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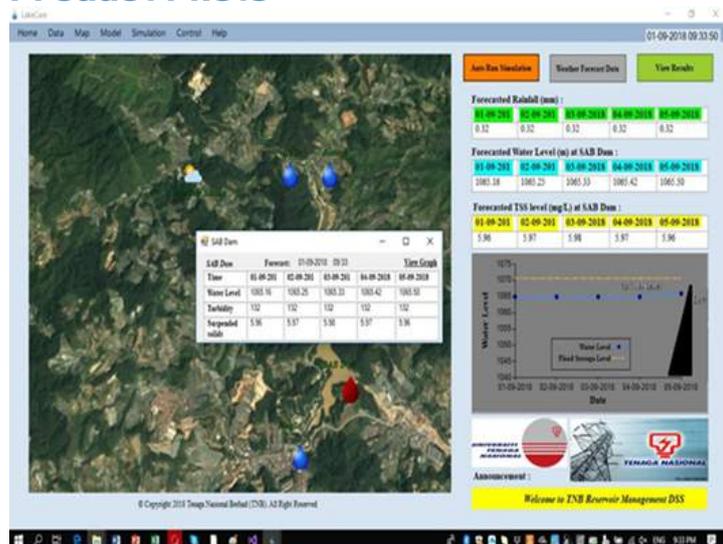
A Catchment Management Decision Support System

Project Leader: Ir. Dr. Chow Ming Fai
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Product Descriptions

A catchment management decision support system which comprises of weather forecast module, watershed model (HSPF), intermediate program, reservoir model (CE-QUAL-W2), best management practice module (BMP) and simulation results post-processing module (W2-Post) to simulate the complete hydrological and nutrient transport cycle in reservoir catchment. This DSS can be used to predict the future 5 days condition for surface runoff, nutrient and sediment discharges into the reservoir as well as evaluating long and short term catchment management scenarios. Early precaution can be taken by the dam operation office based on the predicted incoming inflows of river discharges and sediment. Different control measures can be simulated for their sediment and nutrient removal efficiency that contribute to the sustainable management of reservoir's sedimentation and water pollution problems. The optimization of best management practices (BMP) & cost-benefit analysis can be carried out using this decision support system.

Product Photo



Novelty

All in one solution for catchment management

Team Members

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A Novel Hybridity of Al₂O₃-TiO₂ Hybrid Nanofluid for Power Electronic Cooling Applications

Project Leader: Vignesh Vicki a/I Wanatasanappan
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Product Descriptions

The hybridity of Al₂O₃-TiO₂ hybrid nanofluid possess high thermal conductivity and good dispersion stability. At room temperatures, the thermal conductivity this hybrid nanofluid is approximately 29.9% higher than conventional coolant such as water. Besides, the maximum enhancement of thermal conductivity compared to water is about 52%. This excellent property will enhance the heat transfer capability of Al₂O₃-TiO₂ hybrid nanofluid. As for the rheological properties, this novel hybrid nanofluid exhibits Newtonian fluid characteristic which indicates that the rheological properties are not affected by the addition of nanoparticles. Meanwhile for the dispersion stability, the developed hybrid nanofluids has very good stability with high Zeta potential value. Due to the extremely small size of the nanoparticles, the potential use of this nanofluid as coolant in heat transfer applications is highly promising.

Product Photo



Novelty

A new generation of hybridized Al₂O₃-TiO₂ /water nano-coolant with superior thermal and physical properties.

Team Members

1. Dr. Prem Gunnasegaran
2. Prof. Dr. Ir. Mohd. Zulkifly Abdullah

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An Innovative Pose Matching Remote Sensing Device for Human Physical Movement

Project Leader: Prof. Ts. Dr. Manjit Singh Sidhu
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Product Descriptions

The present invention relates generally to augmented reality-based training. More particularly, the present invention relates to an improved method and system of augmented reality (AR) pose matching mechanism for one or more exercise trainees. This innovation uses visual cue senses to match the pose of multiple dancers. Additionally the method of the present invention may be characterized as the steps of providing a three-dimensional touch screen menu to facilitate trainee interaction by displaying a menu and a real-time video data representing one or more exercise trainees, wherein the menu allows one or more exercise trainees to select the dance genre from a lists of dance. The real-time exercise feedback includes audio, visual, graphical feedback or combination of generated in response to a skeletal movement defined by the skeletal points of the one or more exercise trainees performing the exercise or physical activity, wherein the real-time grading result includes a trainee score on a basis of a skeletal matching percentage computed for each of the skeletal points of the one or more exercise trainees by 10 comparing against that of predefined reference skeletal points established for the exercise or physical activity selected. Conclusively, the learning time and the accuracy of the system are experimentally tested and compared with the state-of-art techniques for the successful learning outcome.

Product Photo



Team Members

Dr. Javid Iqbal

Novelty

1. This system is first of its kind, focuses on motivational feedback to the dance learners, generates certificate.
2. Improved algorithm, existing systems focuses on training a solo trainee but this system enables multiple trainees.
3. Automatically records video / photos, complete dance steps analysis is dance which is stored in a database. The system is aimed to be designed with simultaneous audio & visual feedback.

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BPA - Banana Peel Ash



Project Leader: Nur Liyana Mohd Kamal
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Product Descriptions

Banana peel is one of the agriculture waste that can turn to banana peel ash (BPA) to be used as pozzolanic material in civil construction that can reduce cost and environmental pollution. In this study, the properties of the cement mortar are investigated during fresh and hardened condition. Throughout the study, in fresh state, the results show banana peel contain highest potassium that can enhance properties of cement mortar. It shows that cement paste didn't show any expansion after been added with banana peel ash into the mixture. Hence, it will increase the workability of cement paste. In addition, in hardened state, the data show that during hydration process, the strength of cement mortar added with banana peel ash increase. All banana peel ash admixture which is 1%, 2% and 3% obtained highest strength compare to control mix during 3 days curing. However, during later age the result show the strength keep increase but control mixture obtained the highest strength compare to all banana peel ash admixture. Another results show that the gap for interfacial transition zone (ITZ) for cement mortar decrease when more banana peel ash been added to the mixture. The strength of cement mortar will increase if the gap for ITZ decrease. More percentage of inclusion banana peel ash can be use in the future to obtain highest strength in cement mortar.

Product Photo



Team Members

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2. Fatin Shahira Abdullah
3. Aiman Ismat Bin Mohd Radzi

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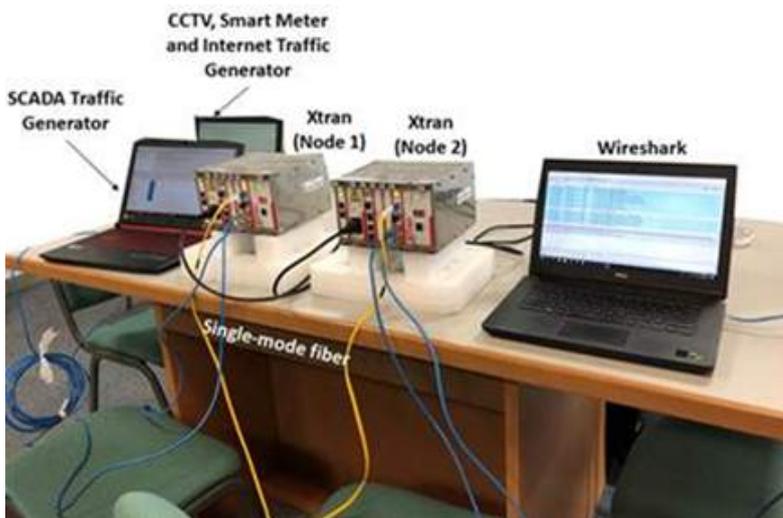
Context-Aware Traffic Scheduling For Power Distribution Network

Project Leader: Ir. Dr. Nurul Asyikin Binti Mohamed Radzi
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Product Descriptions

The emergence of smart grid poses technical challenges to the power distribution network because of the increasing data traffic resulting from diverse data applications. Traffic scheduling algorithms manage these heterogeneous applications by applying different priorities to each traffic type based on its quality of service (Qos). However, Qos alone cannot accurately capture complex situations wherein packets with low priority occasionally need to be served first based on their context, resulting in a suboptimal solution. This invention proposes a context aware traffic scheduling (Catscha) algorithm to schedule the traffic such that it could adapt to varying power network conditions. The power distribution network traffic is characterized based on heterogeneous traffic demands, and then mapped into weighted quality classes. The Catscha algorithm is implemented in packet switched network using an industrial grade MPLS-TP router, and the traffic demand is fulfilled based on the algorithm's context awareness. Compared with traditional traffic scheduling algorithms, the proposed algorithm lowers the delay while maintaining the throughput and link efficiency. The invention is expected to realize "grid of the future" plan for the ability to support increment in traffic due to emergence of renewable energy that leads to increasing amount of inverter-based distributed energy resources.

Product Photo



Novelty

Traffic scheduling algorithm in industrial grade MPLS-TP router

Team Members

1. Prof. Dr. Ir. Md Zaini Jamaludin
2. Assoc. Prof. Dr. Fairuz Abdullah
3. Aiman Ismail
4. Dr. Wan Siti Halimatul Munirah Wan Ahmad
5. Nurshazlina Suhaimy

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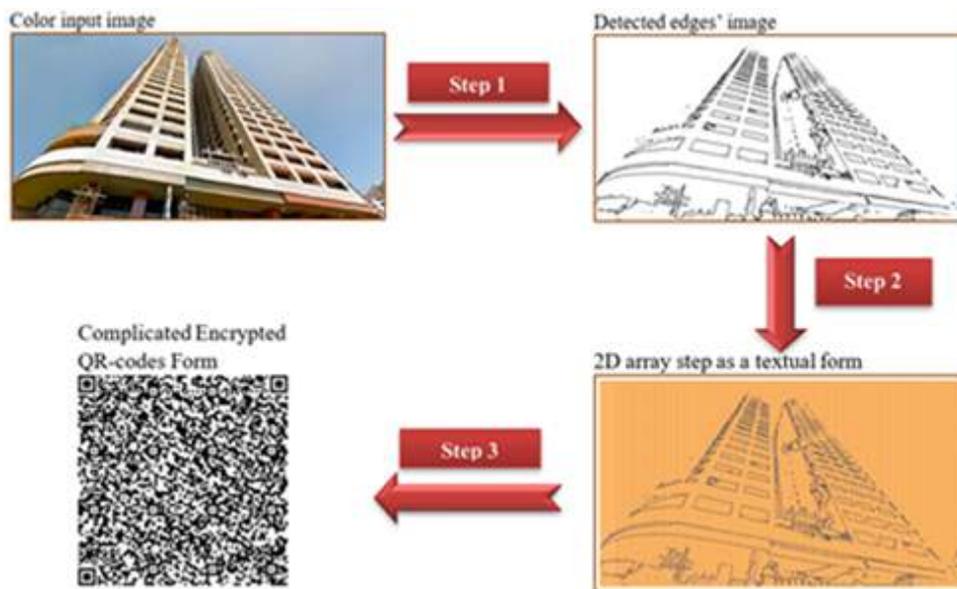
Image Encryption Scheme Using Multiple Layers for Internet of Things (IoT) Applications

Project Leader: Ts. Dr. Hairoladenan Kasim
(hairol@uniten.edu.my)

Product Descriptions

IES is an images' encrypter tool to perform smart identification-purposed services. IES has low computation time to contribute to green computation.

Product Photo



Novelty

1. Three strong security layers.
2. Unknown text produced if decryption occurs.
3. To increase security, encryption is repeated at short periods utilizing green computation.

Team Members

1. Dr. Abbas M. Al-Ghaili
2. Prof. Dr. Zainuddin Hassan
3. Prof. Bo Nørregaard Jørgensen
4. Tharik Jakir Hussain
5. Muhammad Hazim Muhmat Hilme

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PlA/Ha Biocomposite Scaffold Structure For Tissue Engineering Using 3d Printing

Project Leader: Assoc. Prof. Dr. M.N. Mohamed Ansari
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Product Descriptions

Three-dimensional (3D) printed scaffold design constitutes intricate features that aid the bone tissue growth and acts as a medium for conduct of nutrition and elements required for bone growth. It is made of Polylactic acid (PlA), Hydroxyapatite (Ha) and other bio-elements.

Product Photo



45°/-45°/90°/0°/90°/-45°/45°



90°/0°/45°/-45°/0°/-45°/45°/0°/90°



90°/0°/90°/0°/90°/0°/90°

Novelty

1. Tissue Engineering (TE) scaffold design with improved structural stability for the newly formed bone tissues.
2. New design of the scaffold serves as temporary template for the interactive traffic of cells as well as for the formation of the extracellular bone matrix.
3. Three-Dimensional (3D) printing concept introduced to create intricate bone scaffold that can initiate growth factor to the tissue regeneration.
4. The novelty of this product is the new structural design of the scaffold prototype using Polylactic acid (PlA) And Hydroxyapatite (Ha) Biocompos-

Team Members

1. Sughanthy A/P Siva Andan Perumal (UNITEN)
2. Mohammed L. M. Shaath (UNITEN)
3. Assoc. Prof. Ng Min Hwei (HUKM)

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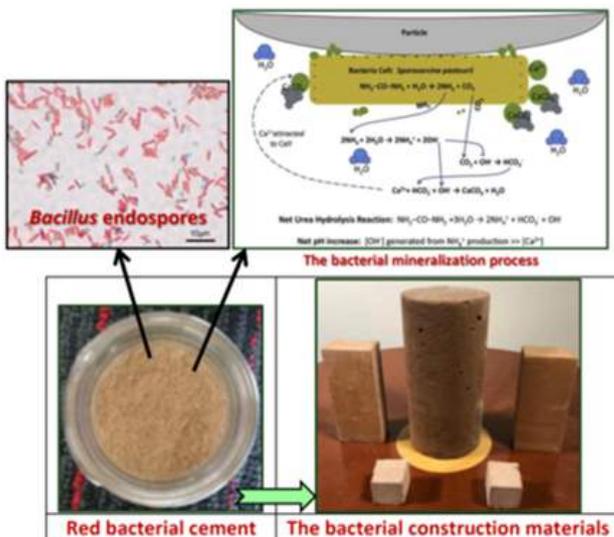
Red Bacterial Cement For Sustainable Construction Materials

Project Leader: Dr. Wong Leong Sing
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Product Descriptions

The present invention relates to a process of mixing cementing raw materials for construction by replacing ordinary portland cement with other sources for cementation that is deemed to be renewable and eco-friendly. More particularly, the invention caters for formulating bio-based cement in concrete columns, bricks and mortar cubes which are sustainable. A red bacterial cement is produced to replace the ordinary portland cement, wherein the said bio-cement is made from a composition of silica sand; red clay soil with bacillus endospores; calcium silicate, and urea; characterized in that, the bio-cement is processed in a 3-phase method including a preparation and accumulation of materials for experimentation, an optimization of the bacterial construction materials via laboratory investigation, and a mixing of all the raw materials at an optimal ratio in formulating the bio-cement. Gravel is added as a coarse aggregate to the admixture of red bacterial cement and a specific water content to produce bacterial concrete columns. The average 28-day compressive strength of the bacterial concrete columns, bacterial bricks and bacterial mortar cubes were found to be 29.6, 14.2 and 11.2 Mpa respectively. Such strength values are compatible with those of the ordinary portland cement based concrete columns, bricks and mortar cubes. This reflects the robustness of the construction materials produced from the red bacterial cement.

Product Photo



Novelty

Newly discovered bacillus endospores in clay that can be unraveled in a sustainable way to produce red bacterial cement as an alternative to ordinary portland cement.

Team Members

1. Dawood Muhammad Iqbal
2. Roshan Charles Razali
3. Kishanthini Sinappan
4. Ahmed Farid Mahmoud Oweida

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Universal Compress Air Fit (UCAF)

Project Leader: Fevia Nurnadia Binti Adria Syaifoel
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Product Descriptions

Universal Compress Air Fit (UCAF) is a mechanical device technology that can create hot and cool air simultaneously which can solve problems in many types of industrial application related with hot and cool air purposes especially towards green technology. The benefits of this technology are:

- no mechanical movements (maintenance)
- no chemical gases applied in term of input and output
- robust design model
- energy saving and cost efficient

Product Photo



Novelty

Advanced mechanical device technology in a robust design that can create hot and cool air in more efficient.

Team Members

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3. Prof. Dr. Megat Mohamad Hamdan Bin Megat Ahmad
4. Mohd Eqwan Mohd Roslan
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Vehicle Performance & Location Monitoring System For Resources Management And Effective Utilization

Project Leader: Ir. Dr. Sami Salama Hussen Hajjaj
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Product Descriptions

This invention is a comprehensive lot-based system that captures and compiles bus user utilization data, and then uses this data to derive the bus operations strategy to increase operator profits in three ways; 1) minimize operational costs, 2) enhance the user experience, and 3) generate a new source of income to the operator.

Bus operators often face the problem of allocating resources; how many busses should be set for each route? Which routes are more important? And other challenges. The root source of this problem is the unpredictable and ever-changing user utilization patterns. So the operators either under or over-allocate resources, resulting in losses and negative user experience. For example, when allocating fewer busses than needed (under-utilization), busses would be over-crowded, causing many to opt for other means of transport. When allocating too many busses (over-utilization), the operator would needlessly incur extra costs.

With this invention, operators can know which routes are in demand, how many busses are needed for each route, monitor driver performance, among others. This allows operators to reduce operational losses and maximize profits. On the other hand, bus users would know current active routes, bus arrival times, available seats and driver profiles (they would know each bus driver and his/her rating in advance), this would enhance their experience while on the bus, making them want to use the bus more, and perhaps recommend to others, and so further increasing the operator's profits.

Finally, user utilization data could be valuable to other sectors; street vendors and businesses near bus stops would want to know when the largest volume of foot traffic is expected, real-estate developers would want to know if their properties pass on or near the in-demand bus routes, and others. The bus operator company could sell this information to the target sectors, and since this information is constantly evolving and changing with the times, it would become a continuous stream of income to the operator.

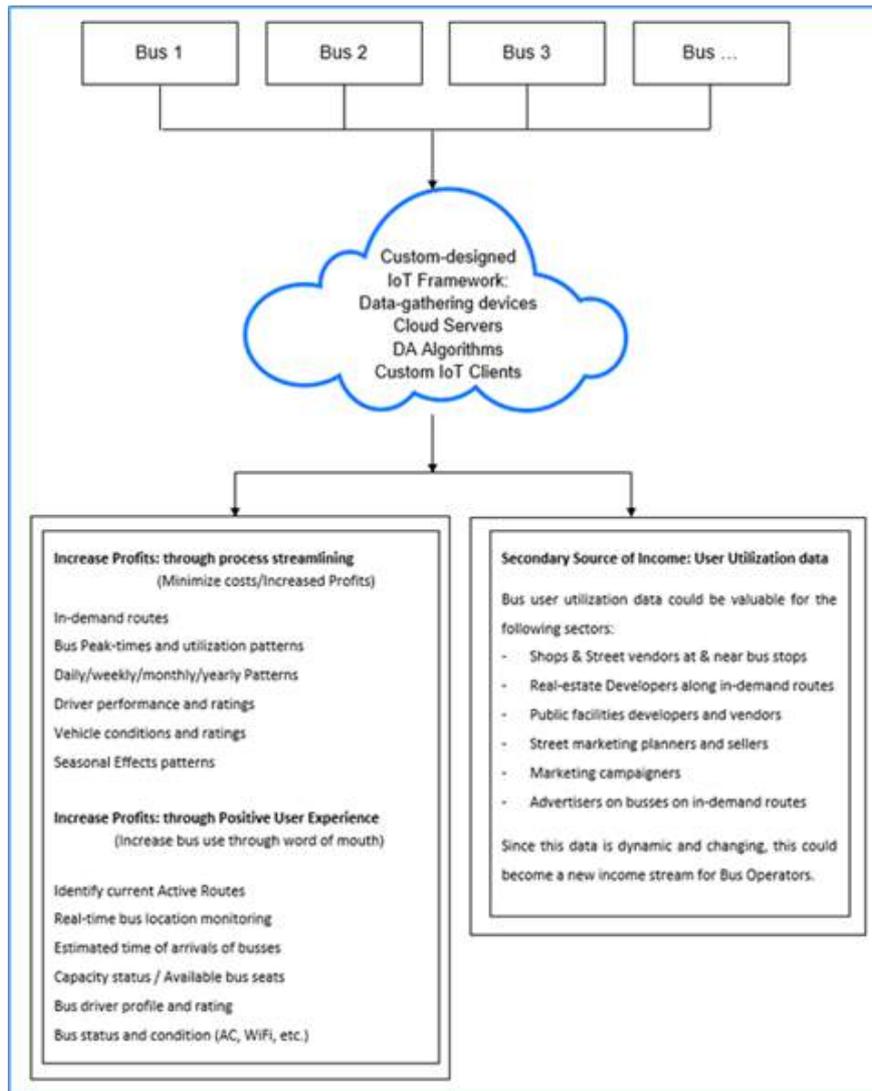
This system has been designed, developed, and tested in Universiti Tenaga Nasional (UNITEN), its intellectual property has been registered, filing number: UI 20190052522.

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Product Photo



Novelty

The Novelty of this system includes two elements; hardware & software. The system uses a number of custom-designed data-gathering devices to capture raw bus info, driver info, route info, and vehicle info. The Patented Data Analytics algorithm developed for this work processes this raw data and produces the information needed by the service provider to maximize their profitability. Finally, the custom-designed IoT Client is designed to show this developed data to the end-users.

Team Members

1. Kisheen Rao Gsangaya
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