

References

Ali, M, 2009, Development of Interactive Learning Media in Electromagnetic Field Course. Jurnal Edukasi 5(1): 11-18.

Bednavora Renata & Merickova Jana, 2012, Learning and Teaching with Technology E-learning as a Motivation in Teaching Physics. Procedia: Social and Behavioral Sciences, (69): 328-331.

Blanka Zajakova, 2013, Learning Styles in Physics Education: Introduction of Our Tools and Design. Procedia: Social and Behavioral Sciences, (106): 1786-1795.

B. Hartati, 2010, Development of Friction Style Apparatus for Improving Critical Thinking Skills High School Students. *Jurnal Pendidikan Fisika Indonesia, (6): 128-132.*

Djaali dan Pudji Muljono, 2004, Measurements In The Field Of Education Postgraduate of State University of Jakarta. Jakarta

Paidi, 2011,Development of Problem-Based Biology Learning Tool. Jurnal Kependidikan, 41 (2): 185-201

RickaTesiMuskania and InsihWilujeng, 2017, Development of Learning-Based Learning Tool To Provide Foundational Knowledge and Increase Scientific Literacy. Jurnal Cakrawala Pendidikan, (1): 34-43

Sugiyono, 2015, Research & Development Methods. *Alfabeta*. Bandung.

ISBN: 978-602-6879-97-4

Application of Nguyen Widrow Weight Initialization Algorithm and Backpropagation Neural Network Method to Diagnose Diabetes Mellitus Disease

Elvia Budianita[1], Okfalisa[2], Hidazri Dermawan[3]
[1,2,3]Departement of Informatics Engineering, Faculty of Science dan Technology, UIN Sultan Syarif Kasim Riau
Jl. HR. Soebrantas No. 155 Simpang Baru, Panam, Pekanbaru, 28293
Email: elvia.budianita@gmail.com, okfalisa@gmail.com, hidazri.dermawan@students.uin-suska.ac.id

Abstract - Diabetes Mellitus (DM) is a chronic disease caused by the body's inability to produce hormone insulin or due to ineffective inhibition of insulin production. This research applied the algorithm of Nguyen Widrow weight initialization and Backpropagation Neural Network (BPNN) method to diagnose and classifiythe disease into DM type I, type II, and DM Neuropathy. This used 150 clinical data from laboratory and parameter learning rate (α) in 0.01 to 0.09, epoch in 5 to 30, input, hidden, and output layer respectively [19; 19; 2], [19; 25; 30], [19; 30; 2], and data testing in scale 90: 10%, 80: 20%, 70: 30%. As the result, data testing in 90: 10%, α is 0.03, the epoch in 15 and hidden layer in 30 became the best accuracy with 93.33%. For testing, random weight provided the best accuracy with 66.67%. The combination of these methods has been successfully and effectively used in diagnosing DM disease.

Keywords: Backpropagation Neural Network; Diabetes Mellitus; Nguyen Widrow

1. Introduction

Diabetes Mellitus (DM) is a chronic disease caused by the body's inability to produce insulin hormone or due to ineffective inhibition of insulin production. The characterized by high levels of sugar in the blood. This disease requires care and treatment in a long time, both to prevent complications and in the treatment of pain. The main risk factors are unhealthy eating, obesity, lack of motion, smoking and lifestyle. Increased cases of Diabetes Mellitus is very rapid in the ASEAN region, including Indonesia. In Jakarta, the incidence of diabetes increased from 1.7 percent in the 1980s and rose again to 5.7 in the 1990s and rose again to 12.8 in 2000. Globally, in 2010 Indonesia was ranked 9th as a contributor to the case of diabetes. According to the International Diabetes Federation data in 2012, cases of diabetes in Indonesia has reached 7.6 million and in seventh. (Tribune, 2013). Therefore, it takes an application about DM disease that can help people to know the symptoms and types of DM disease experience. One application of technology that can be used for the classification between symptoms of the disease and the type of disease is Artificial Neural Network (ANN). ANN is a representative of the neural network that exists in the human brain so the neural network can work like a human mindset. ANN has the advantage of learning adaptive. Adaptive learning is the ability to learn how to do work based on data provided for initial training or experience and can create own organization or representation of the information it receives during the learning period. The research that has been conducted on ANN among others is research conducted by (Adha, 2017) about the classification of diabetes mellitus disease using Backpropagation Neural Network method. The research use initialization of random weight which yields accuracy equal to 86.67%. Further research by (Romanus, 2013) on the analysis of the use of the Nguyen Widrow algorithm in the backpropagation neural network in renal disease acquired 89.77% accuracy. In addition, research conducted by (Khushboo, et al, 2014) on image compression using Backpropagation method and Initialization Nguyen windrow, all weights in the network are adjusted in an identical way, thereby preventing and reducing function errors. While the weight on the backpropagation method usually initialized with the small random value. Therefore, conducted research on the application of weight initialization algorithm to diagnose diabetes mellitus using Backpropagation Neural Network (BPNN) method is used to determine the accuracy level and compare how much accuracy between initialization of random weight and Nguyen Widrow.

2. Material and Methods

2.1Artificial Neural Network (ANN)

 ISBN: 978-602-6879-97-4

Artificial Neural Network (ANN) is an information processing paradigm that is inspired by the biological system ofnerves, such as information processes in the human brain. A key element of this paradigm is the structure of an information processing system consisting of a large number of interconnected processing elements (neurons), working simultaneously to solve a particular problem. The workings of artificial neural networks such as the workings of humans, namely learning through example.

2.2 Backpropagation Neural Network (ANN)

The backpropagation ANN model is a development of perception model. This architecture was first proposed by Rumellhart and McClelland in 1986. The main feature of this neural network is the possession of three types of network layers are fully connected, namely: the input receiver network, hidden network, and output network. Network training is done by providing input vectors and output vectors (training datasets).In artificial neural networks, consists of several stages of learning and training process. In the learning process required training data. Training data in this case, DM disease has several variables such as age, sex, blood pressure, history of diabetes, diabetes complications, blood glucose during (GDS) (mg / dl), blood sugar (GDS) 1st day per 8 hours (mg / dl), insulin levels, HbA1c levels, HDL cholesterol (mm / dl), HDL cholesterol levels (mm / dl), triglyceride levels, Hb, leucocytes, platelets, hematocrit, potassium, sodium, and chloride. Target class isincluding DM type I, DM type II, and diabetic neuropathy.

2.3 Nguyen Widrow

Nguyen and Widrow (1990) developed the perception by introducing the rules of network training, known as the delta rule (or often called the small average squares). This rule will change the weights of perception if the output result does not match the desired target. The busy development discussed since the 1990s is the application of neural network models to solve real-world problems.Nguyen and Widrow proposed how to create weights initialization and biases to hidden units so resulting in faster accuracy and iteration. Nguyen-Widrow is used to initialize weights on the artificial neural network which commonly used random weights. The algorithm is as follows (Mishra, Khushboo, et al, 2014):

1. β interval [-0,5:0,5]
2. β = scale factor0,7 $\sqrt{n}$
3. Count $\|v_j\|=\sqrt{v_{1j}^2 + v_{2j}^2 + \ldots + v_{nj}^2}$
4. Weight used as initialization $v_{ij}=\frac{\beta v_{ij}(lama)}{\|v_{j\|}}$
5. Bias used as initializationv_{0j} =bilangan acak antara $-\beta$dan β
6. Bias used as initialization:

   voj = bilangan acak antara – β dan β.

3 Result and Discussion

3.1. Testing Result using Backpropagation Neural Network (BPNN) Parameters

The testing process was conducted by using BPNN parameter based on learning rate value. The difference between random weight and Nguyen Widrow weight was explained in Figure 1. The difference was showed in α = 0.01, 0.02, 0.03 where Nguyen Widrow performed well in 86.67% and 93.33% accuracy.

3.2 Testing Result of Nguyen Widrow Initialization Algorithm

Apart from the training data, the learning rate value is also required during the learning process. The limit value of learning rate is 0.01, 0.02, 0.03, 0.04, 0.05, 0.06, 0.07, 0.08, and 0.09. The maximum limit of Epoch obtained is Epoch 15. The threshold value for y_0 and y_1 used in the testing process is obtained from the test results of data learning process per learning rate and Epoch. It is done from the lowest Epoch which are Epoch 5, Epoch 10, Epoch 15, and the numbers of hidden

ISBN: 978-602-6879-97-4

layers are 19, 25 and 30. The ratio of training data and testing data used in this study are 70: 30, 80: 20, and 90: 10.

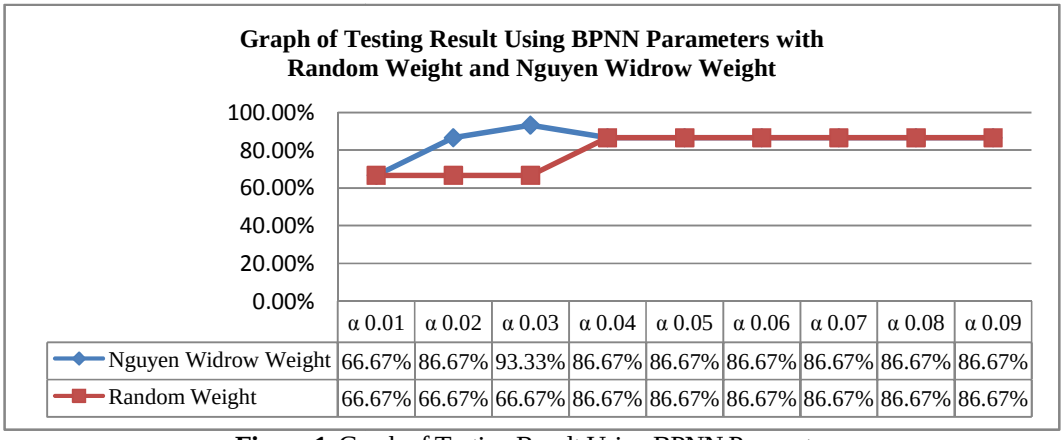

Figure 1. Graph of Testing Result Using BPNN Parameters

Table1. Tests using 90% training data and 10% testing data with 30 hidden layersand Nguyen Widrow weights initialization as follows:

The testing result of Nguyen Widrow initialization algorithm System to diagnose Diabetes Mellitus disease with BPNN method										
Data	15th Epoch with 30 hidden layers									Target
	α 0.01	α 0.02	α 0.03	α 0.04	α 0.05	α 0.06	α 0.07	α 0.08	α 0.09	
1	3	3	3	3	3	3	3	3	3	3
2	3	3	3	3	3	3	3	3	3	3
3	3	3	3	3	3	3	3	3	3	3
4	3	3	3	3	3	3	3	3	3	3
5	3	3	3	3	3	3	3	3	3	3
6	2	2	2	3	3	3	3	3	3	2
7	2	2	2	2	2	2	2	2	2	2
8	2	2	2	2	2	2	2	2	2	2
9	2	2	2	2	2	2	2	2	2	2
10	2	2	2	2	2	2	2	2	2	2
11	2	1	1	1	1	1	1	1	1	1
12	2	1	1	1	1	1	1	1	1	1
13	2	1	1	1	1	1	1	1	1	1
14	2	2	2	2	2	2	2	2	2	1
15	2	2	1	1	1	1	1	1	1	1
Accuracy	66.67 %	86.67 %	93.33 %	86.67 %	86.67 %	86.67 %	86.67 %	86.67 %	86.67 %	

Note :

= Results match the target

= Results do not match the target

 ISBN: 978-602-6879-97-4

Based on testing results using a learning rate from 0.01 to 0.09 in Table 1, the highest accuracy obtained is 93.33% with learning rate (α) 0.03. The testing using 90% training data and 10% testing data with 30 hidden layers and random weights initialization as follows

Table 2. Testing Result for data simulation 90:10

The testing result of Nguyen Widrow initialization algorithm System to diagnose Diabetes Mellitus disease with BPNN method										
Data	15th Epoch with 30 hidden layers									Target
	α 0.01	α 0.02	α 0.03	α 0.04	α 0.05	α 0.06	α 0.07	α 0.08	α 0.09	
1	3	3	3	3	3	3	3	3	3	3
2	3	3	3	3	3	3	3	3	3	3
3	3	3	3	3	3	3	3	3	3	3
4	3	3	3	3	3	3	3	3	3	3
5	3	3	3	3	3	3	3	3	3	3
6	2	2	2	3	3	3	3	3	3	2
7	2	2	2	2	2	2	2	2	2	2
8	2	2	2	2	2	2	2	2	2	2
9	2	2	2	2	2	2	2	2	2	2
10	2	2	2	2	2	2	2	2	2	2
11	2	1	2	1	1	1	1	1	1	1
12	2	1	2	1	1	1	1	1	1	1
13	2	1	2	1	1	1	1	1	1	1
14	2	2	2	2	2	2	2	2	2	1
15	2	2	2	1	1	1	1	1	1	1
Accuracy	66.67 %	66.67 %	66.67 %	86.67 %	86.67 %	86.67 %	86.67 %	86.67 %	86.67 %	

Note :

= Results do not match the target

= Results match the target

Based on the test results in Table 2, the accuracy obtained from learning rate 0.03 is 66.67% while the highest accuracy with learning rate 0.09 is 86.67%.

4. Conclusion

As the conclusion, Nguyen Widrow initialization algorithm System with BPNN method has been successfully applied in diagnosing diabetes mellitus disease. By using the maximum epoch (epoch -15) and learning rate (α: 0.01-0.09), the highest accuracy level is 93.33% in hidden layers 30 and in simulation data training 90:10 with learning rate in 0.03. Meanwhile, the testing result using Nguyen Widrow weight initialization in 30 hidden layers, simulation data trainning in 90:10, and learning rate in 0.03 provided the best accuracy in 93.33%, and Random weight initialization provided 66.67% accuracy. From this, we can conclude that the number of neurons hidden layer, the amount of training data, and the weight initialization can affect the accuracy level.

Acknowledgment

This acknowledgment is given to all parties contribution in this research. The doctor at Sari Medika Clinic, and the staff and lectures in Informatics Department UIN Suska Riau. Hopefully, this research can enrich the theoritical and practice of backpropagation network and initialization of Nguyen Widrow weight method.

ISBN: 978-602-6879-97-4

References

Adha, A, Mita, (2017) “Penerapan Metode Backpropagation Neural Network (BPNN) untuk Klasifikasi Diabetes Mellitus”.Tugas Akhir, Jurusan Teknik Informatika Universitas Islam Negeri Sultan Syarif Kasim, Riau.

Andrian, Y. (2011), “Jurnal Analisis Algoritma Inisialisasi Nguyen-Widrow Pada Proses Prediksi Curah Hujan Kota Medan Menggunakan Metode Backpropagation Neural Network”.

Budianita, E., Prijodiprodjo, W. (2013). “Penerapan Learning Vector Quantization (LVQ) untukKlasifikasi Status GiziAnak”.IJCCS, Vol.7, N0.2, Juli 2013.

Fausett. L, (1994),"Fundamentals Of Neural Network Architectures, Algorithms, and Application", Prentice-Hall, Inc: New Jersey.

Khushboo, M. (2014) "Image Compression Using Multilayer Feed-Forward Artificial Neural Network With Nguyen-Widrow Weight Initialization Method".

Soeryoko, Hero. (2011). 25 “Tanaman Obat Ampuh Penakluk Diabetes Mellitus”. Yogyakarta: Penerbit Andi.

Sriyanto, dan Sutedi. (2010). “Identifikasi Penyakit Diabetes Mellitus Menggunakan Jaringan Syaraf Tiruan Dengan Metode Perambatan-Balik (Backpropagation)”.Jurnal Informatika, Vol. 10, No. 2, Desember 2010, 79-94.

Sutojo, T., Mulyanto, E., dan Suhartono, D. (2010). “Kecerdasan Buatan”. Yogyakarta: Penerbit Andi.