

# Artificial Intelligence in Engineering



Ir. Tejinder Singh

**W**hen we mention Artificial Intelligence (AI), technicolour images of the Terminator robots, Skynet and a post-apocalyptic world may be what comes to mind. Hollywood has certainly played a role in formulating our perception that the rise of intelligent machines can only end in the destruction of planet Earth. But is AI really that dangerous to humankind?

For a start, let us define AI. Borrowing from Wikipedia, the definition of AI is intelligence demonstrated by machines. Actually this term was first used at a conference in Dartmouth College in 1956, where John McCarthy defined it as “the study and design of science and engineering of making intelligent machines”.

## HOW AI IMPACTS ENGINEERING

AI used in engineering combines hardware and software components. Think of robots in a car assembly line and the software that controls them. They are, in themselves, quite impressive feats of engineering, but are they intelligent?

It can be a surprise to learn just how smart and sophisticated our use of AI in engineering has become. Smart production lines are definitely the way of the future; think Industry 4.0. But exactly how does AI make such a big difference to the engineering sector?

**IN MANUFACTURING:** AI gives us the ability to design, develop and build machines which are capable of performing extremely complicated tasks. Machines that are capable of learning and improving without human intervention are the ultimate goal and this will have significant and wide-ranging implications. Furthermore, in our pursuit to create more powerful AIs, we are uncovering knowledge about how our own brains work and how we approach the learning process, both consciously and unconsciously.



Source: <http://www.innomag.no/artificial-intelligence-infinity-beyond/>

Perhaps the most notable example of AI being used in engineering is in car manufacturing. The combination of software and hardware on the manufacturing floor has grown progressively more advanced over the years. Initially, robots performed simple engineering tasks that involved relatively large components and movements. Today, they are capable of precision movements and of emulating the most intricate parts of the process.

**IN PRODUCTION:** A cement mill should provide a defined range of quality and optimal energy consumption. Based on sensor data and algorithms like boosted gradients and linear regression, the system provides advice on how to adjust the operational parameters. So a mill that cannot be supervised by an experienced engineer can still be

controlled. From there, it is only a small step towards automatic controlling. The algorithm adjusts regularly based on incoming sensor data as machine parts wear down or parts of the process change.

**IN CONSTRUCTION:** AI is already impacting the construction industry. Here the definition of AI is in the simplest level of using machine learning (an AI technique) to solve problems and to execute tasks with greater speed and accuracy. AI has started to change the way buildings are designed, constructed and utilised upon completion.

Areas where AI is already having an impact in construction include alerts, wearable sensors for site safety, autonomous site machinery, construction site survey and building information modelling (BIM). The ability to inspect buildings using trained AI software, frees the engineer



Source: <https://www.ukconstructionmedia.co.uk/features/rise-artificial-intelligence-construction-sector/>

from the mundane tasks of physically doing the inspection.

**ON ENGINEERS:** Many engineers fear that their jobs will soon be taken over by sufficiently advanced robots and automation. As our manufacturing and design capabilities continue to expand, we are able to build machinery that is capable of replicating almost everything that humans can do on an assembly line.

Their fears are not unfounded as automation has taken away jobs from people in a number of different areas. Perhaps this is where policy and regulation may play a role.

However, automation frees the engineer from having to do mundane, boring, repetitive tasks and allows them to focus on higher level creative tasks instead. AI is opening new, exciting horizons and these opportunities should be embraced. It is important to realise that many of these advances will make a big difference to our ability to tackle the largest issues facing our civilisation.

In my perspective, the union of AI and Engineering is to produce AI Engineering which deals with invention, innovating, designing, building, maintaining, research, improving structures, machines, tools, systems, manufacturing processes, components, materials, processes, solutions and organisation.

AI definitely has a role to play in engineering our world and this change should be embraced by the professional. ■

### Author's Biodata

*Ir. Tejinder Singh is an electrical engineer with a major focusing on engineering advisory and consulting services, operating in a space that intersects energy efficiency, energy management, automation, artificial intelligence and cybersecurity.*

### IEM DIARY OF EVENTS

#### Title: 1-Day Course on HAZOP Training

**27 June 2018**

Organised by: Oil, Gas & Mining Technical Division & Chemical Engineering  
Technical Division

Time : 8.30 a.m. - 5.30 p.m.

CPD/PDP : Applying

#### Title: 1-Day Workshop on Energy Management

**28 June 2018**

Organised by: Electrical Engineering Technical Division

Time : 8.30 a.m. - 5.30 p.m.

CPD/PDP : Applying

#### Title: Pre AGM Talk on "My Dams"

**30 June 2018**

Organised by: Water Resources Technical Division

Time : 9.00 a.m. - 11.00 a.m.

CPD/PDP : 2

#### Title: 31st AGM for Water Resources Technical Division

**30 June 2018**

Organised by: Water Resources Technical Division

Time : 11.00 a.m. - 1.00 p.m.

CPD/PDP : 2

*Kindly note that the scheduled events are subject to change. Please visit the IEM website at [www.myiem.org.my](http://www.myiem.org.my) for more information on the upcoming events.*