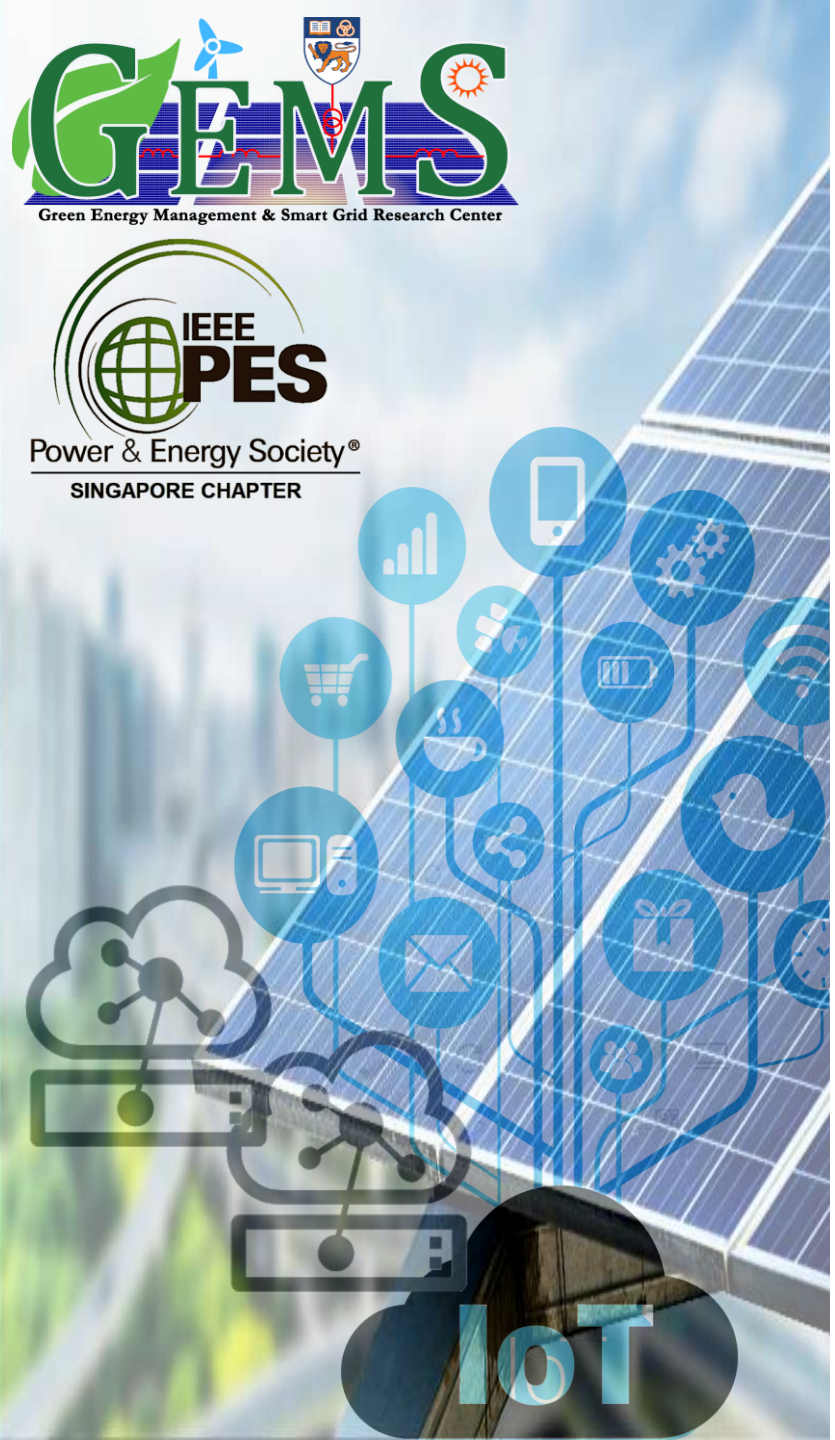


LIVE WEBINAR

30TH July 2020 | 2:00PM – 3:00PM (SGT)

NUS-GREEN ENERGY MANAGEMENT & SMART GRID RESEARCH CENTER + IEEE PES SINGAPORE CHAPTER

TinyML for Solar Panels: Bringing Edge Computing Applications to Solar Energy Systems

Presenter Vaidheeswaran Archana
Graduate Research Student,
National University of Singapore

REGISTER NOW
FOR FREE

Live Webinar on "TinyML for Solar Panels: Bringing Edge Computing Applications to Solar Energy Systems"

Abstract

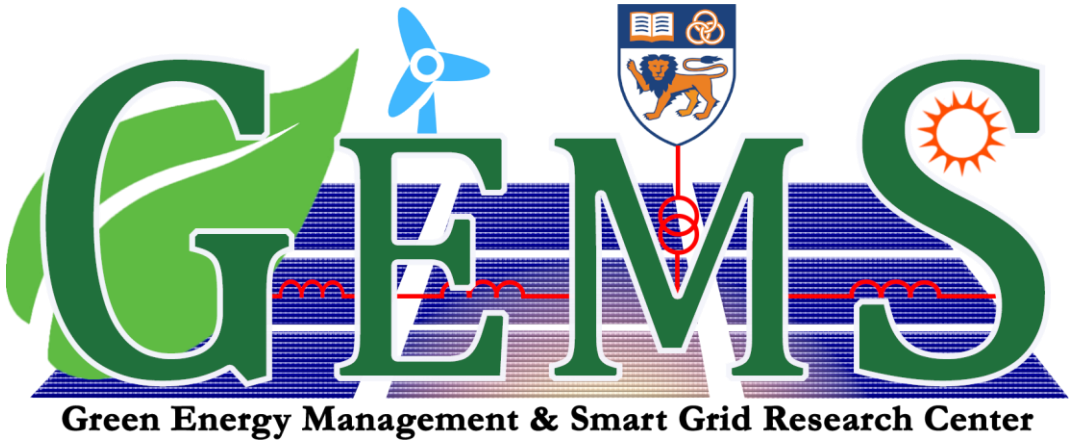
With the advent of IoT devices, it has become essential to utilize their data and run inference on the edge. TinyML is the use of Edge devices which can be used for running machine learning models at the edge. There are several advantages of using edge computing. Firstly, the computation power: we no more require large systems like GPUs, CPUs, TPUs or cloud servers for running our deep learning models. Instead, microcontrollers which might only have 1 or 2 GB of RAM, and which runs on the low power consumption of about 10W or less. Secondly, edge computing offers the advantage of the privacy of data. Often, we might generate valuable data right at the edge. This data might be too sensitive to be sent back to the cloud to do inference and then receive its metrics; instead, the edge can save us the internet bandwidth and perform inference securely. The field of Solar Energy Systems holds immense potential for edge computing. In this talk, we will cover three applications of edge computing. The first application is the Estimation of Power Loss of Solar Panels. Soiling on solar panels can cause more than 30% of power loss in PV system generations. There have been some attempts in utilizing deep learning in soiling detection and the corresponding power loss estimation. However, the proposed methods costly GPU, which is not economically suitable for detecting soiling in remote solar farms. To take care of both of the accuracy and cost, this work proposes a lite model that can be implemented on edge computing devices, such as Raspberry Pi, EdgeTPU, FPGA, and VPU

The second application is the continuation of the first into the detection of soiling and its classification through an open-source dataset called PV Net. The last application is solar irradiance forecasting using sky images. Real-time irradiance measurements can be found through satellite or can be obtained from ground sky images. With edge computing, we can do quicker solar irradiance forecasting; short term forecasting up to 1 min. The work will showcase the same.

Biography

Vaidheeswaran Archana is a graduate research student at the National University of Singapore (NUS) and is a Women Who Code Leadership Fellow. Her area of research covers the application of deep learning techniques to smart grids. As a part of her study, Archana utilises various Google frameworks, tools and hardware. Her expertise includes TensorFlow, TFLite, Colab, TPU and Edge TPU board. As a course instructor for Udacity's "AI for Edge IoT Nanodegree", she teaches her students how to choose the right hardware when deploying their model at the edge. Archana has also contributed to many women in tech organisations and is passionate about conducting talks, workshops and being a mentor to budding developers.


IEEE
PES
Power & Energy Society®
SINGAPORE CHAPTER


GEMS
Green Energy Management & Smart Grid Research Center