SUTD LIBRARY

ENGINEERING PRODUCT DEVELOPMENT

Discovery

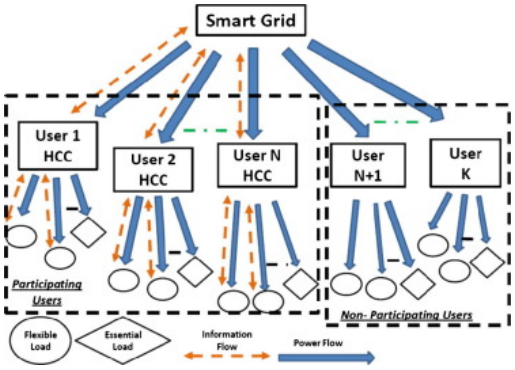
We SHARE to inspire and ignite ideas for
Engineering Product Development (EPD) Pillar!

The titles featured here are to give you a peek into the wealth of resources we have. We hope, through this will encourage you to explore and read further. Share with us topics of importance to EPD and we can introduce relevant titles from some 400,000 eBooks we carry.

January 2016

PUBLICATIONS BY EPD

Framework For Minimum User Participation Rate Determination To Achieve Specific Demand Response Management Objectives In Residential Smart Grids

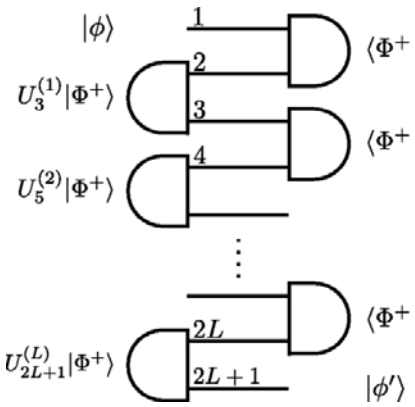


Co-authored by Chau Yuen, Shisheng Huang & Kristin L. Wood.

To determine the minimum required user participation rate to achieve specific Demand Response Management (DRM) objectives in residential smart grids, a framework for grid operators was developed. This was done to assist grid operators in deigning incentives for specific DRM goals.

Source: International Journal of Electrical Power & Energy Systems (January 2016)

Parallelizable Adiabatic Gate Teleportation



Co-authored by EPD Post Doc Fellow, Michal Hajdušek

Adiabatic gate teleportation was modified to investigate how a temporally ordered gate sequence can be parallelized where a sequence of unitary gates is performed in a single step of the adiabatic process.

Source: Physical Review A (December 2015)

AUGMENTED REALITY

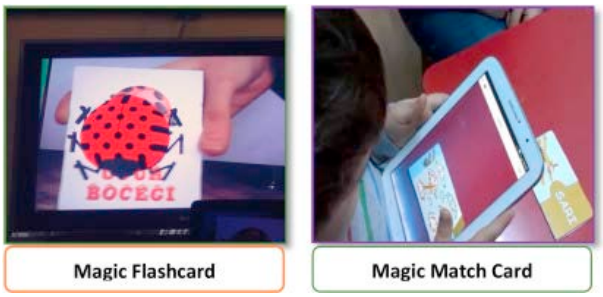
The RIBbon @ Read Bridge

By SUTD's Advanced Architecture Laboratory and Augmented Human Laboratory headed by Professor Thomas Schroepfer and Assistant Professor Suranga Nanayakkara respectively

People walking down the Read Bridge were welcomed with a grand light-up during the festive season as the lights pulsated to the music of the Singapore River and glow to the movements of pedestrians walking along the bridge. This was made possible with a sensor system combined with infrared cameras and microphones with advanced signal processing techniques. This got so much attention that it was mentioned even in the press and view how pedestrians enjoyed it in this video!

Source: Augmented Human Lab (December 2015)

Educational Magic Toys Developed With Augmented Reality Technology For Early Childhood Education



Educational magic toys (EMT) are being developed using augmented reality technology where animations and 3D objects appear on the toys. Opinions on EMT were gathered from teachers and children where it was revealed they liked the EMT toys and the researchers hope to fill the gap in this new educational AR application.

Source: Computers in Human Behavior (January 2016)

SWARM ROBOTICS

Adaptive Foraging For Simulated And Real Robotic Swarms: The Dynamical Response Threshold Approach

It is a complex challenge for swarm robotos operate outside of the laboratory in the real-world. Extending the popular response threshold model (ARTM), this article verifies that such approach improves on the

Special Issue on Distributed Learning Algorithms for Swarm Robotics

This special issue covers on all aspects of efficient distributed control of robot swarms, and mainly distributed and learning algorithms for swarm robotics, to solve operational problems to manage the swarm, such as

adaptability of previous systems such as reducing collision duration among robots

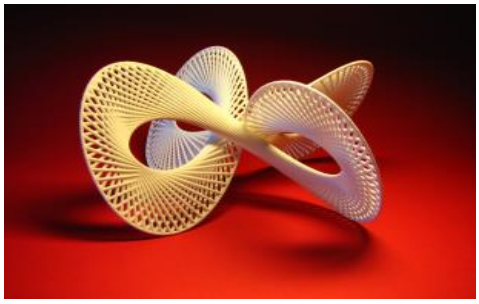
Source: Swarm Intelligence (January 2016)

clustering, dynamic task allocation, and localization. Summaries of the papers are provided here.

Source: Neurocomputing (January 2016)

DIGITAL MANUFACTURING

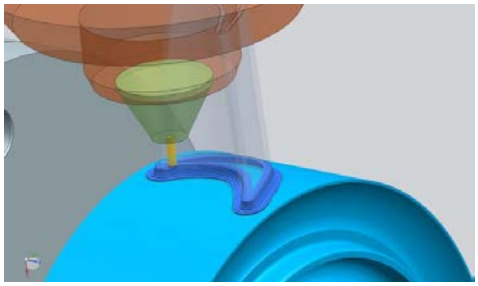
Mega Trends and Their Impact on Advanced Manufacturing



Providing an outward perspective, this trend report looks at how 8 current trends impact advanced manufacturing and impact the future of the manufacturing industry.. Information on each trend's impact on advanced manufacturing includes current challenges, future outlook, relevant case studies of market best practices, and vertical market impact and penetration.

Source: Frost & Sullivan (August 2015)

Direct Digital Manufacturing: Definition, Evolution, And Sustainability Implications



This article discusses direct digital manufacturing mainly from the sustainability perspective. Besides that, the article presents a comprehensive analysis of the new manufacturing paradigm, direct digital manufacturing from different perspectives such as social, economic and environmental dimensions which would have an impact on the global trends.

Source: Journal of Cleaner Production (November 2015)

1. Augmented Reality (there are latest commercial solutions like Samsung VR, Microsoft Hololens (I think we featured this one in the latest discovery). Perhaps we could find some technical articles on the technology itself, related programming, games and other applications
2. Swarm robotics: (this is taken from Google) is a new approach to the coordination of multirobot systems which consist of large numbers of mostly simple physical robots. It is supposed that a desired collective behavior emerges from the interactions between the robots and interactions of robots with the environment.
3. digital manufacturing: we have done research for Keng Hui and DmanD, but the topic itself is quite interesting as well. We can find some reads for students and researchers.
4. Interesting materials & their applications, for eg. http://www.scientificamerican.com/slideshow/9-materials-that-will-change-manufacturing/
5. Any other general readings related to EPD, engineering, manufacturing, etc.

Publications by EPD

- Framework for minimum user participation rate determination to achieve specific demand response management objectives in residential smart grids
    - Co-authors: Yuen Chau, Shisheng Huang, Kristin L. Wood
- Exploiting temporal and spatial diversities for spectrum sensing and access in cognitive vehicular networks
    - Co-authors: Liu Yi *(can help to confirm if Liu Yi is a postdoc research fellow with EPD? Cannot find his/her name in the email directory)* & Yuen Chau
- Open standards, vertical disintegration and entrepreneurial opportunities: How vertically-specialized firms entered the US semiconductor industry

Augmented Reality

- Precise Haptic Device Co-Location for Visuo-Haptic Augmented Reality
- Educational magic toys developed with augmented reality technology for early childhood education

Swarm robotics

- Beyond pheromones: evolving error-tolerant, flexible, and scalable ant-inspired robot swarms
- Special Issue on Distributed Learning Algorithms for Swarm Robotics in Neurocomputing
    - edited by Nadia Nedjah and Luiza de Macedo Mourelle

Digital Manufacturing

- Vijayaraghavan, R. (2015). Mega Trends and Their Impact on Advanced Manufacturing. Frost & Sullivan. Retrieved from http://www.frost.com.library.sutd.edu.sg:2048/sublib/display-report.do?id=NF5F-01-00-00-00
- Chen, D., Heyer, S., Ibbotson, S., Salonitis, K., Steingrímsson, J. G., & Thiede, S. (2015). Direct digital manufacturing: definition, evolution, and sustainability implications. *Journal Of Cleaner Production*, 107615-625.