ABSTRACT BOOK

Indian Science & Engineering Fair

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DHOLAKIYA SCHOOLS

January 7 - 9, 2017, Dholakiya Schools, Rajkot

INDEX

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Science Society of India (SSI) is a registered non profit trust created to promote, assist, facilitate & encourage scientific acumen among people.

It organizes INSEF (Indian Science & Engineering fair) Regional fairs across India to promote project based learning. Here students get a platform to demonstrate their projects. Gold medal winners from various INSEF Regional Fairs get selected to participate in the INSEF National Fair.Top-3 winners from this national fair are selected for International Science Fair I-SWEEEP, U.S.A..

Forward from Dholakiya Schools...

The school is happy to join the hands with Science Society of India (SSI) for hosting INSEF National Science Fair - 2017 where young innovators will meet to showcase their talent. Dholakiya School promotes innovations by hosting various science fairs starting from school level where about 1200 projects are displayed by the students. The school has been hosting INSEF Regional Fair for the last 4 years.

PLANTSERVATIVES AS WIPES

ONLINE ID: 1586
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GUIDE TEACHER: PRASITHA NAIR
STD: 9th, THE NORTH MUMBAI WELFARE SOCIETY'S HIGH SCHOOL, MUMBAI, MAHARASHTRA

Abstract:

Nature has been a source of medicines for thousands of years and an impressive number of modern drugs have been isolated from natural sources. Both Oxalis corniculata(Wood Sorrel) leaves and Coleus aromaticus(Ajwain leaves) have got lot of medicinal values like antibacterial,diuretic,expectorant, astringent effect on wounds etc.The present generation is so much dependent on cell phones, that they are more prone to infections caused due to oral bacteria present on the mouth piece of cell phones eg.Nosocomial infections. Our project aims to find out if the extract of leaves of Wood sorrel and Ajwain can act as an antibacterial wipe for the cell phones.The antibacterial test was performed in sterile condition by using Agar cup diffusion method.Four extracts were prepared for the tests, in benzene, chloroform, pet.ether and alcohol.The extracts were prepared in 1:10 ratio (1g of powder in 10 ml of each solvent).The antibacterial tests were conducted on the swabs collected from mobiles.The test was done in triplicate (Wood sorrel; Ajwain; Mixed) with sterile Petri dish (10×10 cm) containing Mueller Hinton agar (of 0.5 ml) and a well of 8 mm diameter approximately was punched with sterile metallic borer.The wells were filled with 1ml of 4 different extracts. The dishes were labelled and incubated for 48 hours at room temperature. At the end of incubation period, the zone of inhibition (diameter) was measured.According to observations, the most potent extract against bacteria present on mobiles was the mixed extract of Wood sorrel and Ajwain followed by other extracts.Thus, it was concluded that Wood sorrel and Ajwain leaves have the antibacterial property and can be used to make wipes for inhibiting bacterial growth. The screen guard of the cell phones can have a coating of Wood sorrel and Ajwain leaves extract to prevent the infections caused by oral bacteria present on them. As the solvents had some antibacterial property, we compared the control (solvents) and the test (plant extract). The control showed less inhibition zone as compared to the test. For comparing the bacterial growth, mobile was divided into two equal parts .One part was coated with the plant solution and other part was left as it is. Then the specimen was collected and later on swabbed on the petri dish and was incubated for 24 hours. According to the observations the bacterial growth in the specimen which contained the extract was less as compared to the specimen which did not contain the extract. We tried using safe organic solvent, isopropanol which also showed the same inhibiting property. Then making of prototype wipes is tried using the plant extract mixed in isopropanol applied on a normal soft tissue. The process of making wipes is in progress.

LOW COST PLANT TISSUE CULTURE MEDIA

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GUIDE TEACHER: Shalini. S
Std: 9th School: Vagdevi Vilas School, Varthur, Bangalore

Abstract:

The aim of our project is to grow the plants with our Low Cost Plant tissue culture media which is more affordable for everyone.

For the first time we have invented another formula to grow plants without soil, without sunlight and with addition of only two drops of normal water for watering them daily.

It's present uses are:

1. By using the process of nanotech i.e., we can grow plants in our kitchen cabinets and if we want to cook,we can cut the leaves and use them directly for cooking.

2. People who live in apartments mostly may not be having the facility of garden, so, they can grow indoor gardens using our media.

It's future uses are:

1. As we are trying for living in planet MARS so we can implement this idea in planet MARS and grow green there.

It is 100% organic and contains 0% chemicals. This formula is a combination of plant gel and solidifying agent. It's plant hormones are also organic like honey water, cinnamon powder, coconut water and vinegar.

As it is transparent, to beautify the plants, we can add organic colours to it like beetroot juice, watermelon juice, turmeric powder.

Computer Aided Discovery of Novel c–Myc–Max mediated Gene Transcription Inhibitors to combat Cancer

Bio.-03

Online ID:1884
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Abstract:

Cancer epidemic remain a constant threat to public health worldwide. The WHO predicts that the number of new cancer cases will rise to 22 million in the next two decades, from 14 million cases with 8.2 million fatalities in 2012. Antineoplastic drugs are crucial to treat patients until we have highly accurate diagnosis services. Therefore, new anti-cancer drugs are urgently needed to prepare for incessant epidemic. Transcriptional regulation of c-Myc (E–Box activation) cascades are key signalling pathways involved in the regulation of normal cell proliferation, survival and differentiation. Deregulation of c–Myc contributes to carcinoma. The c–Myc–Max complex (E– Box) mediated gene transcription is well conserved and essential part for aberrant deregulation of c– Myc, which makes it a potential drug target. Inhibitors for the same could potentially block the growth/metastasis of cancer, which is required for excision of breast, non small cell carcinoma et cetera. I used an interdisciplinary approach combining computational research with biological assays to expedite the discovery of new Myc inhibitors. A novel pipeline was introduced for virtual screening of compound libraries; which included, using Convolutional Neural Networks (CNN) for activity and free binding energy prediction and alignment of small molecule inhibitors for Myc oncoprotein. Aforementioned parameters were used to assess the potency of ligand, while probabilistic pharmacophore models were built and used for final virtual screening of compound libraries via Inductive Logic Programming (ILP). A fluorescence-based assay was set up to validate virtual screening hits as Myc inhibitors. In parallel, molecular dynamics simulations and computational solvent mapping of the c–Myc were performed to construct a comprehensive database of binding pockets and druggable hot spots. Comparative Molecular Field Analysis aided in drawing the rudimentary 3D structure of ligand given the bioactivity yielded by CNN. Molecular docking of the discovered inhibitors to Myc protein active sites revealed interacting residues. Qualitative Structure and activity relationship (SAR) analysis led to identification of more drug leads. As a result, I identified a number of new, potent and structurally diverse c–Myc inhibitors with great potential to be developed into new anti–metastatic cancer drugs. The structural study also provided valuable information for designing even more potent inhibitors. Moreover, study establishes the principle importance of machine learning and its usage in the field of drug discovery. Therefore, these findings will help combat cancer and save lives. A patent would be filed on my discovery after the permission is granted from INSEF Selection Board.

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"Immunizing Brinjal and Tomato Plants against Leaf Blight and Early Blight Disease caused by Alternaria solani Using Amino acids as Elicitors"

Online ID:1929
PARTICIPANT: Prakruthi R U Kumar
GUIDE TEACHER: Dr. B.S. Ravikumar
Std: 10 School: Army Public School, PRTC. , Bangalore, Karnataka

Abstract:

Plant immunization is the process of triggering natural defence system present in plants induced by biotic or abiotic factors. Brinjal (Solanum melongena L.) and Tomato (Solanumesculentum Mill.) are the most important worldwide used plants, rich in minerals and dietary fibres, involved in curing many diseases. But in recent years, production of these plants has been severely affected by leaf blight disease caused by the fungal pathogen, Alternaria solani. In this study, A.solani was isolated and characterized by standard methods; identity of species was further confirmed by microscopy. The glycine (neutral), lysine (basic) and Aspartic acid (acidic) amino acids were selected as elicitors to study the growth promotion and induction of resistance against leaf blight disease in brinjal and against early blight disease in tomatoes. The seeds of plants were treated with various concentrations (1mM, 2mM, 4mM and 8 mM) of all the three amino acids for 3 hours. After 14 days of incubation, seed germination and seedling vigor index was calculated. The experiment was carried out in triplicates, where n >10.The results were observed. Glycine, aspartic acid and lysine treated brinjal and tomato seeds along with resistant seeds were grown under greenhouse conditions. The 30-day old seedlings were challenged with A. Solani by spray inoculation method. We found that, in tomato plants, 1mM lysine showed better resistance to the disease compared other concentration. The results in brinjal plants reveal that, 2mM aspartic acid showed high vigor index and much resistance compared to others. The resistance may be because of the involvement of amino acids in the synthesis of secondary metabolites, which give resistance to the plants.

References:

Use of Abiotic and Biotic Inducers for Controlling Fungal
Diseases and Improving Growth of Alfalfa
Kadry Mohamed Morsy, MontaserFawzy Abdel-Monaim and
Mohamed Mahmoud Mazen
Plant Pathol. Res. Inst., ARC, Giza, Egypt

Influence of Biotic and Chemical Plant Inducers on Resistance of Chilli to Anthracnose
Le ThiKieu Oanh1, Vichai Korpraditskul1,
Chainarong Rattanakreetakul1* and Sirikul Wasee2

Elicitation of defense related enzymes and resistance by L-methionine
in pearl millet against downy mildew disease caused by Sclerosporagraminicola
Bejai R. Sarosh a,1, SubramoniamSivaramakrishnan b,*, Hunthrike S. Shetty a

A natural novel coagulating agent from Averrhoa Bilimbi for rubber latex

Online ID:1783
PARTICIPANT: (1) Aman K.A (2) Nachiketh Kumar
GUIDE TEACHER:
Std: 9th School: Indraprastha Vidyalaya, Puttur ,Karnataka

Abstract:

A common fruit seen in our area named bilimbi [Averrhoa bilimbi] is not just a weed fruit. It has got much medicinal importance. To check its potential we have tried the extract of this fruit which acts as a natural non- corrosive coagulating agent for rubber latex.

1ltr of bilimbi extract is prepared by grinding 1kg of bilimbi fruit with 100ml of water. To coagulate 2ltrs of Rubber Latex, we have to add 60ml of filtered bilimbi extract. It took 10hrs to coagulate .We observed that rubber latex coagulated 6hrs less time when compared to rubber latex mixed with formic acid.

Rubber Latex is a colloid in which rubber particles dispersed in water solution and are negatively charged. Effectiveness of the acid to coagulate depends on the number of positive ions. While bilimbi extract is added to the rubber latex a physical reaction takes place by neutralizing the negative colloidal particles in the rubber latex and makes them bigger particles. If the rubber latex exceeds 10-6m, the particles settle down and the coagulation takes place.

1ml of bilimbi extract can produce 2 H+ ion because it contains oxalic acid. .Formic acid which is commonly used by the farmers to coagulate rubber latex produces only 1 H+ion . So it requires double the quantity of acid than the bilimbi extract.

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We have conducted Physiochemical tests like anti bacterial, anti fungal, pH and TLC of bilimbi extract in Yenepoya research centre at Deralakatte. The pH of the extract is 1.31.As it has anti microbial property the rubber sheet cannot be infected by microbes easily.
We conducted viscosity, pH, element test and surface tension tests in Vivekananda Degree College. Tests on tensile, break load, elasticity, Abrasion test, high resilient power, etc were conducted in RV College of Engineering Bangalore.

Formic acid is highly corrosive and costlier than bilimbi extract which easily available in bulky, cheaper, eco friendly, natural, non toxic.

At-Home EEG Graphical User Interface for real-time Cognitive Analysis

Comp Sci-01

Online ID: 1572
Participant: Rohan Hundia
Mentor: Dr. Ronak Shodhan
School: Ahmedabad International SchoolCity: Ahmedabad

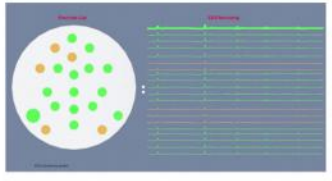
Abstract:

My project is a brain recording and analysis user interface system that I have developed based on the working of an electroencephalography (EEG). The software application streams and displays EEG brain waves from 8 different channels (scalp electrodes) along with brain montage which shows the impedances (in a colour code) at each of these 8 different brain regions. My project is divided into two major categories: the development of the GUI system in Unity3D and the analysis of the recorded cognitive data in MATLAB. The high-end user interface system filters and amplifies brain data, streams in brain waves (real-time) using Labstreaminglayer (LSL) library, displays brain montage and conducts regular status calls to ensure proper functioning of the GUI.

The working of the user interface is categorised as steps below:

1. Connects to an external bio-amplifier using Transmission Control Protocol (TCP) based socket-client interactions.
2. PullstheEEGdataovertheBluetoothfromtheamplifierinchunksusingLSL(Labstreaminglayer)librarytocreatedatainlets.
3. Filters the raw EEG data based on the concept of third order Butterworth filters (High pass and low pass) to get only the desired frequencies i.e. between 0-35 Hz.
4. Normalising the brain data by implementing Z score transform to set threshold values.
5. Displays the EEG brain data in real-time on the front-end of Unity3D (data is updated every 0.085 seconds) and also displays brain montage (mapping) for impedance control
6. Records and stores brain data in raw format in a .easy/.txt file
7. MaintainsregularstatuscallslikeEEGmonitoringstarted,DeviceDisconnectedetc.tomaintainproperfunctioningofGUI.

Once the real-time EEG streaming is carried out the raw EEG data which is stored as a txt file is analysed in MATLAB using a technique known as wavelet decomposition. This technique breaks down the main signal (mother wavelet) into tinier chunks of discretised signals both in the frequency and time localised domain. Therefore, during analysis, I get the power spectral amplitude values of different brain waves alpha, beta, theta, delta and gamma. Using this I get a detailed analysis of various cognitive features like attention, sleep levels, working memory etc. For example: Attentional Measure = Power Beta/ Power Alpha if this value is less than 0.5 it means poor attention, if it is between 0.5 and 0.7 then good attention and if it is above 0.7 it means great attention. Similarly, I also get a detailed analysis of other cognitive features like memory, sleep levels, focus etc. This interface has been tested over 125 students (both typically developing and suffering from cognitive disorders) in and out of Ahmedabad. It is currently being used over students suffering from ADHD, Dyslexia etc.



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Project Alpha 9

Online ID: 1937
PARTICIPANT: Shreyas U Kapale
GUIDE TEACHER: Uday C Kapale
KLE independent Pu college Belgaum, Karnataka

Abstract:

Alpha 9 is a affordable smart robot for people, it costs nearly 5000rs.It can do many advance things like a big robot can do. It can recognise faces, objects(using openCV + python / c). It has wheels for moment and a camera! Its crafted with raspberry pi minicomputer which can run a whole fully-flanged Linux distribution. The robot can be used in homes, offices, security sectors. Robot has its own AI , the robot can also be manually controlled by an app developed by me using PHP, HTML, and wiring pi. Alpha9 can be used as a patrol robot, surveillance, research...the applications of this robot are limitless so to make it more advance i developed a software by which students can program it and extend its capabilities. It also protects the owner's wifi by encrypting the whole network. It can be also used for spying critical victims data which is possible due to its AI and open source projects like reaver, aircrack-ng or more basically (wifite) and for sniffing it uses wireshark.

Applications

Alpha 9 can be used as home assistants and also protects user from accidents. (python 3 . LIB openCV)
can be used as a surveillance bot on streets and can identify thief's
can be used as a security bot
can be used for exploration and research
can be used to teach children robotics and basic programming
It can even sing and can read for you
It can be controlled from any corner of the world because its connected to internet
It can control other IOT devices too
It can be used for agriculture too

What is the innovation ?

Its the first most affordable smart robot which can be bought by everyone
Its can help people learn programming and make their own robots too ! without any programming background
Its connected to internet so you can access it from anywhere! around the globe

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Solar powered desalination module with thermal feedback

Online ID: 1930
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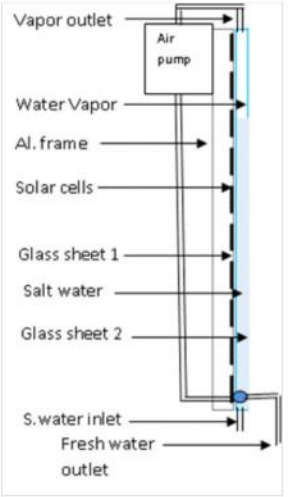
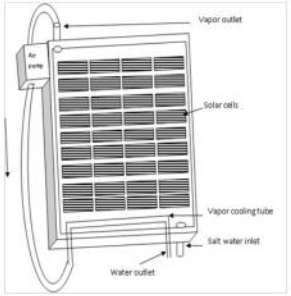
Std: 10 School: VSSC Central School, Thiruvananthapuram, Kerala





Abstract:

Building Integrated Photovoltaic (BIPV) modules are gaining popularity for its multiple benefits. Here amorphous silicon (a-Si) based solar cells are sandwiched between toughened glass plates to serve as roof material producing electricity. Our project of solar powered desalination module is based on modified BIPV modules for simultaneous desalination process. We found that three interesting parameters of a-Si performance coincide at 400nm of solar spectrum. They are:-

(a) Maximum intensity of solar spectrum is at 400nm.
(b) Liquid water has least absorbance at 400nm.
(c) An a-Si cell has maximum efficiency at 400nm.

We conducted experiments to measure effect of water shielding over a-Si solar cells and found that keeping a thin layer of water (2-6mm) over cells does not reduce efficiency of the cells. On contrary a slight increase in solar cell output is seen. Considering these facts, we fabricated water sandwiched BIPV modules in such a way, that about 2mm water column is introduced over exposed solar cells. This layer of water absorbs heat rays (infrared) from sun and only photovoltaic visible light is allowed to fall on the cells. Water column within glass envelope evaporates by removing heat rays from sunlight. A vacuum pump operating on solar energy, created vacuum over water column and enhanced evaporation of water which contains dissolved salt. The vapour thus formed is void of any salts and is made to condense through heat transfer. Since only a small portion (≈ 10%) of solar photovoltaic is used for operating vacuum pump, major portion of electrical output is made available for other useful works. By operating our module, we can get solar electricity and desalinated water simultaneously from a roofing structure. A schematic representation of the module is attached here for better understanding.

References:

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(2) Solar insolation data sheets- mnre.gov.in
(3) pvmeasurements.org

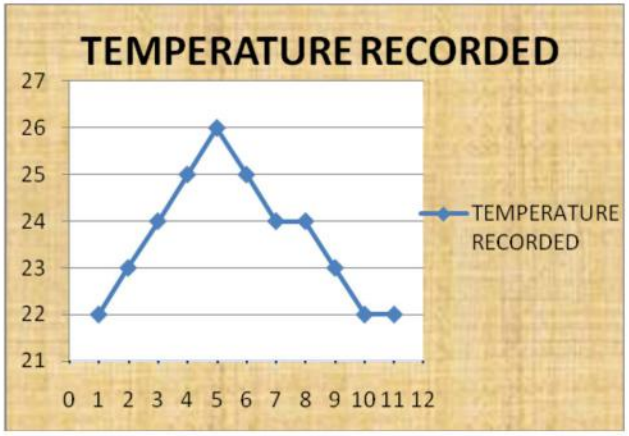
RURAL REFRIGERATOR

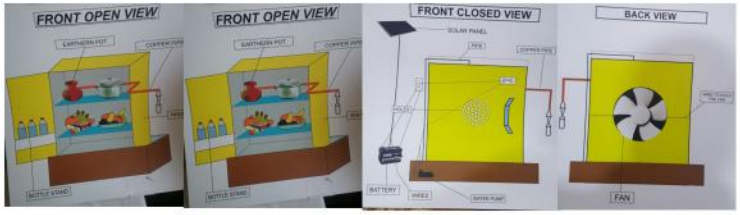
Online ID: 1938
PARTICIPANT: (1) Mast. Varennyam Joshi (2) Mast. Karan Agrawal
GUIDE TEACHER: Mr. Samir Khule
Std. : 10 Bhavan's B. P. Vidya Mandir, Ashti (Khurd), P.O. Walni, Nagpur-441501, Maharashtra

Abstract:

Our model, rural refrigerator, is based on the fact that still many people in rural India do not have refrigerators to keep eatable fresh. They are forced to throw fruits and vegetables which cannot be kept fresh for three to four days. Rural refrigerator is a very cheap, eco friendly and designed for people living in villages. Our model is actually a cooler modified to a fridge. It works on solar power which is eco friendly and easily accessible. The body comprises of a cooler's body in which there are two shelves fixed. A DC water pump is connected to the tank. A fan is fixed on back side. An earthen pot, which has a connection of copper tube, is kept on the upper shelf. The copper tube has a jute coating on it and it is passed touching the khus and on its end a tap is fixed. The water will pass through a pebble filter apparatus (which can be used further for drinking). When fan will be switched ON, it throws air inside the refrigerator from back side. Simultaneously water will pass through through, khus, jute and copper coil which passes cool air inside the refrigerator.. Rural Refrigerator uses a minimum of 5 litres of water which last up to 3days. Our model has the capacity to reduce its temperature up to 26degree Celsius in summer season and 22 deg Celsius in winter and thus keeps vegetables and fruits fresh. It controls many bacterial diseases which cause illness. Below given graph shows variations in temperature of refrigerator with respect to months. X axis- Sr.No. (Month), Y axis- (Temp in deg Celsius)

SR. No.	MONTH	TEMPERATURE RECORDED
1	JANUARY	22 (°C)
2	FEBRUARY	23 (°C)
3	MARCH	24 (°C)
4	APRIL	25 (°C)
5	MAY	26 (°C)
6	JUNE	25 (°C)
7	JULY	24 (°C)
8	AUGUST	24 (°C)
9	SEPTEMBER	23 (°C)
10	OCTOBER	22 (°C)
11	NOVEMBER	22 (°C)





A unique design of pot

Online Id: 1682
PARTICIPANT: (1) BHALODIA KRINA JENTIBHAI (2) BHALALA PRAGTI KISHORBHAI
GUIDE TEACHER: MS. DICOSTA K GHETIA
Std: 9th School: G. K. Dholakiya School, Rajkot, Gujarat

Abstract:

Our project is based on reduce water logged soil's problem which arises during high water supply. Because it slows down or shut down the root activity and plant will not receive enough oxygen.

To overcome this problem, we have prepared a new design of pot. We did installation of buried clay pot into another large pot. In this, we have to maintain space between porous container and outer large pot. Even we have to supply water to that space so that porous container absorb water and deliver it to plant root.

We prepared different model of pot then arranged same amount of soil, seeds, sunlight and water. Then we observed the growth of plant (by measuring no of leaves, height.). We also measured the water evaporation from soil.

(1) Single layer porous pot
(2) Double layer porous pot

Experimental data and analyzed result support the hypothesis that double layer pot will help to reduce water evaporation from soil.

Smart Change over switch that prefers power supply from different sources of electricity as per requirement.

Online ID:1683
PARTICIPANT: (1) Kanjia Khush S. (2) Limbasiya Meet C.
GUIDE TEACHER: Charu Goswami
Std: 9th School: G. K. Dholakiya School, Rajkot, Gujarat

Abstract:

This paper reviewed the methods of implementing change over system and proposed a better and cost effective approach to realizing the same. Some of the approaches which have been employed to implement change over system include manual change over switch box, automatic change over system with electromechanical relays and changeover system with automatic transfer switch. We have made an circuit that takes electricity from different sources as per availability. It means if solar power Is not available than it takes powerfrom wind Mill is wind power is also not than it takes power from battery and if battery is dead than at last it takes power from GEB. It checks availability of electricity and gives electricity to home. Each of the methods has some drawbacks that make it undesirable. These contribute to the high cost of these methods.in this we have used relays, LEDs, Diods, IC,regulator IC, transistor. This system is also known as redundancy system. In engineering, redundancy is the duplication of critical components or functions of a system with the intention of increasing reliability of the system, usually in the form of a backup or fail-safe. In many safety-critical systems, such as fly-by-wire and hydraulic systems in aircraft, some parts of the control system may be triplicated, which is formally termed triple modular redundancy (TMR). An error in one component may then be out-voted by the other two. In a triply redundant system, the system has three sub components, all three of which must fail before the system fails. Since each one rarely fails, and the sub components are expected to fail independently, the probability of all three failing is calculated to be extraordinarily small; often outweighed by other risk factors, such as human error. Redundancy may also be known by the terms "majority voting system"or "voting logic". In reliability engineering, dual modular redundancy (DMR) is when components of a system are duplicated, providing redundancy in case one should fail. It is particularly applied to systems where the duplicated components work in parallel, particularly in fault-tolerant computer systems. A typical example is a complex computer system which has duplicated nodes, so that should one node fail, another is ready to carry on its work. A machine with three replications of each element is termed triple modular redundant (TMR). The voting circuit can determine which replication is in error when a two-to-one vote is observed. In this case, the voting circuit can output the correct result, and discard the erroneous version. After this, the internal state of the erroneous replication is assumed to be different from that of the other two, and the voting circuit can switch to a DMR mode. This model can be applied to any larger number of replications. Our system is quadruple modular redundant .It means as in triple modular redundant we take three duplicates of power supply in quadruple modular redundant system we can take four duplicates means we have four backups instead of three. so in quadruple modular redundant we are more safe and have less possiblities to run out of constant power supply.

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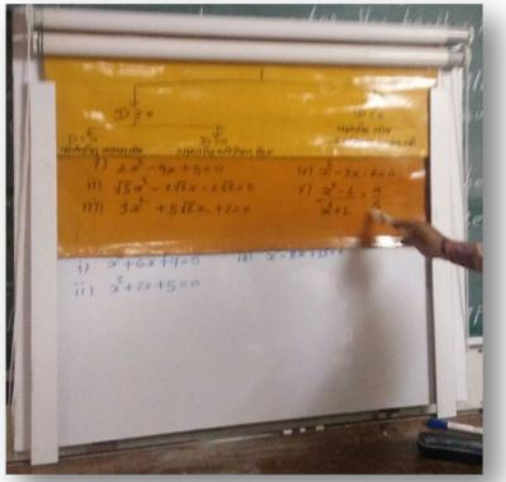
https://en.m.wikipedia.prg/wiki/Redundancy (engineering)#

User friendly Sliding Writing Board

Online ID:1863
PARTICIPANT: (1) pipaliya janal vinobhai (2) Chatrala Jenil Hareshbhai
GUIDE TEACHER: Rakshit Kanjiya
Std: 10 School: Matu shree l.g. dhoalkiya school-Rajkot, Gujrat.

Abstract:

Today in the world of science and technology knowledge is power and education is required. for that To educate the people is became an important task for each and every country for its development. Writing board, pen and teachers are playing an important role in this task. There are many different writing boards available in market like black board, green board, white board and smart board. According to the written survey for its applicability (anaxture-1), We found that teachers have to face so many problems like they have to write and rub the same thing in board for more than one time and they also have to face health problems like Cough, Skin irritation, throat infection etc. So, that we had prepared a user-friendly sliding multiple writing board with the help of laminate glossy white sheet, fibre cotton flexible paper, plywood, strings We attached white sheet with fibre cotton paper and attached with plywood. then we arrange the strings. this all system is arranged with wooden frame. We had arranged led light surrounding the board to avoid the reflection. In this board, we can roll up the board after using and unfold it at the time of re-use it. So, we can display more written material in less space as well as we can show same written material for more than one time in different lecture. Time and ink also can be saved by this board.



BIO CEILINGS – A NOVEL APPROACH

Online ID:1881
PARTICIPANT: Thejas K.V.
GUIDE TEACHER: Rashmi R.
Std: 12 School: Christ Junior College, Hosur Main Road, Bengaluru, Karnataka

Abstract:

Huge efforts have been done by the research community worldwide, in order to find alternative sustainable building materials and low technology methods, which result in a more sustainable and affordable construction complying with the comfort standards required nowadays.In the last decade, considerable effort has been directed towards using various natural fibers which are available in abundance for producing cost-effective building materials.This project aims to develop a false ceiling material using a composite of sugarcane (Saccharumofficinarum) bagasse and corn cob (Zea mays) with natural resins as adhesives contributing for the cause of greener and sustainable environment.

The natural material based composites can be very cost effective especially for building and construction industry. These composites are gaining importance due to their non-carcinogenic and bio-degradable nature. Usually, corn cob and sugarcane bagasse are considered as agriculture wastes. These natural and organic waste materials may be used in the industry, in general, and in the building industry, in particular. As per statistics, about 54 million tons of sugarcane bagasse and 120 million tons of corn cobs are being produced annually in the world. Incorporating these materials in the manufacture of particleboards for construction materials can put them into a better use.Our focus is on preparing the composite of the duo and study their properties. The steamed corn cob slices and SCB fibers were powdered after drying, mixed in different ratio using resin from like Araucaria cunninghamii as adhesive. The samples so prepared were tested for sound absorption, mechanical strength and thermal insulation. The results so obtained were promising and showed that a mixture of sugar bagasse and corn cob could be used in the manufacture of low cost false ceiling material which could also show a better performance in thermal insulation. The use of sugarcane bagasse and corn cob minimizes the environmental impact and contributes to the creation of a new product with low density, good sound absorption capacity and can improve the acoustic conditions of buildings. Light partition walls, ceiling coating, indoor doors and furniture are among other possible applications of the prepared composite. We are further exploring the possibility of it being used in packing industry as a substitute for synthetic packing materials. This not only contributes for a green environment but also will boost nation's economy by creating various job opportunities.

Abstract:

- IOSR-JMCE, Acoustics – Essential requirement for public buildings
- International Journal of Composite Material 2013, Characteristics of Sugarcane/coir Fibers Reinforced Composites in Phenol Formaldehyde Resin
- Physical Properties of Bagasse – by J. Pidduck
- Mechanical properties of corn cob, by Uche Godwin NzukoAnazado
- Corn's cob as a potential ecological thermal insulation material, journal published by Elsevier
- Recent advances in the sound insulation properties of bio-based materials, bioresources.com
- Mechanical Properties of Particle boards from maize cob and urea-formaldehyde resin, by A. Danladi and I.O.Patrick
- A study of Thermal Conductivity of corn cob ash blended cement mortar, by A.A. Raheem and Prof. D.A. Adesanya

Herbal cure for tennis elbow using Holoptelea integrifolia (Rahubija) leaves

Online ID:1608
PARTICIPANT: (1) PSATHWIKA (2) PSWASTHIK
GUIDE TEACHER: KRISHNA MOORTHY P
Std: 10 School: ST.PHILOMENA HIGH SCHOOL,PUTTUR,KARNATAKA

Env.-01

Abstract:

Tennis elbow is pain in the outer part of the elbow due to inflammation. Many native herbal medicines have been used in the treatment of this disorder. One such plant is Holoptelea integrifolia. It is called Indian Elm tree, Tapassi tree or Rahubija in Kannada. It is a tree that grows in this region. The leaves of this plant have been subjected to phyto-chemical and Pharmacological investigation. Several activities have been reported such as anti inflammatory, analgesic, anti cancer, anti diabetic, anti microbial and anti helmenthic activities.

The seed idea for doing this project work has been obtained from a local "Ayurvedic Pandit" who encouraged and suggested to prepare a project having been convinced of the very good analgesic potential of the leaves of this plant to alleviate pain of Tennis Elbow. An aqueous extract is prepared by grinding the leaves with butter milk and applied on the affected elbow, twice or thrice repeatedly after drying. The paste should be washed when a burning sensation is felt in that area. Cow's fresh ghee should be applied to relieve sensation. In 2 to 3 days, skin flaps. In 5 days the skin recovers due to the application of the ghee. The treatment will be complete only with continuous application of the oil prepared from Carombola fruit in coconut oil. The chemical constituents isolated from Holoptelea include hexacosanol (C25H52OH), fatty acid esters, holoptelin A&B, Beta–amyrin (a triterpenoid), and an anti microbial substance (1,4-naphthalein dione). This compound has been reported to be effective against beta lactone resistant staphylococcus organism. The result of present study showed the presence of alkaloids, carbohydrates, triterpenoids, saponins, steroids and tannins.

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A NOVEL MULTI PURPOSE LACQUER FOR RUST PREVENTION AND WOOD PRESERVATION FROM TENDER ARECANUT EXTRACT

Online ID:1691
PARTICIPANT: Nihal Noojibail
GUIDE TEACHER: Badanaje Shankara Bhat
Std: 9th School: Indraprastha Vidyalaya, Upppinangady, Puttur, Karnataka

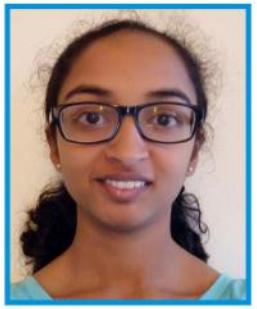
Abstract:

In coastal areas due to heavy rain and high humidity it is a great challenge to prevent the steel from corrosion and wood from fungus and termites. I prepared a multipurpose lacquer from the waste extract of tender arecanut to prevent the oxidation of steel and to protect the wood from termites and fungus. To prepare the extract boil 1 kg of chopped tender arecanuts in 4 litres of water and condense it to 1/4 of its original volume.Then dissolve 1 spoon of gum acacia in 20 ml of mustard oil and 5 ml of Cashew nut shell liquid. To this mixture slowly add 70 ml of condensed tender arecanut extract with 0.5 g of borax and mix well. Final volume was made up to 100 ml using turpentine. Stir well to get a homogeneous areca lacquer. The investigation showed the presence of 529.63 mg/g of tannin which acts as anti rust agent and 6 mm of anti-fungal inhibition zone in tender arecanut lacquer. The tests also proved the anti-termite actions in mustard oil and Cashew nut shell liquid. This multipurpose lacquer is very effective, economical, eco-friendly, farmer friendly, easily preparable, without any hazardous chemicals and it is successful in indoors and outdoors for various application.

Env.-02

Areca Lacquer

A New Approach to Monitoring Lakes in Developing Countries - Crowdsourcing

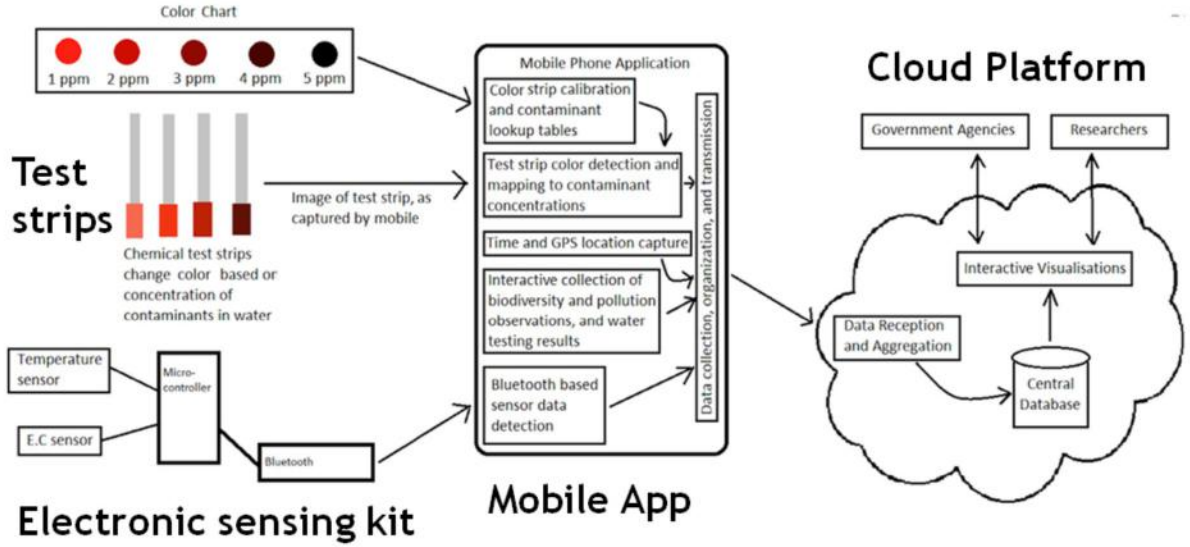


Online ID:1824
PARTICIPANT: Sahithi Pingali
GUIDE TEACHER: Mary Ra
Std: 11 School: Inventure Academy, Bengaluru, Karnataka

Abstract:

Lake pollution is a major and growing environmental threat in developing countries, exacerbated by the lack of ongoing scientific data about health of lakes. One way to address this problem is to crowdsource monitoring of lakes to interested citizens. We investigated changes in a lake in Bangalore, India over three months and found that there was double digit percentage change in several chemical and physical parameters, confirming that frequent monitoring of lakes would be valuable.

We went on to develop an integrated mobile phone app and lake monitoring kit consisting of an electronic sensing device and chemical test strips. The electronic device measures total dissolved solids, electrical conductivity, salinity, and temperature of a water sample, and transmits this data to a mobile app. The app also measures contaminant concentration levels of pH, Hardness, Alkalinity, Total Chlorine, Total Bromine, Free Chlorine, Iron, Copper, Nitrates, and Nitrites by detecting color changes in chemical test strips. All data collected by the app is uploaded to a cloud platform that enables spatiotemporal visualizations of health parameters of multiple lakes. We validated that our first of a kind end-to-end lake monitoring system gives reliable data and initial crowdsourcing experiments showed that this approach could indeed provide valuable insights on the changing conditions of lakes.



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Use of waste plastics to manufacture tiles

Env.-04

Online ID:1892
PARTICIPANT: Neelappa
GUIDE TEACHER: Brijpal Singh Raghav
Std: 10 School: Sri Ramakrishna High School Puttur, Puttur, Karnataka

Abstract:

Now a day's non-biodegradable plastic wastes created a major problem in solving the environmental issues .So in this project, plastic wastes are used in the preparation of tiles.At first, a plastic sheet is set up inside the tiles mould (trace). Cement, sand should be added. Then gravel is added to it in small proportion and water is added and mixed well. Then waste plastic pieces should be mixed.This mixture is then put into the mould about half of the mould and level it. Then add the mixture of sand and cement and level it. Then the mould is closed by adding weight to it. Then with the help of the pressing machine press the mould. Then the mould is removed and separate the tile from its mould. It has to be kept for curing for 22 days. Then the tiles are ready.Its can used in the grounds in place of interlock. It can be used for various purposes. After subjecting ordinary interlocks or tiles to high pressure I have found that it cracks instantly. But the interlock or tiles which I have prepared did not crack that instantly. Hence the interlock or tiles prepared using my method is more durable and is strong. Due to population explosion urbanization industrialization, sophisticated lifestyle the usage of plastic is increasing drastically. So we should use my method in preparing interlocks or tiles which recycles plastic and rubber and protects our future.

Math is Interesting!! – Beauty of numbers in life aspects.

Online Id: 1664
PARTICIPANT: Sebastian Thomas
GUIDE TEACHER:
STD: 12th Christ Junior College, Bangalore.

Abstract:

I have discovered a new mathematical concept that bridges two domains of mathematics – Calculus and Analytical Number theory. I named the concept as "Limit of Extension Theorem", which states that "The limit up to which a number can be expressed as sum of squares or cubes can be determined, only if the number can be expressed as sum of two squares in two ways". This theorem holds good for angel numbers like 125, 1241, 1717 etc.

The procedures followed in the experimentation are: i) Take any number that can be expressed in the form of $a^2 + b^2 = c^2 +$ d2. ii) Take the factors of the number and apply MFC (Masahiko Fujiwara) theorem and Euclid's division lemma in a different way. iii) Repeat the procedure, until which same quotient and remainder are obtained. iv) Once the quotient and remainder are the same, this gives us the limit of the number taken and the Extension step can be determined.

As per statistics conducted by Phillips (2007) it was found that 71% of people found math to be not interesting. To make math more simple and innovative, I have discovered unique properties behind cubic numbers such that it can be applied easily in Conservation theorem (Physics), Periodic table (Chemistry) and DNA (Chargaff's rules). I named these concepts as "Base Pair theorem". To understand the effect of this novel application of numbers in different fields, a survey analysis was conducted.

The survey was conducted in "The Samhita Academy" with 65 students and 5 teachers. I took the session on my research work for the survey analysis. The survey included four Analysis where Analysis I was used to find out people's interest towards math before the session on research work. Analysis II, III and IV was used to find people's interest towards math after taking the session. The results are tabulated and are analysed graphically.

The rates of people's interest before taking the session were 2201 and after taking the session, it was 2619.4. There was increase of 418.4 from initial rates after taking the session on research work.

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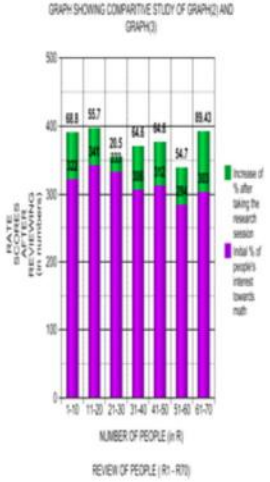
Maths-01

$$\lim_{x \to \{y \equiv p(mod\ x)\}} x = y.$$

⇨ $p = q$.

Where y = dividend
x = original number
p = quotient
q= remainder.



NATURAL ICE PACK FROM ALOE VERA

Online ID:1704
PARTICIPANT: (1) Tank Ishan Amitbhai (2) Parekh Bhavya Tejasbhai
GUIDE TEACHER: Charu Goswami
Std: 9th School: G. K. Dholakiya School, Rajkot, Gujarat

Abstract:

As we know that simple ice pack melts very faster so,we had discovered 'ALOE VERA ICE PACK'. Our ice pack is more durable than simple ice pack. This ice pack is very easy to made. It is low cost too. Put it in refrigerator for at least 4 to 5 hours. Now it is ready to use.

If you want to make this ice pack , it is very easy. First we have to take some aloe vera leaves. Take out jelly extracted from aloe vera leaves. Now fill it in an air tight plastic bag. And then mix it in water i.e. if 100 ml then 50ml aloe vera gel and 50 ml water and then keep in refrigerator for 5 to 6 hours and then it is ready to use .

We have done the experiments with both home-made ice pack and market ice pack. In home mad e ice pack we fill aloe vera gel in air tight plastic bag and in market ice pack we fill the aloe vera gel with water in a special hard plastic container.

And from both we got best results from market ice pack. There are some other experiment made by us and they are as follows:

Aloe Vera	Water	Melting Time	Only Water	Melting Time
8ml	2ml	00:10:02	10ml	00:07:11
2ml	8ml	00:10:41	10ml	00:07:47
10ml	0ml	00:10:55	10ml	00:07:42
4ml	6ml	00:10:50	10ml	00:07:51
6ml	4ml	00:11:15	10ml	00:07:46
5ml	5ml	00:11:53	10ml	00:07:52

Through the observation we can conclude that by adding aloe vera in simple ice pack, it can be made at home which is more durable, more useful to us & at low cost.

USES:

- It can be used to reduce muscular pain.
- It can be used as a cooling agent.
- It can be used to transport medicines as well as syringes.

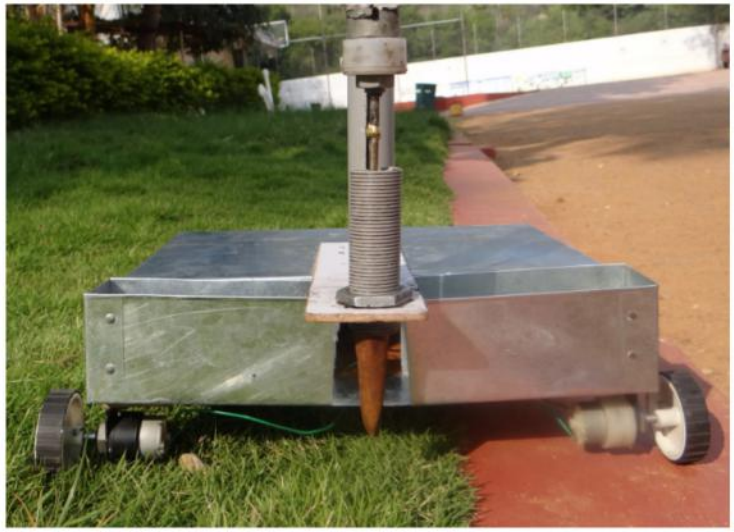
AFFORESTATION ROVER

Online ID:1904
PARTICIPANT: (1) V. Navaneetha Krishnan (2) J. Naren Bharathi
GUIDE TEACHER: Venkatadri Dasolla
Std: 10 School: Sri Seshaas International Public School, Salem, Tamil Nadu

Abstract:

The afforestation rover is a fully automated machine which does afforestation without any human effort. The rover can plant both seeds and saplings as per the wish of instructor. In regional fair, we made the rover which can plant only seeds. But this time we have modified the rover in such a way that it could plant both seeds and saplings which can be a boon to the society by extracting more benefit out of it. This rover uses special sensors that could detect the obstacles, traverse its path and moves accordingly, so that it could plant smoothly. In this rover we have used AT mega 8 programming boards for the processes of the rover. This rover has an advantage that we have reduced number of AT mega 8 boards but incorporated programming to a significant level. In its working this rover moves for a certain distance (can be increased or decreased as per requirement) and then it drills the soil and plant seed or saplings. However, this processing can be altered as per the requirement after making changes in program. This rover uses delay programming and sensor programming for all the processes of the rover.

We think that, this rover can be used better at places called as “No-Man's-land”. This can be controlled with satellite too so can be operated from any corner of the world. It can be of immense use in home, roadside, mountain, desert, and in forests for plantation purpose to make “CLEAN INDIA! GREEN INDIA!”



Building an Emergency Alert System for Senior Citizens

Online ID:1860
PARTICIPANT: Shashank Rammoorthy
GUIDE TEACHER: Madhu Rammoorthy
Std: 11 School: Stonehill International School, Bengaluru, Karnataka

Abstract:

Falls are the leading cause of death for senior citizens 79 years and older, and are the second-leading cause of unintentional injury death for people of all ages.

According to the Centre for Disease Control (CDC),more than 33 percent of falls involving senior citizens in the USA occur at home. And above 80% of these occur in the bathroom. The figure in India is likely to be higher given that bathrooms are, in general, wet. In 2001, 7.4% of India's population comprised of senior citizens and this figure is projected to explode by 2050. My project is an endeavour to use technology to help this significant section of the population.

In this project, I built an emergency alert system for the physically disabled and senior citizens. The system comprises of distance sensing ultrasonic modules, laser tripwire systems and to ensure maximum accuracy, a pressure-sensing waterproof floor board. It also includes a mobile application to be installed on the mobile phones of the caretaker(s) and, if any, the senior citizen or disabled person.

The system works by detecting occupancy, and if there were to be a longer duration than what is optimal, or average, there will be a smart alarm sounded. Occupancy detection works with absolute accuracy, and did so in all trials. The alarm is sounded through the Android/iOS smartphones with the preinstalled app, and with a GSM module in the central system.

I built a mobile application for Android and iOS using the Ionic Framework, which is based on Cordova. The application alerts the user (or caretaker) in case of a fall. In addition, the mobile app to be installed on the senior citizen's phone has fall detection capabilities. This app has a simple intuitive User Interface, and on startup from Google Now's Voice based assistant - leads to instant messaging to the 5 predetermined numbers. On the phone of the caretaker(s), the SMS reception triggers the app to run in the background. This leads to an alarm sounding to alert the caretaker.

The focus of this project is to enable a reduction in response time while keeping the cost of the system low. Keeping costs low is of critical importance, as the other products on the market are out of the reach of a majority of Indian households.

The project can be considered to be within the realm of the Internet of Things (IoT), but SMS-based alerts are used over WiFi or ethernet based modules due to there being much more reliable coverage and connectivity - and this is especially true of India.

NOTE

Host of
various INSEF Regional Fairs

Rajkot	:	Shree K. G. Dholakiya School
Puttur	:	Shri Ramkrishna Highschool
Bangalore	:	Vagdevi Vilas School
Belgaum	:	Rotary Club of Belgaum with Rotary Science Fair
Mumbai	:	SIES Highschool
Salem	:	Shree Seshaas International Public School

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