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บรรณาธิการปริทัศน์/Editorial Corner

เราพร้อมหรือไม่ในการเข้าสู่ระบบการผลิตกายภาพไซเบอร์ของอุตสาหกรรมประเทศไทย 4.0

Are We Ready for Cyber Physical Manufacturing System of Thailand Industrial 4.0?

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Thailand Industrial 4.0 is aiming to achieve in a very near future. One in many directions is to revolutionise traditional manufacturing system to become "Cyber Physical Manufacturing System". A Cyber Physical Manufacturing System (CPMS) is a combination cluster of machines and embedded computer based softwares that are connected them together with Users via Internet of Thing (IoT). During design stage in CPMS, the physical machine and controlled software are autonomously intervened each other operating system on multiple levels of spatial and centrifugal scale. A variety of extracting decision from users based upon order requirements from customer can be designed intelligently inside software controlled by a designer team then feedback to customer until satisfaction is obtained.

A gap is existing between design stage and manufacturing stage, as complicated designs are needed to be assessed of manufacturing availability and maintainability, Virtual Reality (VR), 3 Dimensions Controlled, Gesture Control, Motional Capture Control and Haptics Gloves should be applied to simulate the optimality of manufacture, assembly, test and maintenance of finished product.

At manufacturing stage, Augmented Reality (AR) technology, e.g. smart glass etc. can play a vital role to assist engineer or worker (working side-by-side with robot) who actually build the product by receiving information through smart glass beginning from part storage locations until finished product is in the package ready to be logistics to customer. The Quality Control of each step can be recorded by superimposing a green or red colour over the item's Radio Frequency Identification: RFID and stored in the meta database.

Mixing of VR and AR are a challenge to cyber physical manufacturing, particularly using it in action demand headsets, hardware and internet with robustness, reliability and flexibility than ever. Haptics technology can serve users well in feeling sense of physical interaction between interaction of touch and manipulate virtual objects and holograms.

What about Security of IoT? None of us can

affirm that IoT is invulnerable as a number of cyber attack are risen continuously e.g. in October 2016, a major cyber attack on smart home routers that connected thermostats and appliances via IoT and caused disrupting operations of those smart homes etc. This means "smart home" doesn't mean it has smart passwords or anti-virus software to protect it from malware. (i.e. Mirai etc.) IoT can connect endlessly users and sensors around the globe, experts estimate by 2020, the number of connected devices can reach at least 30 billion (through Wifi, Bluetooth, Zigbee etc.), risk of cyber attack shall be increased in the near future which leads us to have a secure CPMS. In particular, at Database/Data Warehouse/Data Storage contained information of critical design product with marketing information shall be the prime target for the hacker.

To be able to be ready for Thailand Industry 4.0, education bodies such as King Mongkut's University of Technology North Bangkok (KMUTNB) and research centres together with closed collaboration with industry partners have to work tightly than ever to deeply understand the requirements so that the students can be equipped with advanced and complex skills. There are, for example, how to apply Artificial Intelligent (AI) within VR and AR require skills of Fuzzy Logic, Neural Network, Genetics Algorithm, Particle Swarm Optimisation etc. to monitor devices in multi-levels of design/manufacture over IoT, application of robot to make a physical assistance (Exoskeleton), design to blend "drone" into the manufacturing industry as we tend to utilise facilities on ground level rather than above the ground: farming and logistics industries are amongst the forefront of this drone's application, autonomous communication between machines are a major trend particularly driverless automobile and road sensors communications, last but not least students should have environment care in mind. Harvest of sunlight by using solar cell should be developed to the direction of "harvest of darkness and convert it to electrical mega-energy." These examples are amongst required skills of the future that KMUTNB is ready for them.

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