OREPA

Newsletter

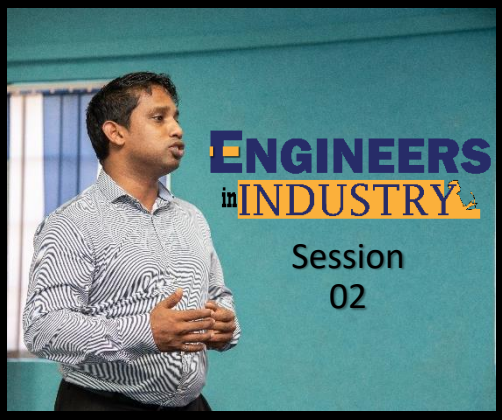
2019 AUGUST

Welcome to the newsletter of

OLD ROYALISTS ENGINEERING PROFESSIONALS' ASSOCIATION
STUDENT CHAPTER

OREPA AGM

SCHOOL PROJECTS



Student Intern

Providing Internships for young Royalists who are selected to enter to an Engineering Faculty is done at University of Moratuwa through OREPA-SC. Those interns are divided to departments as they wish and are given opportunities to get involved in research or industrial projects conducted by either the university together with postgraduates or companies.

Key Projects

- Public transport management system (Google Transit) by Mr. Sakitha Kumarage
- Air quality project by Mr. Sakitha Kumarage
- Internships at Hybriteq by Mr. Dinuka Salwathura

The Student Intern program is initiated by OREPA Student Chapter to deliver internship opportunities and industrial exposure to young old royalists prior to their entrance to Higher Education. The principal objective of this program is to provide an opportunity to seek, identify and further develop an appropriate level of professionalism before entering the University life.

Highlighted below is the personal experience received by one of the interns involved in this program.

Last year 15 students were selected for the student intern program including me by our performance at GCE Advance Level examination. We were allocated according to our preferences to 3 different projects from three different engineering fields.

By the Student Intern program, we were privileged to work with the Google Public Transit project which created history in Sri Lanka's public transportation.

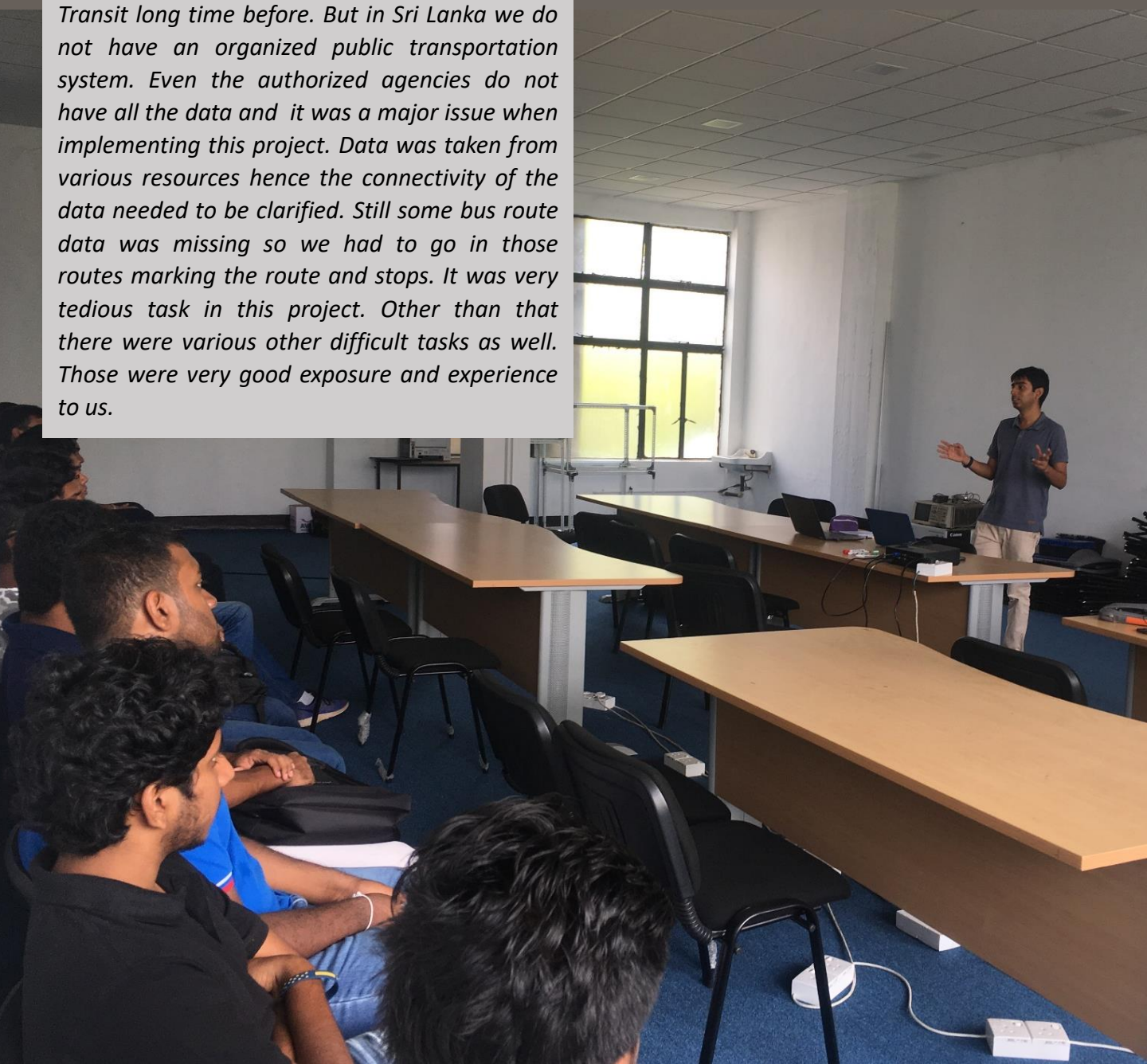
This project was supervised by an esteemed old Royalist and a senior lecturer of University of Moratuwa, Dr. Dimantha de Silva, with the original idea by another old Royalist Sakitha Kumarage. The project was funded by NTC (National Transportation Commission) and assisted by the effort of many other stakeholders.

This was a novel experience for us as students immediately coming out of school after ALs.

Sri Lankan transportation is highly dependable on public modes such as trains and buses. According statistics, it has been found that 51.9% percent of the population uses public transport. Yet, public passengers did not have proper information about bus routes, bus numbers and time schedules of public transportation. Sakitha Kumarage has found this issue as a major problem in transportation system in Sri Lanka and come up with the solution of implementing Google Public Transit. So many countries which have organized public transport systems have implemented Google Transit long time before. But in Sri Lanka we do not have an organized public transportation system. Even the authorized agencies do not have all the data and it was a major issue when implementing this project. Data was taken from various resources hence the connectivity of the data needed to be clarified. Still some bus route data was missing so we had to go in those routes marking the route and stops. It was very tedious task in this project. Other than that there were various other difficult tasks as well. Those were very good exposure and experience to us.

We would like to acknowledge Dr. Dimantha de Silva for taking all the responsibilities of this tedious but fertile project on his shoulders and Ms. Harini Mendis and Mr. Sakitha Kumarage for guiding us in this project. Further we would like to thank Binod Madubhashitha and Kanchana Ranasinghe for giving us this opportunity through OREPA Student Chapter Student Intern program

-Tharindu Dissanayake



OREPA

ENGINEERS in INDUSTRY

Session 02

OREPA successfully conducted the second session of Engineers in Industry on 20th of February 2019 on the topic 'Proposed solutions to solve traffic congestion in Western province' at Royal College Union Skills Centre. Distinguished Dr. Dimantha De Silva from the Civil Engineering department of University of Moratuwa participated to the event as the guest speaker.

First, Dr. Dimantha De Silva discussed key patterns of the transportation and how they change with the time of the day presenting the analytical day-to-day data of traffic in Colombo and nearby areas in a very descriptive way outlining the importance of understanding those patterns. Then several mass transportation methods were explained. Dr Dimantha De Silva clearly emphasized how to effectively use those transportation methods to reduce the traffic congestion with the help of the analytical flow patterns.

Then, the transportation methods used in developed countries were discussed. Dr. Dimantha De Silva discussed how, foreign countries have developed the transportation systems including Light-rail, Metro, MRT (Mass Rapid Transit) and reduced the traffic congestion. He also explained how to get them as examples to reduce the traffic congestion in Western province.

In the final part of the tech talk, he discussed how to select most suitable transportation methods for Sri Lanka to reduce the traffic congestion and how to develop the existing transportation methods furthermore.

The Engineers in Industry-Session 2 was concluding giving a vast knowledge of transportation systems and many solutions to solve the traffic congestion in Western province. This was a great chance for the tech enthusiasts to think and come up with innovative solutions to solve the traffic congestion.

-Chanuka Abeysinghe

MIND GUIDES

CAMPUS VISIT

The main objectives of the field visit was to give students a good idea of real engineering, university life and the motivation to work hard for their A/L examination balancing their academics and other activities. Numerous mentoring programs and student support sessions has been organized by the OREPA over the past few years focusing on Advanced Level students studying in the Physical Science Stream. This time it was initiated for 2020 and 2021 Advanced Level Students. As an organization centered around the engineering faculty of University of Moratuwa, one of our main targets is to increase the number of university students from the college every year.

The mentoring sessions for this year (for the 2020 and 2021 A/L batches) started off under Mind Guides focusing on smaller number of students (33).Thirty three students who represented the mathematics society of the college got opportunity to visit UOM on the 2nd of August 2019 and took part in a one-day session organized specially for them. They had the privilege to visit several departments including the Electronics and Telecommunication Engineering Department, Civil Engineering Department, Mechanical Engineering Department and Computer Science Engineering Department.

Young Royalists listening to a Lecturer at the Department of Electronic Engineering

The senior lecturers in some department conducted about one-hour session which was very useful for students. In all these departments students had the rare opportunity to visit and inspect all the facilities within a certain department making themselves familiar with a range of engineering applications.

Moratuwa and University of Sri Jayawardenepura where the students received some valuable tips and advice on how to overcome the advanced level barrier by balancing their sports/ clubs work alongside their academics. In addition, mentors were appointed to assist this batch of students for the upcoming year.

Dr. Chandana talking to the students at Department of Computer Science Engineering - University of Moratuwa

Refreshments for the students were provided after visiting of Mechanical Engineering Department. And the lunch was provided for the students from the participants from OREPA after visiting Electronics and Telecommunication Engineering Department. The day was wrapped up with a session with the 2017 batch of Old Royalists at University of

Special thanks to,

Dr. Chandana Gamage

Prof. Nadika Jayasooriya

Dr. Tharindu Miyanwala

-Tharindu Dissanayake

Google Transit in Sri Lanka

Many of the people use Google Maps to check many travel options before planning trips. The transit option was added to Google Maps in Sri Lanka thanks to a team from the Civil Engineering Department of University of Moratuwa in partnership with the National Transport Commission.

By using this particular feature anyone can check island wide railway routes and inter-city bus routes starting and ending in the Western Province. Most bus routes in Western province are included and they hope to add the remaining bus routes soon. The users can take a rough idea about the time of the trip and the walking time is also included. Users can also select specialized options that have less walking, fewer transfers etc.

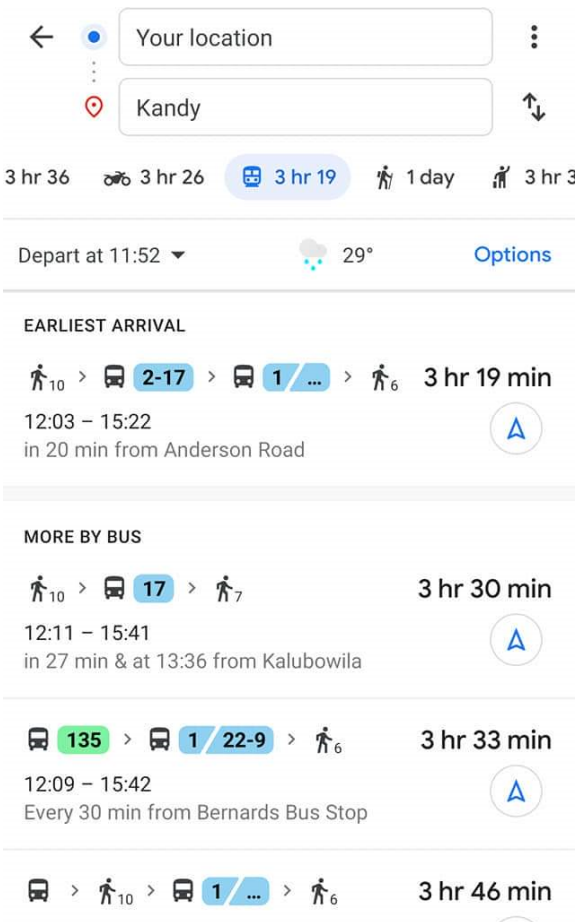
The team was led by senior lecturer Dr. Dimantha De Silva and his graduate students assisted by a bunch of students awaiting university entrance.

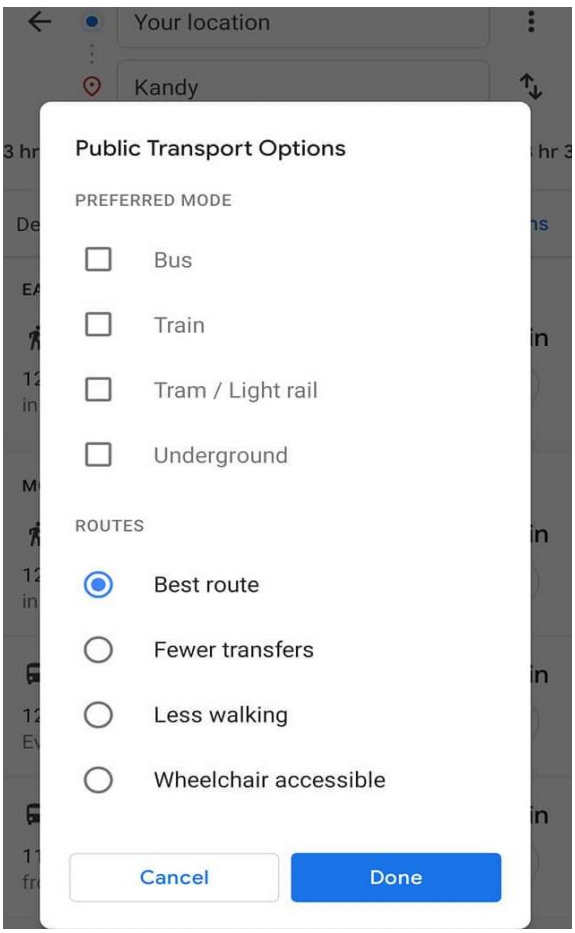
The team comprised of graduate students Sakitha Kumarage, Harini Mendis, Dileepa Fernando, Pubudu Damsara and undergraduate students Thilakshan Thisaiveerasingam, Lakshan Dissanayake, Tharindu Dissanayake, Mihisara Jayasooriya, Manul Karunasiri, Mayooran Thavendra and Nuwan Prabath.

Dr. Dimantha de Silva (Right corner) , Ms. Harini Mendis and a few members of the crew

The idea for the project came when Dr. De Silva noticed people using mobile phone applications with incomplete data to find bus routes and train details. Dr. De Silva explained that the details were taken from existing data of Google Maps and they were added to the transit feature of the same. According to Dr. De Silva, the team has used data on the websites of local transport authorities and new data has been collected by team members from travelling on several bus routes and marking all the stops. Apart from adding the rest of local bus routes to Google Maps, the team is hoping to include real time GPS data of all buses and trains. Now that the relevant information is available on an mobile application, bus owners and other officials will see a benefit in installing GPS trackers, making travelling plans even easier to be made through Google Maps, Dr. De Silva explained.

-Tharindu Dissanayake





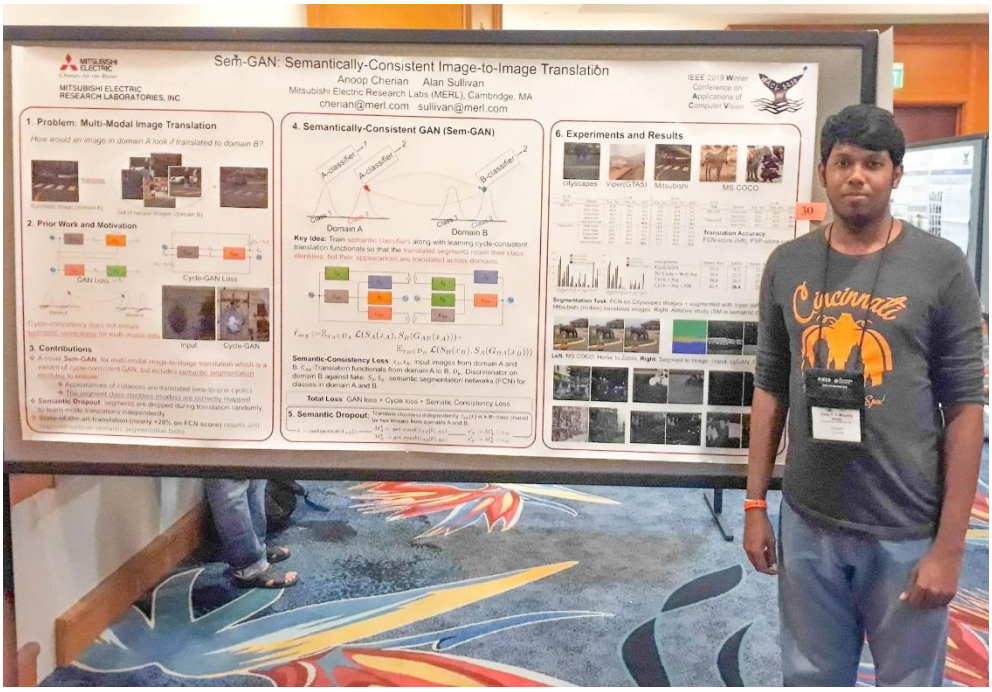
EXPLORING
Student Innovation

Vinoj Jayasundara and Sandaru Jayasekara from the batch of 2013, who graduated from the University of Moratuwa in 2018, along with their comrades Jathushan Rajasegaran and Nipuni Hirunima Jayasekara have proposed a revolutionary new concept for deep learning named DeepCaps as their final year project which was presented at the IEEE Computer Vision and Pattern Recognition (CVPR) conference, which is the world's premiere conference for Artificial Intelligence.

Convolutional Neural Networks (CNNs) have revolutionized the computer vision task, yet, they have several limitations. Newly introduced Capsule Networks have alleviated these underlying limitations up to a certain level.

Vinoj and his colleagues were able to introduce a deep capsule network architecture which uses a novel 3D convolution based, dynamic routing algorithm and also a class independent recorder network. As mentioned earlier, despite the fact that CNNs were capable of making breakthroughs in many computer vision tasks, they host limitations such as the inability to understand spatial relationship between features. Capsule Networks had been proposed to overcome these limitations which comprises of only one convolution layer and one fully connected capsule layer. Although this architecture works well with the MNIST dataset, it cannot comprehend rather complex objects such as CIFAR due to more complex shapes in comparison to MNIST.

Sandaru, Hirunima, Vinoj, Jathushan, and Dr Rodrigo (left to right)



Hence to reduce the computational complexity introduced by the multiple layers needing dynamic routing, they proposed a novel deep architecture for capsule networks, termed “DeepCaps” that aimed to improve the performance of the capsule networks for more complex image datasets. Further, they have proposed a novel 3D-convolution-based dynamic routing algorithm to aid the learning process of DeepCaps.

The results were exceptional. They have significantly outperformed the existing state-of-art capsule network architecture, while requiring a significantly lower number of parameters. To be precise, for the CIFAR10 database, DeepCaps has achieved a 3% improvement in the accuracy in comparison to Sabour’s Capsule Networks along with a 68% reduction in the number of parameters.

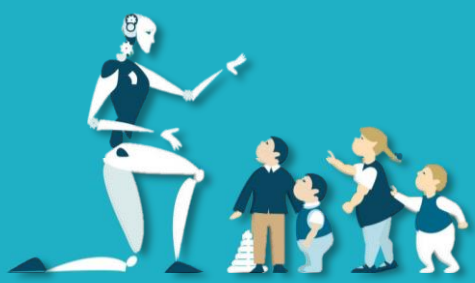
TextCaps solved this problem by introducing a technique of generating new training samples from the existing samples, with realistic augmentations which reflect actual variations that are present in human hand writing, by adding random controlled noise to their corresponding instantiation parameters.

Their system is useful in character recognition for localized languages that lack much labeled training data and even in other related more general contexts such as object recognition.

In conclusion, DeepCaps is capable of going deeper with capsules using less computational complexity compared to Sabour et al. and also it has surpassed the state-of-the art performance on CIFAR10, SVHN and Fashion-MNIST, while achieving the state-of-the art performance on MNIST dataset in the Capsule Network domain. The overall hindered performance of CapsNet has been taken over by DeepCaps and showed a significantly improved performance.

After grasping this genius idea which allowed a big step forward in deep learning, the team became a prodigy in Capsule Networks. Ultimately, DeepCaps and TextCaps are two of the few publications from Sri Lanka, ever to be mentioned in top global conferences like CVPR and WACV. They hope to build even deeper and higher level understanding models and apply on popular datasets, and also investigate on eliminating the correlation between the instantiation parameters.

-Lasan Manujitha



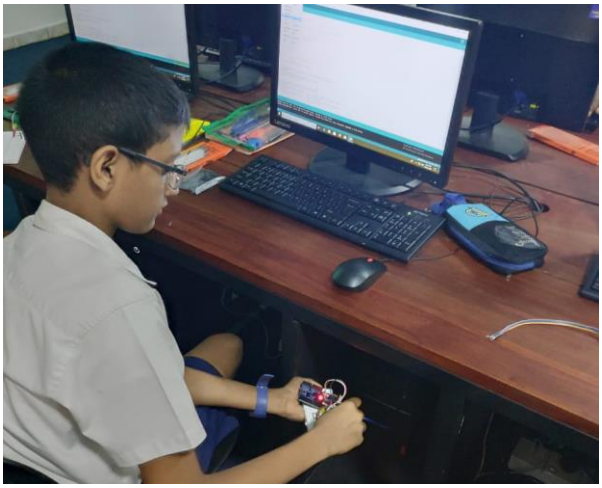
CREATIVITY ENHANCEMENT

Innovation is the vital factor in human evolution which comes through immense blend of knowledge and creativity. OREPA being the main professional body entrusted in enhancing young Royalist passion for innovation for a bright future identifies this vital need of human evolution. Identifying the need of innovation.

Inauguration of Creativity Enhancement Project dates back in year 2016.The project was initiated based on four goals which are correlated to robotics

and interested disciplines of automation. Design Thinking, manifesting ideas, and Creativity, lateral approach for solutions were the main goals of this project.

OREPA initiated numerous projects based on the fact “Both Learning and Innovation go in hand”. Creativity Enhancement Project was a successful effort put on this matter of interest.



The undergoing program consists of two main phases in vaccinating innovative mindset on to young Royalists which is composed of an introductory workshop on programming with Arduino and a series of weekly lecture series followed by a weekly meetup session. The weekly meetup session is held immediately after every weekly lecture at the Main Computer Lab. The lecture series were commenced on 26TH of July 2019 with a basic introduction to robotics and control systems. The program shall be concluded on 25TH October 2019.

Concluding on the limelight of the well-known fact that “Innovation is the new competitive advantage “, OREPA have made a great effort in arming young Royalists with novel technology and innovative mindset.

The project was supported by Paraqum Technologies, Sri Lanka as the technology partner and principal sponsor.

-Nilan Fernando

STUDENT CHAPTER AGM 2019

The Annual General Meeting of the Student Chapter of Old Royalists Engineering Professionals' Association concluded successfully on the 20th of February 2019 at the Royal College Union Skills Centre. Prof J.M.S.J Bandara – president of OREPA Main body, Dr. Jagath Manathunga and Eng. Geethanga Wijesinghe – Secretary of OREPA Main Body graced the event with their presence. Undergraduates and Academia representing all member institutions of OREPA as well as Engineering Professionals from a variety of disciplines also took part.

The AGM commenced at 6.30 p.m. with secretary reading out the secretary's report. He read out the minutes of the previous AGM followed by a thorough summary of projects carried out by OREPA Student Chapter for the term 2018/19.

This was followed by reading out the Treasurer's Report for the past term. The report was unanimously approved and seconded by the members who were present. Letters of appreciation were handed out to members who actively engaged and committed in numerous ways to carry out the Student Chapter projects successfully.

Prof J.M.S.J Bandara – president of OREPA Main body in his speech praised and commended the efforts of all those involved in carrying out Student Chapter projects and for the support extended towards the Main Body. He further explained the synergy between the Main Body and Student Chapter which is instrumental and vital when carrying out the mission of OREPA and requested for continued support.

The out-going President Mr. Sandaru Jayasekara being the pro tem chair of the AGM, proposed the incoming Committee. There being no objections, the appointments were approved and seconded by the members.

-Nimsara Seneviratne

At the end of another successful term, OREPA held its Annual General Meeting for the Session 2019/2020, on Friday the 02nd of August at the Royal College Union Skills Centre.

The event started at 6.30 p.m. with the Vice President Mr. Kavinga Karunasekara welcoming the assembly. Next followed the Secretary's report by Mr. Geethanga Wijesinghe and a presentation on school projects carried out throughout the Session 2018/19 by Mr. Nalith Udugampola, Director - School Projects of OREPA Student Chapter.

Dr. Tissa Jayaweera, being the Pro Tem Chair for the event, proposed the incoming Office Bearers and they were appointed with unanimous consent of the house.

Another nine professionals were elected to the Executive Committee after being proposed and seconded by the members of the house.

The office bearers for the Session 2019/2020 are are follows.

Immediate Past President
Prof. U. G. A. Puswewala

President
Prof. J. M. S. J. Bandara

Vice Presidents
Dr. C. D. Gamage
Kavinga Karunasekara

Secretary
Dr. Nadika Jayasooriya

Assistant Secretary
Chandula Samaranayake

Treasurer
Prof. J. M. A. Manatunge

Assistant Treasurer
Pamodh Alwis

A resolution for adopting an Advisory Committee was passed unanimously, enabling the Executive Committee to appoint the Advisory Committee. The adopted resolution notes;

"This House resolves that the existing constitution of the Old Royalists' Engineering Professionals Association (OREPA) be amended to include the following clause:
The Executive Committee of OREPA shall appoint a standing subcommittee of OREPA consisting of 12 members which shall be called the Advisory Committee. The Executive Committee shall invite professionals to serve in this committee and the term of appointment shall be for a period of three (3) years."

Mrs. M. M. T. U. Kumarihami, the deputy principal - A/L section, addressed the assembly on behalf of the principal, appreciating the help given by OREPA and requesting further and strengthened collaboration, especially in STEM promotion efforts. This was followed by an address by Mr. Mithila Mendis, Secretary of the Royal College Union. In his speech, which reinvigorated the gathered membership, he emphasized the ways in which OREPA can contribute more and necessity to do so, while applauding our active assistance to and involvement with the alma mater.

Prof. J. M. S. J. Bandara, re-elected as the President for a second term, then addressed the gathering, outlining his priorities for the next OREPA Session and thanking all the stakeholders who helped OREPA in serving the alma mater in the Session 2018/19.

Dr. Nadika Jayasooriya, the newly elected Secretary of the Association, delivered the vote of thanks. With that Mr. Abishek Mapa, the host of the event, officially concluded the AGM.

-Udara Kumarasena

Executive Committee 2019/20

Kanchana Ranasinghe
President

Mayuka Jayawardhana
Treasurer

Naveen Avishka
Secretary

Dasun Kariyawasam
Vice President

Dulaj Dilshan
Assistant Secretary

Nalith Udugampola

Dilshan Perera
Directors of School Projects

Supun Ranawaka

Dulshan De Silva
Directors of Information Management and Marketing

Binod Madubhashitha
Director of Public Relation

Pasan Kumarasinghe
Director of Events

Indunil Uthpalanjana
Director of Membership

NEWSLETTER TEAM

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Dulshan De Silva

DESIGNER
Sahan Pasindu Peiris

CONTENT WRITERS
Tharindu Dissanayake
Nilan Fernando
Lasan Manujitha
Chanuka Abeysinghe
Nimsara Senevirathna
Udara Kumarasena

"OREPA, as a host of technical experts in many facets of engineering and related fields, opens up a reservoir of knowledge, technical expertise and material support in the fields of engineering, architecture and related fields for the benefit of the students and the youth. OREPA is looking for- ward to become a key stakeholder of the Royal College and the community, continuously working towards the betterment of our society. This Professional Newsletter provides news on our projects, events, innovations and achievements to promote sustainability, new innovations and youth em- powerment within and beyond Royal College."

Please send your thoughts and insights to empower our initiatives; OREPA Student Chapter - Editorial Board
orepa.newsletter@gmail.com