Uplink.

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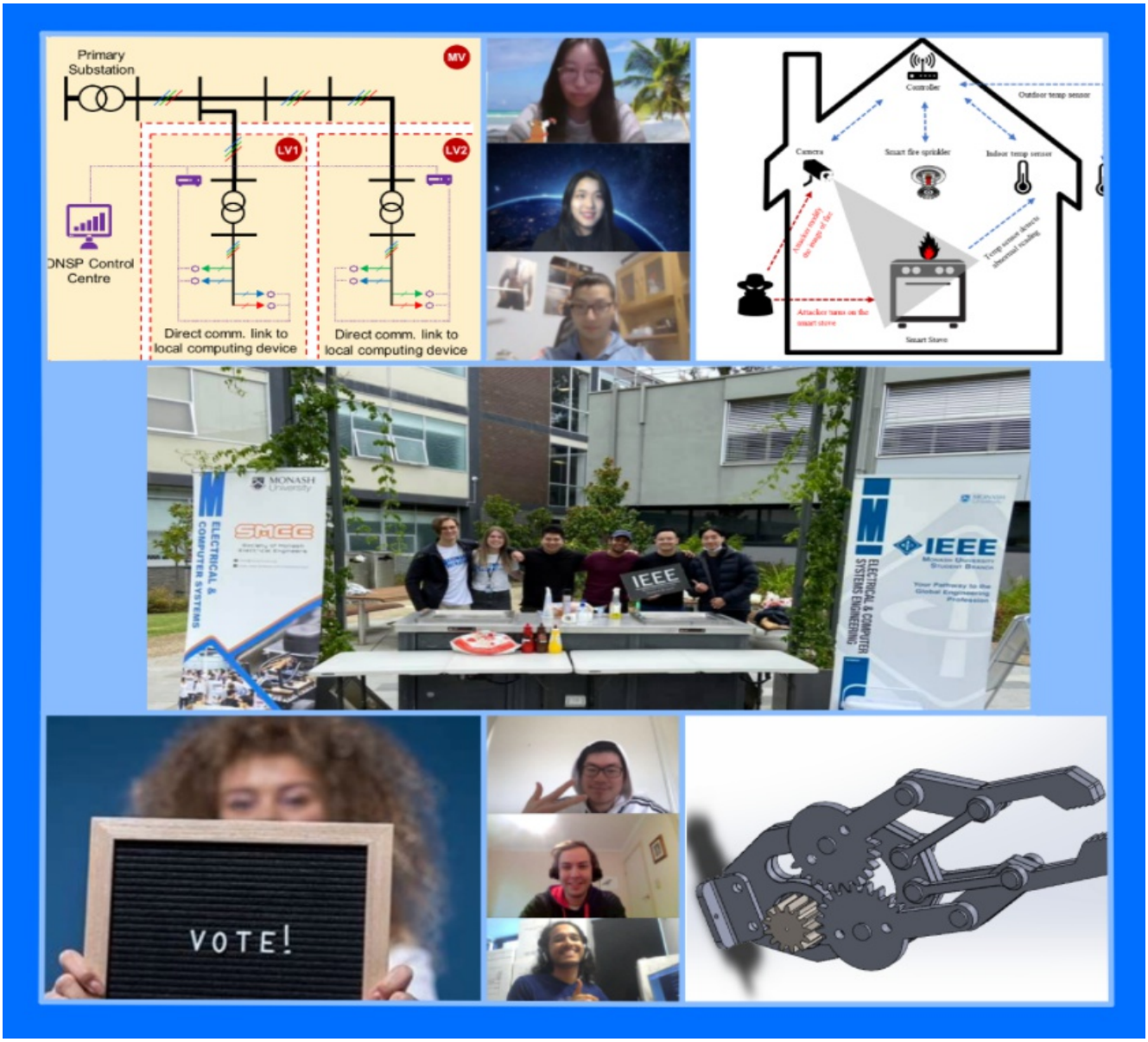

IEEE

Call for 'Articles and Letters to Editor'

Articles for Uplink from IEEE members

Uplink is *your* Journal. It exists not only to inform and enlighten our readers, but also to provide a channel of communication. If you have any technical topic that you have been working on, or something you think would be of particular interest to others, or simply timely announcements, then please do contact the Editor. Articles can be from a half page to three pages.

Letters to the Editor

Also, letters to the Editor from IEEE members would be much appreciated. For example, suggestions on new things you think the Section could do, or comments on how we are already doing things or on broader issues as well. Letters about *Uplink* itself would be particularly welcome! Letters should aim to be 200 words or less in length. For further details about letter requirements, please refer to the Section website.

You can send article proposals or letters to the Uplink Editor.

Our Cover and Acknowledgements:

The cover is a montage of images taken from the articles in this edition of Uplink. The photograph on page 2 is from http://www.iemoji.com/view/emoji/368/objects/postbox

IEEE Victorian Section

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From the Flight Deck

The past two years have likely been the most unusual for the Victorian Section, as for all the world! Along with all other volunteers involved, we have done our best to keep the activities going throughout lockdowns. While we missed having face to face meetings, we have had some great online events many of which are shared on our YouTube channel and can be viewed again. We are now preparing to hand over activities to the new Vic Section Committee starting in January 2022 and I would like to wish them well in their tasks.

Some of the unexpected benefits from all the restrictions we have faced due to the pandemic have been our inter-chapter co-operations with the other IEEE Sections in Australia and even globally. We have also gained experience in running and publicising large scale symposia on-line.

It has been a pleasure to lead the Victorian Section along with all Technical Chapters, Affinity Groups and Student Branches over the past two years and I look forward to continuing my IEEE volunteering in other areas. It is inspiring to work with all the great volunteers and engineers in the IEEE community.

Mehrnaz Shoushtarian, PhD
Chair, IEEE Victorian Section 2019-2021
mehrnaz@ieee.org

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IEEE News

Victorian Section AGM 2021

For the last few years, our AGMs have been held at the University of Melbourne's Graduate House. But due to the ongoing Pandemic, it will be held as a virtual event like last year. But worry not, there will be speakers to delight, IEEE awards and prizes, and reports on the "State-of-the-IEEE in Victoria". Please register here to attend the AGM at 6pm on Wednesday, December 8, 2021.

IEEE Student Paper Prize Competition Results - 2021 First and Second Rounds

This year the Section ran two competitions, one in each half-year. The competition was divided into “first-papers” and “non-first” papers. The aim of having a “first-paper” category was to give an equal opportunity to people who were starting their publishing careers. In all, 22 papers were entered over the two rounds and the quality of writing was excellent to amazing.

First Half Year: First-Paper Competition

First Prize: Angela Simonovska et al for "Phase Grouping in PV-Rich LV Feeders: Smart Meter Data and Unconstrained k-Means"
Second Prize: Hasini Nakulugamuwa Gamage et al for "An Efficient Boolean Modelling Approach for Genetic Network Inference"
Third Prize: Jaskaran Gill et al for "Dynamically Regulated Initialization for S-system Modelling of Genetic Networks"

First Half Year: Non-First Paper Competition

First Prize: Arthur Gonçalves Givisiez et al for "Residential PV Settings for MV-LV Networks: A Distributed Three-Phase AC OPF"
Second Prize: Vincenzo Bassi et al for "Model-Free Voltage Calculations for PV-Rich LV Networks: Smart Meter Data & Deep Neural Networks"
Third Prize: Mir Toufikur Rahman et al for "Assessment of Conservation Voltage Reduction Capabilities Using Load Modelling in Renewable-Rich Power Systems"

Second Half Year: Non-First Paper Competition

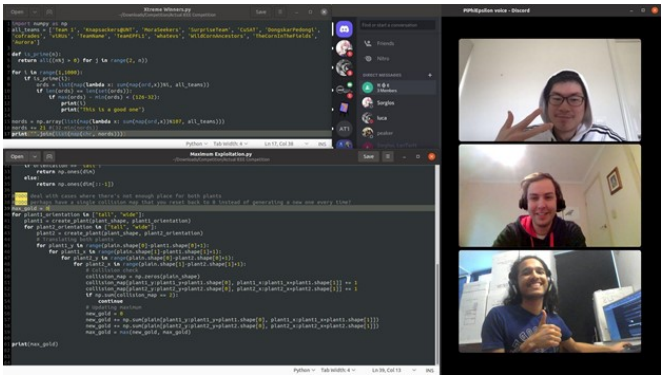
First Prize: Sina Mansour et al for "High-resolution connectomic fingerprints: Mapping neural identity and behavior"
Second Prize: Ethan Grooby et al for "A New Non-Negative Matrix Co-Factorisation Approach for Noisy Neonatal Chest Sound Separation"
Third Prize: Dean M. Corva et al for " An Investigation Into Miniaturised Closed-Loop DBS Devices"

The prizes come with a cash award of $300 (First), $200 (Second) or $100 (Third) and a certificate. The Victorian Section will run another competition from 20 October 2021 to 19 April 2022 and details are on our website. For further imformation please email us.

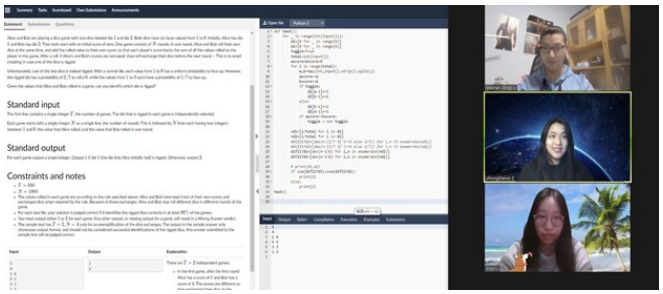
IEEE Xtreme 15.0 Programming Competition

IEEEXtreme is a much anticipated event where student branches compete against each other to coming up with solutions to technical challenges.
IEEE Monash Student Branch and University of Melbourne Student Branch in Victoria jointly organized IEEE Xtreme 15.0, a 24-hour Global Programming Competition via Discord server on 23rd October 2021 from 11 AM AEDT. The respective Student Branch chairs, Mengqing Xuan and Sina Mansour as well as Noor Shaik, Student Activities Coordinator in IEEE Victorian Section, have actively led their student volunteers and organized the competition. Samin Haque and Chia-Wei Cheng are the Xtreme Ambassadors this year. Yan Wong, Fatemeh Jalali, Emanuele Viterbo, James Saunderson, and Tauseef Gulrez proctored the event this year. A total of 14 teams from both universities (8 from Monash, and 6 from UniMelb) participated this year which is twice the number of teams from last year. There have been various IEEE outreach events, tutorials, and competitive programming sessions organised prior to the event to attract student participants. Hansen

Kurli (#TheSingle team) from UniMelb ranked second in the Australian teams, and first at the Victorian Section level. Maoran Li, Xinyi Li, and Yihong Zhu (#MSB5 team) from Monash University topped the Monash SB teams. Both the winning teams will receive a local cash prize from the Victorian Section. The proctors were happy to be involved in this event and extended their support for future events. We are hoping to have more teams next year from various universities in Victoria. If you want to see some of the typical problems which were solved, go to the IEEE Xtreme practice community site



Team #PiPhiEpsilon (from UniMelb)



Team #MSB5 (from Monash)

New IEEE publications to interest you

The IEEE is a valuable resource for keeping you up-to-date in your present career, or preparing you for the one you aspire to. The areas that the IEEE covers expands each year and new fields are opened up and new journals are published.

One innovation that the IEEE is embracing is a hybrid model of publishing where tradition subscription-based publications are augmented by open-access ones. The IEEE's multi-disciplinary open publication is IEEE Access. As well, each Society has a range of open access publications. Also, you can browse through all of the journals for each society.

So you can see that the IEEE is a great resource for work or to explore your interests. When you renew your IEEE Membership renewal for 2022 have a look first through the journal lists and see what new and interesting ones appeal to you - you might find some suprising new interests!

IEEE Victorian Section Elections

by Section Election Committee
Ee Hui Lim, Emerson Keenan and Enn Vinnal

Something important is happening in the IEEE Victorian Section! An election is underway now for contested positions on the elected committee for 2022-2023 and we'd like you to vote. Have a read of the on-line candidate statements and vote for one (1) person for each contested position. The nominations for the elected positions are shown below and the positions that are contested are the Chair, Vice-Chair and Assistant-Secretary.

Section Chair:
Annick Boghossian, Madhusudan Chetty and Feng Xia
Vice Chair:
Vijay S. Paul and Sridhar Reddy Pulikanti
Secretary:
Akhlaqur Rahman
Assistant Secretary:
Robert Koch and Susmita Saha
Treasurer:
Priya Rani
Assistant Treasurer:
Champake Mendis

You can vote now here! The election will close at 11:59 PM Saturday, the 4th of December 2021.

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Can We Trust IoT Ecosystems? – A Framework Towards IoT Trust Assessment

by IoT Lab @ Federation University

We live in an era of intelligent internet-connected devices, commonly known as the Internet of Things (IoT). These smart devices have found their ways into our everyday lives. For example, from smart cities to smart homes, IoT has become the main vehicle for accelerating automation. Recently, IoT appears to be a major disruptive and innovative technology in all sectors, including financial, social, business and medical domains. According to Business Insider Intelligence, there will be more than 64 billion IoT devices deployed around the globe in variaus applications by 2026. However, the security mechanism adopted for IoT is not strong enough, mainly because of the resource constraints of lightweight IoT devices and the use of Internet protocols. IoT data are primarily in image and numeric forms. Recently IoT images are advancing intelligent systems such as smart home, intelligent surveillance and transportation, and industrial automation.

An example

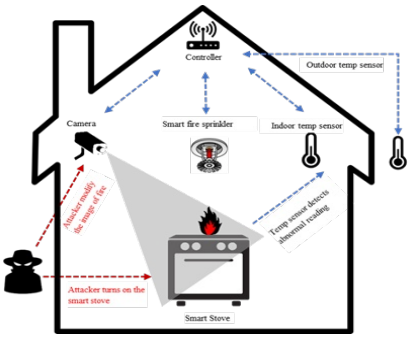


Figure 1: An example of scenario where a camera and temperature sensor are observing the same object, namely, a smart stove

Let us consider a scenario (Figure 1) where a camera sensor monitors the safety and security of a smart kitchen. It monitors whether there is an unattended fire from the stove. If there is an alarm , the controller triggers the smart fire sprinkler to extinguish the fire. What if an attacker hacks into the intelligent kitchen stove and creates a fire hazard in the middle of the night or when the home occupants are away? Let us consider that the attacker also gets access to the camera data and alters the surveillance images so that the camera sends misinformation (no fire hazard) to the controller. The trustworthiness of the smart stove and camera remains unchanged to the controller, and the fire sprinkler remains idle as it has no idea about the attack or hazard.

However, a particular event can be observed by multiple sensors, better representing the characteristics of that event. It is then less likely that all the sensors will be compromised at the same timebecause the utilization of the data of non-compromised sensors is used to verify the trust level of other sensor data. Assume the fire event in the above example is monitored with a temperature sensor and an image sensor. For the sake of simplicity and assuming that a fire event has occurred, let us consider that the temperature sensors were not hacked. The correlation between indoor and outdoor temperature sensors can represent important information regarding the true temperature trend in the kitchen. Although the hacker tampered (removed the fire event information) with the image sensor data, the temperature sensors indicate that the unattended kitchen temperature is above a certain threshold compared with the outdoor temperature trend, meaning the stove is operating in an unusual way. The controller now can identify that there are mismatches in the information provided by different types of sensors. The controller can then take the necessary actions (e.g., start fire sprinkler, generate an alarm, ask for administrative intervention) to put out the fire and recalculate the trustworthiness of connected sensors. Research on assessing the IoT image trust level in such situations is being undertaken in the IoT Lab @ FedUni.

Image trust management framework developed by IoT lab @ FedUni

One of the IEEE Victorian Section members,

Mohammad Manzurul Islam PhD's work has been focused on estimating the trustworthiness of IoT image data. With his PhD supervisors, Mohammad has formulated an image trustworthiness measurement framework (Figure 2) and validated his theory by implementing an industry-grade test-bed in the laboratory. The project aims to identify unattended fire hazards in a regular intelligent household setup. A variety of sensors, edge devices and LoRaWAN devices were utilised to develop the working prototype as the proof of concept. For data communication, LoRaWAN technology was employed. The LoRaWAN gateway was connected with The Things Network (TTN) for remote communication and monitoring. The initial work was published in IEEE Trustcom 2019. In this project, trusted numeric data from temperature sensors were used to assess the trust level of image data.

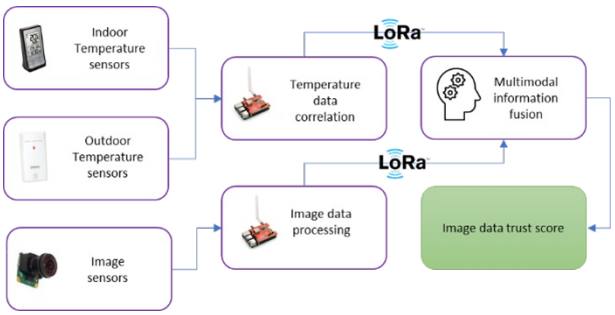


Figure 2: Overview of the trustworthiness framework based on an example scenario

The prototype development in this research has been improved by replacing the public TTN LoRaWAN network with a private LoRaWAN network adopting an open-source LoRaWAN network server stack and is work in progress.

Mohammad Manzurul Islam received his Ph.D. in IT from Federation University in 2021.
Gour C. Karmakar is currently an associate professor at Federation University.
Joarder Kamruzzaman is a Professor in the School of Science, Engineering and Information Technology, Federation University.
Manzur Murshed is a Professor and the Associate Dean (Research) at the School of Science, Engineering and Information Technology, Federation University.

Phase Grouping in PV-Rich LV Feeders

By Angela Simonovska

The Environment

The growing number of residential solar photovoltaic (PV) systems being installed in residential premises is changing the way our power distribution grid works and is managed. Traditionally, power has been generated in power stations, carried along transmission lines to urban areas and then distributed to household and industry. With wide-spread use of PV systems power is injected into the network within the distribution network itself and that needs to be managed to ensure the stability of the network. One way for distribution companies to identify out what potential network impacts would be when PVs feed power back into the network is to use feeder models.

In Australia, we use 3-phase environment and an end user can be supplied with a single phase supply or a 3-phase one. Since residential customers are supplied by a single-phase, they can belong to one of the three phases, i.e. phase groups.

The Problem

One of the major challenges is that the phase group to which residential customers are connected to is largely unknown. The growing adoption of smart meters is providing distribution companies with many opportunities to exploit the corresponding historical data using advanced analytics. One potential application is the identification of the phase group to which residential customers are connected to.

Studies found in literature, which attempt to identify the phase group of residential customers using smart meter data, explore different approaches and algorithms. The main drawback of these studies is that time-series data from both smart meters and from the head of the

corresponding LV feeder is needed [1, 2, 3], or knowledge of the phase group of a small fraction of smart meters involved in the investigated set is required [4, 5, 6]. For the former, in practice, measurements at the head of LV feeders are not available given that distribution companies do not typically monitor such locations. As for the latter, while the extra information brings accuracy, it makes the approaches less practical for distribution companies as manual tests/check would be required. Also, in all the studies previously discussed, customers (and smart meter data) are considered to only consume electricity (positive net demand resulting in voltage drops). That is, the presence of residential solar PV installations are not considered. Given the growing uptake of solar PV, and the resulting variability on voltages (voltage rise during times of high PV generations and voltage drops at other times), it is crucial to understand the corresponding effects on phase grouping approaches.

How can we more easily find energy data information about phase groups?

We can try a phase grouping approach that uses, the daily voltage magnitude data (in Volts) of all single-phase residential customers extracted from the smart meter database for the observed time period (e.g., a week of historical data), followed by the principal component analysis (PCA) method. PCA is a common method used for dimensionality reduction in data analytics. It reduces data dimension and extracts key features (patterns) of the original data in order to express their similarities. In the context of the normalized voltage dataset (for one day), the PCA method is implemented to reduce its dimension so as to allow a simpler comparison among customers (that will enable their clustering).

The analysis uses an unconstrained k-means clustering technique which is a commonly used clustering technique in data analytics. It aims to partition m observations (the coordinates per customer obtained from the PCA method) into k clusters (number of phase groups, i.e., k=3 when all three phases are expected) based on the Euclidean distances to the centers of the clusters. The proposed approach uses an unconstrained k-means clustering technique that sorts the customers in three clusters according to their similarities, and does not require prior knowledge (i.e., phase group of a few customers).

The Approach

This article explores the accuracy of the proposed approach in the presence of residential PV systems and different amounts of historical seasonal data.

The proposed phase grouping approach consists of five sequential steps. The first three steps are done for each of the days of the investigated historical data (e.g., a week or a month). Once all the days are analysed, the last two steps take place.

In the first step, the pre-processing of customer's data is performed. The voltage time-series data of the customers (fed by the same feeder) is imported and normalized. In the second step, the

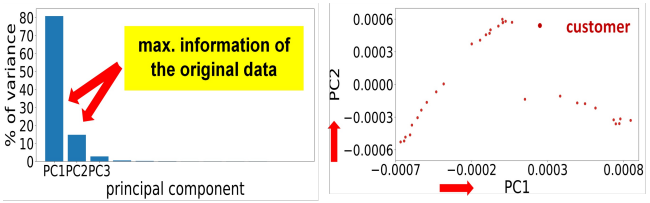


Figure 1. Principal Component Analysis Method

PCA method is used to extract the main features of the voltage time-series data. The first two principal components (PCs) from the PCA are selected and used as coordinates representing each of the customers, as shown in Fig.1. In the third step, an unconstrained k-means clustering technique sorts the customers in three clusters according to their similarities, as shown in Fig. 2. After multiple days are analysed, an algorithm is used to link each of the three clusters identified in each day to a consistent phase group. Finally, a statistical assessment is performed to determine the most predominant phase group for each customer, i.e., customers are allocated to the phase group that is more frequent.

The performance of the approach is demonstrated on a realistic Australian LV feeder from Victoria with 31 single-phase customers, with PV

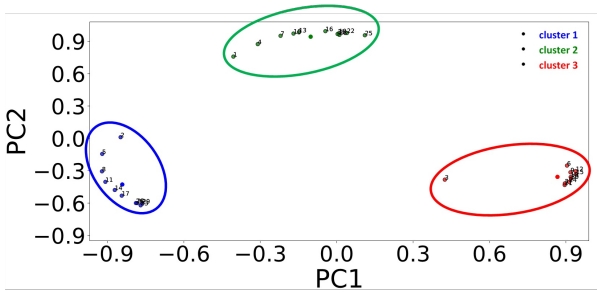


Figure 2. Unconstrained k-Means Clustering

penetrations ranging from 0 to 100%, and considering different cases varying the length of the historical data (one and two weeks, and different time periods) of 30 minute voltage time-series data per season for each of the customers. For the time periods, the approach considers the whole day of measurements as well as high and low demand periods.

Conclusion

The proposed phase grouping approach has shown effectiveness in allocating the customers to their correct phase group without or with PV (even with 100% of PV penetration). Furthermore, results suggest that historical data could be limited to one week-worth of voltage time-series data to correctly allocate the customers fed by the same feeder. In addition, there is also no need to consider the whole day of smart meter measurements, given the decreased accuracy of the proposed approach due to the higher penetration of PV systems. Consequently, to achieve the best performance, the implementation of the proposed phase grouping approach should limit the smart meter measurements to be processed to either high or low demand periods.

Angela Simonovska is a PhD student in Smart Grids at The University of Melbourne. She holds a Bachelor's degree in Electrical Engineering from The Saints Cyril and Methodius University in Skopje, Macedonia, and a Master's degree from Politecnico di Milano, Italy.

ResearchGate | *LinkedIn*

What a PCB Assembler Wants You to Know about Design for Manufacture

By Alexandra L. Uitdenbogerd and John Harnett

Electronics manufacturers receive a variety of circuit board designs from customers and in surprisingly many cases, the design (or the materials provided) has caused problems in the manufacturing process.

This article is intended to provide some background information about the way circuit boards are assembled and a checklist for electronics designers so that you can avoid pitfalls that get in the way of efficient cheap manufacture.

We shall limit the discussion here to surface mount assembly, but some tips can also apply to through-hole assembly.

What happens during electronics manufacture?

While different manufacturers will have different machinery and processes (See Figure 1), the following are common. The basic ingredients for circuit board assembly include bare PCBs, components, and solder paste. The solder paste

Figure 1. Solder stencil printer (foreground), pick & place machine (right) & reflow oven (back left).

can be applied to the circuit board using a solder paste stencil. The pasted boards pass through a pick and place machine, which places the components onto the boards. These populated boards are then put through a reflow oven that

Figure 2. Circuit boards in our small-batch reflow oven after assembly.

melts the solder, creating the connections between components and the tracks on the circuit board, and securing them in place.

Each phase may include inspection and testing. Before all this can happen, there is a set-up phase, where parts are loaded into feeders and the machines are programmed with the details about the specific assembly job.

The information needed for PCB assembly set-up

To put together the ingredients listed above, we need a recipe. The recipe in this case consists of a Bill of Materials (BOM), centroid data and Gerber files. These files can be generated from design software such as Altium or Eagle. The BOM provides a list of the component types to be used, much like the list of ingredients in a recipe. The essential information it contains are the part designators (for example C1 for capacitor 1), value (for example, 22 µF 50V for a capacitor), quantity and the "package" in addition to the product identifier. The package description for passives, such as resistors, is typically just the size, for example, 0603 or 0402. For other components there are some standard package types, such as QFN-32 (quad flat no-lead with 32 connectors), but some are unique to specific components.

The centroid file specifies where the components are to be placed, including their orientation. However, placement can't be exact unless there is a way to guide the machine's vision system. This is achieved with reference points, called fiducials, which are small, exposed copper shapes (usually circles) etched onto boards and panels. These allow the physical board and machine coordinate system to be aligned so that the placement is as accurate as possible. The fiducial coordinates should be included in the centroid file. Other information required is usually found on the silk screen layer of the PCBs. Clearly indicating orientation of polarised components on the silk screen is essential so that components are placed correctly. Showing component designators on the board, such as Q1 and D1, also makes manual checking easier. The Gerber files are used to produce the bare boards and solder paste stencil. The Gerber of the solder paste layer may also be required for automatic inspection of the solder paste. Looking at the schematic can reveal any potential problems. Otherwise, the Gerber files and component product information can be a useful back-up reference.

Can We Build it? Yes, We Can! …Or Can We?

There are size limits to what can be assembled. The board must be able to fit into the machine. For example a maximum board size may be 250mm by 250mm and the minimum is 50mm by 50mm. If your board is very small or a non-rectangular shape, it must be panelised (see here for details). While manual solder pasting has fewer size restrictions, a solder printer has hard limits. Always use at least a 520mm by 420mm framed stencil. Better still is a 23" by 23" (584mm x 584mm) stencil, as most automated stencil printers cannot use anything smaller. Size limits also apply to components. Some manufacturers may have older machines that can only assemble 0603 components and larger. They may not be able to assemble fine pitch component types such as BGAs. We can assemble 0201 components and BGAs but may have a surcharge for some

components that are known to be more finicky in assembly.

Sometimes it might not be the size but the shape that prevents a component from being placed by machine. The machine uses a vacuum-based system to pick up most components, so if there is a hole or uneven surface on the top of the component, it may fail to be picked up. The edges of the board cannot be populated. Either keep those clear of components or add tooling strips. We recommend strips be at least 10mm wide to also allow for panel fiducials to be located at least 5mm from the edge. PCBs with large holes might not be manufacturable without modification. Some board handlers' optical systems see the hole as the end of the board. If holes are larger than a few centimetres, we suggest filling the space and using break-away tabs so that the PCB hole can be easily removed after assembly. This retains board rigidity, which can help during assembly.

It might not be possible to automatically assemble all double-sided boards. One tip is to put all large components on one side, since small components can remain adhered with solder surface tension after the first pass, but large components might not. Sometimes a dab of glue is required to keep troublesome components in place. While having many distinct components may be feasible for assembly, it may mean multiple passes through the machine, and it increases the set-up time. As a rough guide, having fewer than 70 distinct components will usually be no problem. If there are more than that, check with your assembler what their limits are.

Finally, here is a design checklist. We hope it helps lead you to successful designs in the future.

Guidelines for Design for Manufacture

• Make sure your board and stencil are within size limits.

• Always include at least two fiducials per board, ideally at diagonally opposite ends.

• Use half-etched and filled fiducials on the underside of the stencils – unless otherwise specified by the assembler.

• Panelise your design if possible and don't leave this to the board manufacturer. This way you have all the assembly information to hand.

• When using C-shaped or home-plate style paste footprints, always round the inside corners, as the sharp edges can catch on the stencil cleaning paper. Rounding all paste footprints can help with paste release as well.

• Use surface mount components instead of through-hole where possible.

• Minimise the number of distinct components where possible. For example, can you use the same 22uF capacitor instead of two with different voltages? Some values of resistors and capacitors may be able to be combined where a range of values are possible in the design.

• Avoid highly asymmetric parts as these tend to move during reflow due to unequal solder wetting forces. This is a tough one to avoid, but if there is a choice, use the part with a symmetric footprint.

• Ensure at least 2mm clearance between component footprints and apertures and V-grooves if possible.

• Ensure that the orientation of polarised parts is clearly shown on the silk screen.

• If you have both large and fine-pitched parts, base your stencil thickness on the finest pitched parts. If additional paste is needed on large parts, their apertures can always be increased beyond their footprint, if there is space. Alternatively, a stepped stencil could be used, but this is more expensive.

• Make sure that the type of solder paste you choose matches the specification of the components used (some components are not compatible with some fluxes).

Alexandra L. Uitdenbogerd is a director of Agile Electronics and its Chief Scientist. She is a former Computer Science academic and remains an RMIT associate, with research interests encompassing usability and creative uses of advanced technologies.

John Harnett is a director of Agile Electronics and its Chief Engineer. His lifelong interest in electronics has led to a growing electronic design and assembly business located in Camberwell, Victoria.

IEEE Standard 7000™ -2021 'Model Process for Addressing Ethical Concerns During System Design'

by Ruth Lewis

The need for a standard

Computers have certainly evolved substantially in the last couple of decades. In the past they provided fairly straightforward efficiency improvements in computational processes, supplemented by manual handling practices and decision making by real people.

How things have changed! Now our expectations of customer service are much higher. We are impatient if our queries for a loan application or an insurance quotation or a stock item may even take a few minutes, let alone a day. Facilitating this efficiency and decision making is the new world of Artificial Intelligence and automation through automated processes, machine learning and 'bots'. With these, we enjoy unlimited access to our friends and families across the world via social media apps and instant video conferencing, online shopping and gaming, often curated to our personal taste.

It is expected that the same technology, automated and machine learning algorithms, fuelled by a wealth of historical data, accelerating computing power, deep learning methods and embedded sensors may be used to assist in solving the world's most wicked and intractable problems. Problems like global food shortages, developing responses to pandemics like COVID-19 and medical diagnostics, creating efficient and sustainable energy sources and transition plans, and how to moderate the effects of climate change.

However, for all of the hope that these technologies introduce, there is an equally insidious dark layer that is unfolding in parallel, that has the potential to undermine society's fabric, one which we have taken for granted previously. In hastening the speed to market to capitalise on generous financial returns and promised efficiencies, many companies and developers are failing to consider the harmful societal impacts that their new services and products may create. Examples such as the Australian Centrelink Robodebt provide glaring reminders at how an attempt at efficiency can have disastrous effects on both the 380,000 recipients of the wrongful debt notices, but also on the Federal Government which has just settled a class action for $1.2Bn (Robodebt Settlement Media Release).

International Standards provide a key way towards offering industry and consumers a self-regulated alternative to legislative Acts and Regulations imposed through Government mandates. These provide responsible voluntary guidelines to define what is socially and environmentally acceptable for trustworthy Artificial Intelligence systems and governance. IEEE has just released the IEEE Standard 7000™-2021 'Model Process for Addressing Ethical Concerns During System Design' on 15th September 2021, after a 6 year development journey involving almost 100 Working Group members across many countries, including the UK, Europe, South America, USA, Asia, Africa and Australia. This new standard provides a guiding process on how to address ethical concerns of stakeholders, by embedding their ethical and organisational values transparently into the design of IT and AI systems designed in accordance with this standard.

The value of a standard

The value of this new standard is that it incentivises responsible innovation. This benefits both Business Executives and System Developers, as it increases the business value proposition of the developing product and service, reduces the risk of ethical harms to their

stakeholders, including their company, their customers, suppliers, and the general public, and reduces the risk of investing in emerging and developing technologies.

IEEE Standard 7000™-2021 goes far beyond a list of value principles, and provides a structured process to go from ethical principles and values to system design outcomes in a practical step by step way through a 'Value Based Engineering' methodology. This provides an overlay process that will fit into an organisation's own governance practices, policies, project management, risk management and lifecycle models or system development methodologies.

IEEE Standard 7000™-2021 is recommended for use by any organisation of any size or type, that is engaged in concept exploration, requirements definition, or development of new or revised products or services.

The standard can be read on-line for free in IEEE Xplore in the IEEE Standards Reading Room.

Ruth Lewis is Principal Strategy Consultant at 'Technology Foresight', is a qualified futurist and professional engineer.

She is Chair of the IEEE Society on Social Implications of Technology Standards Committee and is the Standards Coordinator for the IEEE Victorian Section.

She is an active contributor in developing the IEEE 7000™-2021 'Model Process for Addressing Ethical Concerns During System Design' standard development between 2017 - 2021.

Residential PV Settings for Integrated Medium Voltage - Low Voltage Distribution Networks

by Arthur Gonçalves Givisiez

Introduction

The growing uptake of residential photovoltaic (PV) systems around the world is causing voltage rise above the required limits, and congestion problems in distribution network assets (e.g., cables, transformers). In recent years, distribution companies (known as Distribution Network Service Providers (DNSPs) in Australia) have been dealing with these challenges by defining fixed export limits to customers with PV systems. For instance, many DNSPs do not allow customers with PV systems to export more than 5kVA per phase.

However, fixed export limits, typically the same value for all customers within a distribution network area, may restrict PV generation in areas where restrictions are not needed, while it might not be sufficient to prevent network problems in other areas [1].

Thanks to the increased adoption of smart meters, communication infrastructure, and the ability of PV systems' inverters to receive external control signals [2], it is technically possible for DNSPs to actively calculate and broadcast the most adequate individual PV settings (e.g., maximum generation) that ensure network integrity, i.e., voltages and power flows are within the network limits, with the least restriction on PV generation.

In this context, among the different techniques that can be used to calculate PV settings, three-phase AC optimal power flow (OPF)-based schemes have shown great potential [1, 3].

Approaching the problem of calculating PV settings

However, the full classical formulation of the three-phase AC OPF problem is non-convex and well-known to suffer from scalability issues, i.e., as the size of the problem grows, it may not be solvable, or it is not solved fast enough (within few minutes) to be relevant for operation purposes. This happens particularly because they are implemented as a single problem (i.e., conventional approach). For instance, in Figure 1, measurements from customers' smart meters are sent to the DNSP control room, which uses these measurements to calculate PV settings via the conventional approach, then send the calculated PV settings back to customers' PV systems.

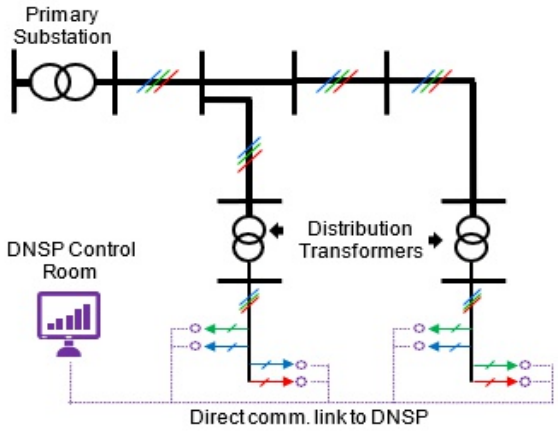


Figure 1. Architecture for the AC OPF modelled and solved as a single, large problem (conventional approach).

An alternative solution is to use distributed optimisation algorithms. These algorithms split a single, large problem into multiple smaller sub-problems. As a result, sub-problems are easier to be solved and they can also be solved in parallel [4], which can improve scalability. Nevertheless, from the implementation point of view, there is a trade-off between how small the sub-problems are and the required infrastructure, i.e., the smaller sub-problems get, the more measurements and computing devices are needed. This is because, typically, each sub-problem not only needs to be solved locally but also required to exchange data with its neighbours.

In the context of distribution networks, which start at primary substations originating medium voltage (MV, aka high voltage [HV] in Australia) feeders and then connecting hundreds or thousands of customers through low voltage (LV) feeders, the most practical locations to install measurements and computing devices in a way that also creates adequate splits (sub-problems) are distribution transformers. Furthermore, since LV networks are expected to evolve in the next few years, the proposed split makes the LV networks (sub-problems) modular, which means the corresponding models can be updated as they get expanded or modified, making the process faster and safer.

In Figure 2, the problem presented before was split in three parts (MV, LV1, and LV2), with split points at the primary side of distribution transformers. Here, measurements from customers' smart meters are sent to local computing devices (not to the DNSP control room), which calculate PV settings in coordination with the DNSP control room (with minimal information exchange) via a distributed approach, and local devices send the calculated PV settings back to customers' PV systems.

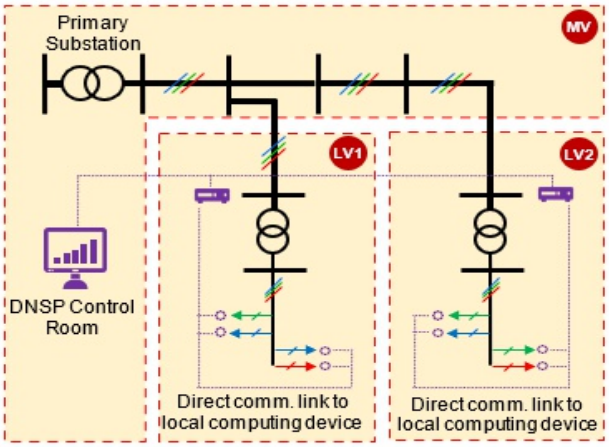


Figure 2. Architecture for the AC OPF modelled and solved as multiple, smaller sub-problems (distributed approach).

The Results

In order to create a practical distributed algorithm especially designed to handle integrated MV-LV distribution networks, this article proposes the use of the Alternating Direction Method of Multipliers

(ADMM) based three-phase AC OPF (formulated as a non-convex problem).

This considers realistically modelled (based on a real Victorian HV feeder), integrated MV and LV distribution networks (split on the primary side of distribution transformers) and calculates PV settings to maximize PV generation whilst keeping voltages at customers and distribution network assets power flows within required limits. The performance of the proposed ADMM-based algorithm was assessed in terms of accuracy and solution time, both in comparison with the conventional approach.

Four different problem sizes are considered for the assessment, by using different numbers of LV networks (i.e., 1LV, 10LV, 20LV, 30LV) connected to the same MV feeder. Problem sizes range from 193 to 10,580 single-phase equivalent nodes, which could be equivalent to 56 three-phase electric poles (when considering overhead lines) plus 25 single-phase customers' connection points, and 2,762 three-phase electric poles plus 2,294 single-phase customers' connection points, respectively.

For the smallest integrated MV-LV distribution network problem, both algorithms decide that there is no need of reducing PV generation (curtailment) due to network problems. In contrast, for the three larger problems, both algorithms produce PV settings that reduce PV generation and result in customer voltages within voltage limits (up to 253 V) and in power flows that do not exceed the capacity of the assets (lines and transformers).

Regarding the solution time, Figure 3 shows solution times for the conventional and distributed approaches, and the solution speed index (SSI) metric. The SSI metric is the ratio of conventional and distributed approaches solution times, if higher than one, the distributed approach is faster than the conventional. The proposed ADMM algorithm is slower for the cases with fewer LV networks (smaller OPF problems) because there is an overhead due to the ADMM algorithm convergence process.

However, as the distribution network (problem) size grows, the solution time of the conventional approach increases, and the benefit of the ADMM-based algorithm becomes evident. Therefore, there is a clear upwards trend on the SSI, and it is higher than one for 20LV and 30LV networks. This clearly shows that the proposed distributed approach tends to be faster than the conventional approach when more LV networks (larger OPF problems) are considered.

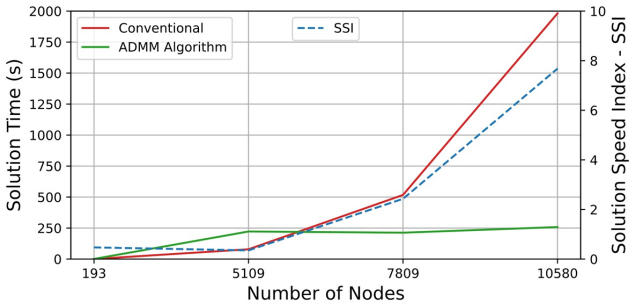


Figure 3. Solution times for the conventional and distributed OPF approaches, and the SSI for the investigated MV-LV distribution networks.

In conclusion, the proposed ADMM-based three-phase AC OPF is especially designed to handle integrated MV-LV distribution networks. The use of split points at distribution transformers was proposed because they are considered the most practical location to install measurements and computing devices, which are necessary to solve the local sub-problems. Results show that the proposed algorithm is not only accurate but tends to be faster than the conventional approach for large distribution networks.

Arthur Gonçalves Givisiez is a PhD student on Smart Grids and Power Systems at The University of Melbourne. In his PhD, he has been studying the challenges and opportunities brought by distributed energy resources (DERs) to power systems operation, focusing on the distribution network side. He is an IEEE member since 2011 and has bachelor and master's degree in Electrical Engineering, both from the Federal University of Juiz de Fora (UFJF), Brazil.
ResearchGate | *LinkedIn*

The Why and How of Legacy System Migration - Lotus Notes to Microsoft SharePoint

By Piyali Sarkar

Many intranets and custom collaboration environments that were built on Lotus Notes and Lotus Domino are being migrated to Microsoft SharePoint. Lotus Notes is the original name for a client-side application first introduced in 1989 which provides email, a group calendar and schedules, a Personal Information Manager, instant messaging, Web browsing, and other applications. Lotus Domino is the server-side of this client-server collaborative environment. IBM acquired Lotus in 1995 and HCL Technologies acquired Notes and Domino from IBM in 2019.

Microsoft 365 is a cloud based subscription service which incorporates Microsoft Word Microsoft SharePoint is a web-based collaborative platform that integrates with Office. The integrated tools in Microsoft Office 365 complement each companies may wish to move their Notes / Domino applications to 365. To do so, a proper migration plan is required for Lotus Notes migration because old legacy systems and data-bases are involved. The migration strategies and pro-cesses are described in this article.

Process for Rationalization

As part of the migration plan, we need perform a content and data audit to identify the business owners for the content in order to make decisions about migration in the Office 365 platform. Another important part of the migration plan is mapping the old Notes content to feature in Office 365 content. Moreover, it is required to plan access control and data governance that starts with the process for rationalization.

Data governance and access control is about setting up a set of policies, processes, structures, roles and responsi-bilities to ensure that an organisations data is secure and well managed.

The processes for rationalization and their outcomes have been summarized below:

TABLE 1
PROCESSES FOR RATIONALIZATION

PROCESS	OUTCOMES
Track the incoming NSF Files in the Tracker	Helps in work bundle man-agement and requirement tracing.
Copy the NSF files in the staging server	To access, examine and mi-grate.
Perform Technical Inspection	Using standard definitions, score the database against defined parameters.
Perform Business Input Survey	Perform Business Input Sur-vey Using standard question-naire, gather the business criticality related information & score the database.
Perform tool-based assessment	Automated tool provides 40+ parameters and their respec-tive values related to the Notes database.
Collate Assessment Result	Using standard template, collate the results together.
Mark for complexity	Define the complexity of the database, related to Share-Point.

Development and migration processes

The migration processes include developing SharePoint templates and rolling them out with corresponding functionality. SharePoint templates are used to more easily build an intranet.

Templates & Functionality Development

The templates and functionality development process type covers the guidelines to ensure functionality, usability and stability. A high level guidance is shown below.

Template Development Guidance

1. Every database after assessment should be marked for complexity.
2. A master list of SharePoint site templates needs to be maintained that will also enlist the related components (master pages, web parts, style sheets, syndication elements) that can be reused.
3. Wherever possible, the already existing

SharePoint template that has the closest match to the requirements for the database in consideration can be used.

Functionality Development Guidance

Functionality design set out the logical flow of the sys-tem, its inputs and outputs, its data organization, the applicable business and processing rules, and how it should appear to users.

1. A master sheet of functional components should be kept for reference purposes. This includes not only reusable assets but also the reference index of templates created as part of previous migrations.
2. The best practices to create and manage packages for deployment will be available in the knowledge repository.

Automated Tool Processes

The migration process is easier if automated tools are used because these eases the knowledge burden on individual team members. In this process there are mainly 3 process types- bundling, configuration and mapping.

Bundling: Bundling is the process of logically combin-ing more than one database, and the work bundle will get tracked as a single entity. This is useful when the factory executes a good number of databases in parallel.

Configurations: All the URLs for development, testing, Quality Assurance (QA), and production can be config-ured in respective configuration files.

Mapping: Mapping is the process of dragging & dropping database contents (filtered or entire set) on to the respective SharePoint library. Mapping also includes assigning metadata mapping, access control lists mapping, automatic mapping, dynamic library creation, dynamic column creations. The maps are reusable in applicable situations.

Handling Sensitive Applications

The sensitive Lotus Notes applications include pro-tected, validated, and confidential databases. The migration of these requires compliance to guidelines on data movement.

1. Depending on the sensitivity levels, the businessperson should walk through the application for assessment.
2. The business owner may strip the data off from the Lotus Notes database and hand it over to migration consultant for further analysis.
3. It is important to understand the ACL patterns and its implications on migrations for the sensi-tive Lotus Notes databases.
4. The target SharePoint site will be protected and accessible only for authorized personnel.
5. For migration and testing, migration teams will add/modify/delete sample content within the Lotus Notes database given without data.

Deployment and Transition Strategy

This section describes the overview of guidelines for packaging and deployment of migrated SharePoint sites.

1. It is always recommended not to access production environment for extraction/ deployment directly.
2. The movement from QA environment to Production should be through a BACK-UP/RESTORE method.
3. The Backup package created should undergo a validation process before Go-Live!
4. The SharePoint solution package (WSP) contain-ing templates should conform to overall Template development guidelines.
5. During the transition phase, the Lotus Notes da-tabase will be shut down for migration.
6. Transition communication will be on pre-defined template and schedule with clear own-ership within migration teams.

Migration Tools

There are few custom and industry standard tools are available to migrate the contents from Lotus Notes data-base to SharePoint. For example, Quest, Nintex etc.

The right tool needs to be chosen or customized which will be best suit for the migration. The tool needs to be installed and configured in the

development center. Product licensing and support structure also needs to be defined clearly.

Environment Guidelines and Configurations

A range of major environment parameters of migration is listed in this section. These parameters needed to be mapped with the environmental guidelines and configurations. Some of these parameters are listed as below:

1. The size - Average size of individual Lotus Domino server files (NSF). Also, average file size of SharePoint WSP Packages (with data & without data).
2. Location - where the NSF files reside? (Local folders of end users, Domino Servers, Staging Servers).
3. Bandwidth -The bandwidth (Copying 1 GB via internet can take overnight with broken/resumed download.
4. Permission - security permissions to access the Lotus Notes databases must be ensured.

Infrastructure Pre-requisites

The following parameters constitute the infrastructure pre-requisites for the program as in the table below.

TABLE 2
INFRASTRUCTURE PARAMETERS WITH DESCRIPTION

PARAMETER	DESCRIPTION
Hardware	1. Servers for SharePoint 2. Desktops/Laptops for Developing SharePoint components
Process Belts	1. Depending on the demand for migration, appropriate number of parallel teams & environments to be defined (process belts) 2. The hardware should be allocated per 'process belt' in the factory
Connectivity	1. The files may be transported as per practical work bundles 2. Min 5Mbps line for connectivity

Configuration Pre-requisites

The following parameters constitute the configuration pre-requisites for the program as set out in the table below.

TABLE 3
CONFIGURATION PARAMETERS WITH DESCRIPTION

PARAMETER	DESCRIPTION
Active Directory	1.Active Directory should be populated with the Lotus Notes user base
DNS Servers	All machines should be connected to appropriate DNS servers
Proxy Servers/Firewalls	1.All pass-through information for all proxies should be available for machine configurations 2.Firewall ports for HTTP/HTTPS should be opened for SharePoint Access 3.Depending on need for custom scripting, appropriate UDP/TCP port should be identified and managed
Identity/ServiceAccounts	All SharePoint Services accounts for respective environments (dev, test, QA, prod) should be available for tool & machines configurations
SharePoint URL & SiteArchitecture	1.All SharePoint web applications, Root Site Collections URL and information should be available in Dev, test, QA, Prod) 2.Information Architecture Document to be ready for Sites Organization & URL/Configuration
AAM, Managed Paths	1.Pre-planned information on AAM and Managed Paths 2.Replicate configurations in SharePoint environment that matches the target production environment

Tool Pre-requisites

This section describes the pre-requisites to use any tool for migrations.

Administrative Access for the tool experts to the machines: The person who executes the migration activities should have administrative rights on:

1. Desktop where tool will be installed
2. Source folders where the databases reside
3. Target sites within appropriate environment (Development, Test, QA)

Access to Source & Target Environments:

The person who performs tool activities should have the below access permissions:

1. Lotus Notes Manager Privilege
2. SharePoint Site Collection Administration

Instructions for Mapping & Execution:

The user should have the written instructions for:

1. Connectivity to appropriate servers / locations
2. Data libraries in respective source and target locations
3. Preliminary and detailed mapping of metadata & Access Control List (ACL) entities
4. Respective filters to qualify and create subset for migrations
5. The bundles and configurations

Issues and Challenges

As you can see, migration of Lotus Notes to SharePoint is not straightforward. There are multiple challenges both technical and functional and there is no tool to do the whole migration.

Sometimes, it requires building hybrid custom solution where some organizations want to retain some part of the applications in on-premises and rest of it into Office 365.

There are many other implementation challenges that you will come across but from an organisational per-spective make sure there is buy-in from the business and other stakeholders. The stakeholder participation in different sprints is also recommended. Be aware that a non-agility environment can lead to scope creep.

Piyali Sarkar is a technical consultant at Wipro Technologies. She has previously worked in SunGard and Tata Consultancy Services. In past, she has led multiple projects of migration from Lotus Notes to SharePoint on-premise and Office 365. She has a professional knowledge of .Net, SharePoint and MS Azure and overall experience for 12 years in Microsoft suits.

IEEE VIC AP-MTT Chapter Activities in 2021

by Fatemeh Babaeian

We have all have faced uncertainty and many challenges throughout this year due to pandemic and in adopting a new ‘normal’ lifestyle. We have miss face-to-face social events for a very long time now.

So while we have not had the opportunity to attend seminars and conferences in person, luckily the virtual world allowed us to be connected with engineers all around the world and to get updates about the latest developments in science and technology.

The IEEE Victorian joint Antenna & Propagation / Microwave Theory & Techniques (AP-MTT) Chapter has been able to take the opportunity to host or co-host quite a few of these fascinating virtual events. These have included postgraduates talks, distinguished lectures, academic and industry talks.

The highlight of these events was a series of virtual talks by young researchers from Victorian universities at which the postgraduate researchers shared their experience and research outcomes in cutting edge technologies. Participants found these talks interesting also because of the opportunity to explore further with questions and answers after the conclusion of each formal presentation.

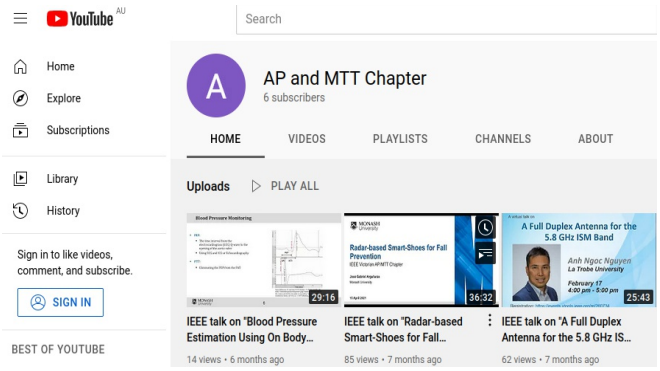
Of the industry talks, the most popular one was on ElectroMagnetic Compliance (EMC). The event was advertised widely on social media and there were many registrations and attendees from interstate and around the world.

The other innovative benefit of virtual platform was a collaboration which was set up between Australian AP and MTT Chapters to share events to host distinguished lecturers and academic

talks. These co-hosted events were advertised interstate and resulted in a wide audience across Australia

The VIC AP-MTT Chapter's YouTube channel was started this year to share these talks with people who were not able to participate at the time. The recordings of most of these local talks are available on-demand on our channel. Since these virtual events have been shown to have new benefits, the AP-MTT Chapter committee is planning to make our events hybrid ones even when the face-to-face event resume.

Please visit the IEEE Victorian AP-MTT Chapter website for more information about our past and upcoming events. The recordings for some of the past talks are available on the Chapter's YouTube Channel.



Dr Fatemeh Babaeian has completed her Bachelors and Masters degree in Electrical and Electronics Engineering from Shiraz University and Amirkabir University of Technology, Tehran, respectively.

She completed her PhD at Monash University this year. Her fields of expertise are RF and microwave engineering. She is currently serving as the Chair of AP-MTT Chapter at Victorian Section.

Inside a Student Branch in 2021

by Monash University Student Branch

Here is a catch up of all the news from the Section's Monash University Student Branch - it has added some new committee members, has launched a website, and in the midst of the on-and-off lockdowns, has run great in 2021 with more planned as well.

As a committee, we have put in our best effort to stay connected with our wider student members and have provided an educational platform on various engineering-related concepts and software.

Our People

The continuing committee from 2020 is Mengqing Xuan (Chair), Henry Ye and Samin Haque (Vice Chairs), Sai Gandra (Secretary), Eltayeb Elsunni (Treasurer), and Atyula Kumar & Akanksha Sankaran (Event Planners).

New Committee members who joined this year are Jerry Yang & Mukesh Sudhakar (Graphics and marketing manager), Senith DeSilva (Webmaster), and Abishek Uprety & Pattadon Khobunsongserm (Event Planners).

Launch of our website

Our website is now live! Our new webmaster, Senith, has created a website to complement our Facebook page. This makes it easier for members to track IEEE News and past and future events. Please check out the website at to stay updated about what we are doing!

Our events

BBQ

With COVID restrictions easing in Victoria in early 2021, we were able to hold a few events on campus. We kicked off the year with a BBQ event during the first week of the semester, in

collaboration with SMEE. The event was an opportunity to inform all that came along about our upcoming events, and to also increase visibility of our IEEE discord server, which is used as an additional platform to promote events and keep in touch with members. Additionally, this BBQ was a great opportunity for students to become acquainted with the club, its members and our activities.

Solidworks workshop

Halfway through semester one of 2021, we held two Solidworks workshops. The first workshop was a beginner's workshop that covered the basics of the Solidworks CAD program such as user interface, common CAD terminologies, sketching basic shapes and features to create more complex shapes. The learning outcomes were achieved through project-based learning.

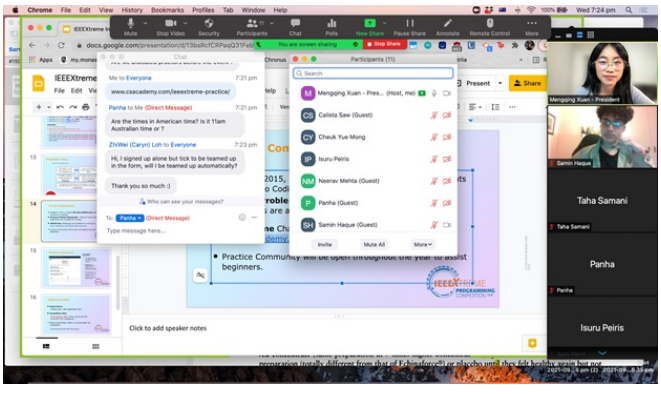
The second workshop was a more advanced session of Solidworks, where the assembly functions were covered. Students were stepped through the process of how to design and assemble a mechanical gripper as well as a rack and pinion which could be used for a robotic arm. They learned how to insert parts from either their own work or from open-source libraries, as well as mating parts together and setting interactions such as rotation.

Arduino

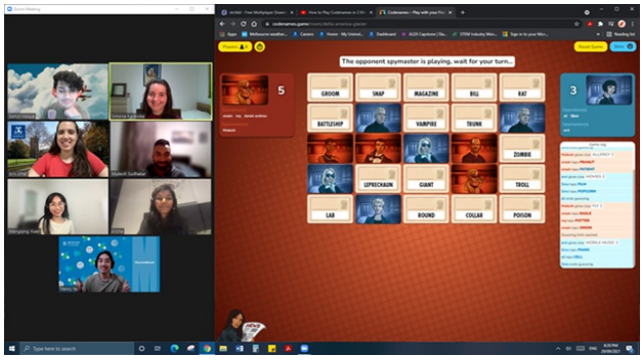
With Victoria entering lockdown 5.0 in July 2021, we held our Arduino workshop virtually using the TinkerCAD platform. This beginner's Arduino workshop covered the Arduino IDE (Integrated Development Environment), the TinkerCAD user interface, and the Arduino language. Besides a brief overview of the Arduino, projects were used to convey key learning outcomes to the attendees. There were 3 projects that scaled in complexity. The first one taught students how to control a micro-servo using a potentiometer. This was their first taste of how to not only connect simple components and wires together with the Arduino, but how to make these components talk and interact using specific commands in software! The final project was more complex and challenged participants to create a snake game. Students were expected to apply the theoretical concepts previously explored during the workshop to end up with a working program.

Upcoming Events

To encourage students to participate in IEEEXtreme 2021, we hosted an information session via Zoom to detail the history of the event, what to expect as participants, the global prize pool, and the potential networking incentives. This event sparked interest and attracted students to join our Student Branch, which was good given our our student interactions have been limited by being online again this year. To promote this event further, we contacted various other student clubs and societies at Monash to help promote our event on their social media and email streams. As a result, our student sign-ups have increased more than double compared to last year and this could not be achieved without the full support of the Student Branch members, IEEE Victorian Section and the other clubs and faculties from Monash University. Members from both Monash and UniMelb SB are looking forward to meeting these new teams in a month's time!



Other activities



As a break from our usual technical workshops and talks, Women in Engineering (WIE) Victorian Section invited us to co-host an interactive games night during the university's mid-semester break. It was a great way for student attendees from both universities to get to know the committee members from our Student Branches through light-hearted entertainment, especially among a technology-heavy lifestyle. Also, a new event series "TechX" will be held in the beginning of December in collaboration with other student branches, including UniMelb Student Branch, UniMelb IAS (Industrial Applications Society) and UniMelb WIE. This series will be made up of a discussion panel about the future of STEM careers, as well as a student poster competition on emerging technology during COVID-19. We hope this can inspire students about the potential in their career and consolidate their passion for the STEM field.

Reflections

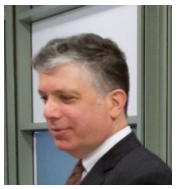
During the last 18 months of living in an on-and-off- again lockdown period, Monash SB has strived to bring forth our best efforts in shifting almost all our events online and minimizing the compromise in content delivery. A special thanks to the IEEE Victorian Section for their ongoing mentorship and support, they not only helped us grow as a Student Branch but also in our career progression as individual students. In the following years to come, we hope to break new records in our future technical and social events!

If you want to follow up on who we are and what we will be doing, you can find or contact us at:
Facebook | *Website* | *LinkedIn* | *Email*

Publications Corner

Here, for your interest, are some of the theses/ publications by IEEE Victorian Section members.

- ***Publication:*** Measuring Trustworthiness of IoT Image Sensor Data Using Other Sensors' Complementary Multimodal Data
  Name: Mohammad Manzurul Islam
  Field of Study: PhD (Information Technology)
  Affiliation: Federation University



- ***Publication:*** Change of Basis between Classical Orthogonal Polynomials
  Name: Dr David Wolfram
  Field of Study: Computer Science
  Affiliation: Visitor (Australian National University)

- ***Publication:*** Large Kernel Polar Codes With Efficient Window Decoding
  Name: Fariba Abbasi
  Field of Study: Postdoctoral Research Fellow
  Affiliation: University of Michigan-Ann Arbor

- ***Publication:*** Security and Privacy Factors Influencing the Adoption of Cloud Computing in Australian SMEs
  Name: Ruwan Nagahawatta
  Field of Study: PhD (Cloud Computing)
  Affiliation: RMIT University

- ***Publication:*** Exploring the consequences of ICT realisation in a secondary school
  Name: Sonia Ivetac
  Field of Study: PhD (Educational Technology)
  Affiliation: Deakin University

- ***Publication:*** Model-Free Voltage Calculations for PV-Rich LV Networks: Smart Meter Data and Deep Neural Networks
  Name: Vincenzo Bassi Zillmann
  Field of Study: PhD (Data-Driven Operation and Planning of DER-Rich Distribution Networks)
  Affiliation: The University of Melbourne

- ***Publication:*** Transactive Coordination of Electric Vehicles with Voltage Control in Distribution Networks
  Name: Md Murshadul Hoque
  Field of Study: PhD (Electrical and Computer Systems Engineering)
  Affiliation: Monash University

- ***Publication:*** An Efficient Boolean Modelling Approach for Genetic Network Inference
  Name: Hasini Nakulugamuwa Gamage
  Field of Study: Masters by Research (Computing)
  Affiliation: Federation University Australia

- ***Publication:*** Deep learning techniques for the fine art and Australian Aboriginal painting analysis
  Name: Catherine Sandoval Rodriguez
  Field of Study: PhD (Electrical & Electronic Engineering)
  Affiliation: RMIT University

- ***Publication:*** Assessment of Conservation Voltage Reduction Capabilities Using Load Modelling in Renewable-Rich Power Systems
  Name: Mir Toufikur Rahman
  Field of Study: PhD (Electrical & Electronic Engineering)
  Affiliation: RMIT University

- ***Publication:*** Potential effect of antibacterial mouthwash on the incidence of Neisseria gonorrhoeae among men who have sex with men: a mathematical modelling study
  Name: Xianglong Xu
  Field of Study: PhD (Mathematical modelling and machine learning algorithms)
  Affiliation: Monash University

- ***Publication:*** Impact of battery storage on residential energy consumption: An Australian case study based on smart meter data
  Name: Nameer Al Khafaf
  Field of Study: PhD (Electrical and Electronic Engineering)
  Affiliation: RMIT University

- ***Publication:*** Protection and Control Strategies for Shipboard Power Systems
  Name: Daniel Ryan
  Field of Study: PhD (Engineering)
  Affiliation: Monash University

Our authors

- ***Article:*** Can we trust IoT Systems?
  Mohammad Manzurul Islam,
  Gour C. Karmakar,
  Joarder Kamruzzaman and
  Manzur Murshed




- ***Article:*** Phase Grouping in PV- Rich LV Feeders
  Angela Simonovska

- ***Article:*** PCB Assembler and Design
  Alexandra L. Uitdenbogerd and John Harnett


- ***Article:*** IEEE Standard 7000
  Ruth Lewis

- ***Article:*** Residential PV settings for MV- LV Networks
  Arthur Gonçalves Givisiez

• ***Article:*** Legacy System migration
Piyali Sarkar

• ***Article:*** AP- MTT Chapter Contribution
Fatemeh Babaeian

• ***Article:*** Student Branch Contribution
Monash University Student Branch

Our People

Editor

Priya Rani works as an Associate Research Fellow at A2I2 at Deakin University. In IEEE, she was the Co-Convenor and founding Chair of IoT Community at Victorian Section in 2020. Currently, she is serving as Treasurer of Women In Engineering and Engineering in Medicine and Biology Society at Victorian Section.

Guest editors

Enn Vinnal works for Wireless Frequency Studio which specialises in radio frequency management, interference analysis, co-ordination and regulatory support. His interest is in the application of frequency spectrum sharing methodologies to examine the feasibility of co-existence among various systems. In IEEE, he has served as past Chair and past Treasurer of IEEE Victorian Section and current VTS Chapter Convenor.

Hyder Al Ramahi is studying Bachelors of Engineering at RMIT University. In IEEE, he is working as a volunteer in RMIT Student Branch.

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