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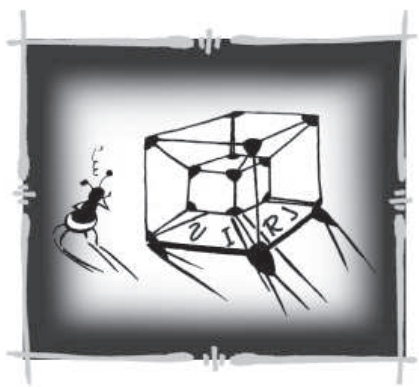

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Aims & Objectives

- To promote original and quality research in various disciplines of science.
- To develop an interdisciplinary research culture.
- To encourage an environment-friendly research promoting sustainable development.
- To provide a venue for the publication of Conference / Seminar Proceedings.

Instructions to Authors

Papers that have not been published elsewhere only will be accepted. Manuscripts should be composed in MS Word (2500 – 3000 typed words) and mailed to virj@vimalacollege.edu.in.

Editorial

It is the fifth volume of *Vimala International Research Journal for Pure and Applied Science* (VIRJ) that is continuing its journey unraveling the Science in our Nature; who is shaping her forms forever and ever.

The research that transcends the confines of current academic disciplines, that explore the uncharted territory, is sometimes going beyond the limits of Science as they are currently understood or trying to push those limits outward into new areas. It is the characteristics of every research at the frontiers of knowledge that one never knows where it will lead, but in the end, if everything goes well, one can often discern a consistent pattern of evolution in one's ideas and understanding. The aim of the journal is to provide a framework for presenting the original perceptions of researchers in different branches of Science in a common platform .

The story of development of each article in the journal symbolizes totally new directions in research which seems to be quite exciting. The journal carefully presents a myriad of special themes; the material world of Graphene, Carbon Nanotubes, the freshwater Volvocales of the Kole lands, the natural Insecticides for Poultry louse, the Artificial Neural Network theories, the simulation on Artificial Intelligence, the beauty of Chaos in Jerk Circuits, the Food Patterns of different societal areas and finally the Fuzzy Logic application to a flood affected society. Hence it is like a small expedition through the vast interdisciplinary scientific terrain. We ardently hope that all the contributors of the articles will pursue the research tenaciously, systematically and carefully to realize productive outcomes for the benefit of the society.

Thanks to all the executive editors, the editorial board and the press for the support and services rendered in making this volume a reality. The Science community of Vimala College has always been contributing to the journal in all possible ways. We look forward to the Science community to publish research articles in our journal to Experience, Expertise and Excel in Science. We thank the God Almighty for leading and guiding us throughout this successful endeavor.

September 2019

Editor
VIRJ for Pure and Applied Science

Dehydration Defined Ion Selectivity in Graphene-Based Membranes

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Abstract

Selectively permeable membranes with a sub-nanometre (sub-nm) sieve size are attracting tremendous interest due to their similarities with biological ion channels, a unique mechanism of ion selectivity and potential applications in water filtration, molecular separation and desalination. Sub-nm pores with a pore size comparable to, or smaller than, the size of hydrated ions are predicted to show enhanced ion selectivity, due to the difference in ion dehydration behaviour defined by the electrostatic interactions between ions and water. This study focus on Molecular permeation through GO membranes proceeding via a pathway throughout the inter-layer (IL) graphene channels and its sieving properties defined by the IL-spacing, which is susceptible to the water content in the environment.

Key words : GO membrane, Molecular permeation, Selectivity

Freshwater Volvocales (Chlorophyceae) from Thrissur Kole lands, part of Vembanad - Kol (Ramsar site), Kerala, India

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Abstract

The present paper is a systematic documentation of Volvocales (Chlorophyceae) with photomicrographs, from the Kole lands of Thrissur, Kerala, India, which is a part of Vembanad - Kol, a declared Ramsar site of Kerala. This study describes three species of *Pandorina* Bory, one species each of *Eudorina* Ehrenberg, *Pleodorina* Shaw and *Volvox* Linnaeus with their distribution in India. The seasonal and spatial variation of the taxa also analyzed. *Pandorina* Bory and *Eudorina* Ehrenberg are the pollution tolerant algae, considered indicative of enriched waters and providing evidence of pollution of water in the study area.

Key words : Volvocales, Chlorophyceae, Freshwater algae, Ramsar site, Vembanad – Kol

Comparison of Logistic Regression and Artificial Neural Networks for Prediction of Developmental Delay

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Abstract

Logistic Regression (LR) and Artificial Neural Networks (ANN) are two different methods which can be used to predict dichotomous outcomes like developmental delay. Most of the articles comparing LR and ANN reports ANN as superior than LR. It has been observed that number of independent variables used in ANN is more than LR in these articles. This paper examines performance of ANN and LR based on data in Rohini (2014). It has seen that ANN and LR are similar in terms of area under the curve (AUC)when only linearly associated and significant independent variables are used for prediction. But when insignificant independent variables and significant variables together used for prediction, ANN becomes superior than LR in terms of accuracy measures. The reason for the same might be the non-linear associations existing between the independent variable and dependent variable.

Keywords : Logistic regression, Artificial neural network, AUC, Developmental delay, Accuracy

Barium Titanate/Mutiwalled Carbon Nano Tube based Natural Rubber Nanocomposites for Electromagnetic Shielding Applications

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Abstract

This study aims to prepare Barium Titanate ($BaTiO_3$)/Mutiwalled Carbon nanotube (MWCNT) based Natural Rubber nanocomposites by conventional two roll mill mixing method. $BaTiO_3$ is prepared via sol gel process and characterized by several techniques. Hybrid filler is prepared by grinding both $BaTiO_3$ and MWCNT in an agate mortar by simple grinding. A detailed investigation of mechanical, morphological and dielectric characteristics of prepared nanocomposites was done. Finally applicability of this material as an EMI shielding material is explored.

Keywords: Polymers nanocomposites, $BaTiO_3$, MWCNT, hybrid filler, electrical behaviour, EMI shielding

An Experimental Exploration of Chaos in an Electronic Jerk Circuit

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Abstract

Nonlinearity is a universal feature of the real world. It is thus valuable to illustrate in a simple system, the important features that nonlinearity introduces. A chaotic Jerk circuit is realized, which was well predicted by a variant of the simplest differential equation whose solutions are chaotic. We have implemented a Jerk circuit to realize a simple jerk equation using operational amplifier (op-amp) TL-082, p– n junction diode IN4007, different resistances and capacitors. The circuit consists of three successive active integrators in a feedback loop plus a second non linear feedback loop involving only two of the integrators and an inverter with a diode. As the variable resistor is varied slowly, the period was showing a doubling scroll leading to a chaotic behavior through P2, P4 and P8. Then the beautiful feature that distinguish chaos from noise was that a region of periodicity with P6 again appeared followed by a second Chaotic region and then periodic region with period P3.The cycle of periodicity and chaotic region forms the basis of the nonlinear dynamic characteristics of chaos. The small changes in the control parameter routes the jerk system to chaos. The attractor plots in the x-$\dot{x}$, $\dot{x}$ - $\ddot{x}$, and x - $\ddot{x}$ planes were observed which showed typical signatures of chaotic attractors. The value of the control parameter $\boldsymbol{a}$ is found to be consistent with the theoretical and experimental values reported.

Keywords : Dynamical systems, Chaos, Jerk circuits, Period Doubling, Chaotic Attractors

Food Consumption Pattern in Farmer Households at Idukki District of Kerala

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Abstract

Agriculture is the only essential industry we have in this world as it is the field which produces food to satisfy hunger of the world.The farmers are unable to recover their money spend during cultivation of crops from harvesting. In light of this, the present study was carried out to assess the food consumption pattern of farmer holds at Idukki district of Kerala. Hundred farmer households from Vathikkudi Gramapanchayath of Idukki district were selected for the study. Data collection was done through questionnaire. The results of the study indicated better availability of different food items for consumption for the population.

Key Words : Farmer households, Food consumption pattern, BPL families, APL families

A Study and Simulation of Chatbots at Hospitals using Artificial Intelligence

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Abstract

The concept of Artificial Intelligence (AI) was introduced into the world of machines from fifth generation of computers. From then, we have witnessed a tremendous impact of AI and Machine learning in every bit and bytes of technology driven gadgets and applications. AI has also made chatbots resemble to natural life than ever before, and they are becoming pervasive in various domains of lives. This paper presents a novel idea of a medical chatbot which assists a patient at the outpatient department of a hospital. Using a blend of Machine learning and AI the chat bot responds to the users query in a diagnosis mode and suggests the physician or doctor the patient could meet for further treatment procedures. The methodologies adopted in the paper makes use of an external medical database in order to obtain the correct diagnosis of diseases. This chatbot was alpha tested to assess the performance and it is inferred that a scalable model of the chatbot will be useful in the real medical domains.

Keywords : Artificial Intelligence, Machine Learning, Natural Language Processing, Chatbot

Insecticidal Activity of Certain Plant Extracts against Poultry Louse

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Abstract

Poultry industry provides an economic and effective source of animal protein within the shortest possible time, playing vital role in narrowing down the animal protein supply gap. Lice are common pests on poultry. They feed on blood, feathers, skin or scales of the bird. Heavy infestation can result poor health, reduced growth and egg production and even death of birds. The use of chemical insecticides in poultry may lead to problems in both host and environment. Hence the present study to explore the insecticidal effect of herbal extracts would serve as a platform for the development of organic insecticide. In vitro filter paper method was adopted for testing the efficacy of different concentration of Calotropis gigantea, Annona squamosa, Lantana camara for each trial. The lice selected for the study were recovered from the backyard chicken. They were morphologically identified as Lipeurus spp. and Goniodes spp. The trials proved the significantly high insecticidal activity of ethanolic extract of Calotropis gigantea than Lantana camara and Annona squamosa in each concentration. This shows that extracts from Calotropis gigantea and Annona squamosa possess better insecticidal activities than Lantana camara which were directly proportionate to the concentration and incubation period. The study encourages the documentation of insecticidal activity of different locally available plants and production of organic drugs.

Keywords : Calotropis gigantea, Annona squamosa, Lantana camara, Poultry louse.

Nutritional Status and Haemoglobin Level of Adolescents among Scheduled Caste Community

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Abstract

Adolescence is a transitional stage of physical and psychological development that generally occurs during the period from puberty to legal adulthood. Eating patterns and behaviors of adolescents are influenced by many factors, including peer influences, parental modeling, food availability, food preferences, cost, convenience, personal and cultural beliefs, mass media, and body image. Scheduled caste is the depressed Class, which referred to those classes or categories of persons who were poor and exploited, and socially and ritually degraded. The present study was carried out to assess the nutritional status and haemoglobin level of adolescents among scheduled caste (SC) community. For this study hundred SC adolescents aged between 15 – 18 years old were selected as macro samples, randomly from the SC population. Questionnaire method was used for data collection. Dietary assessment, anthropometric measurement and clinical examination were employed to assess the nutritional status. Hemoglobin in the blood was estimated in 50 samples to assess their general iron status. This study concluded that 58 per cent of the SC adolescents had normal weight according to their height and 52 per cent of them were anemic due to poor food and nutrient intake.

Key Words : Body mass Index, Recommended Dietary allowances, Scheduled Caste

Sieve Out Flood Victims using Fuzzy Decision Making

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Abstract

Analytic Hierarchy Process (AHP) is a mathematical decision making tool based on Multi Criteria Decision Analysis (MCDA) . Kerala has been badly affected by unexpectedflood calamity in 2018. In this paper, we have selected five households and five criteria that affected these households due to flood in Kerala AHP method facilitated analysis of the flood-levels at five victim household items selected randomly from Nandipulam village, Thrissur. Five main criteria such as Food, Housing, Business, Social status, Clothing and Valuable accessories along with their ten sub criteria are considered. Using the decision making tool AHP , we have found which criteria has affected them the most.

Key words: Analytic Hierarchy process, Fuzzy set, Fuzzy Decision Making, Membership Function, Flood.

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I Dr. Sr. Beena Jose, Principal, Vimala College (Autonomous) Thrissur hereby declare that the particulars given above are true to the best of my knowledge.

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Dated : 3 September 2019

Dr. Sr. Beena Jose
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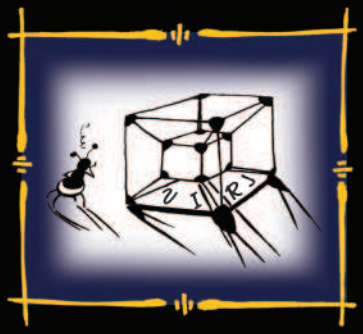

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