MEA MAGAZINE

DEPARTMENT OF MECHANICAL ENGINEERING (AUTONOMOUS)
SRI VENKATESWARA COLLEGE OF ENGINEERING , TIRUPATI

ARTIFICIAL INTELLIGENCE IN MANUFACTURING

Inside This Issue

PRODUCT DESIGN:

Artificial intelligence is also changing the way we design products. One methodis to enter a detailed brief defined by designers and engineers as input into an AIalgorithm (generative design).The brief can include data describing restrictions and various parameters such asmaterial types, available production methods, budget limitations and time constraints.The algorithm explores every possible configuration, until an optimal design solutionis reached (Buchmeister & Palcic, 2017). One of the major advantages of this approachis that an AI algorithm is completely objective.

DIGITALTWINS

A digital twin is a virtual model of a process, product or service. The digital twinleverages the Internet of Things (IoT) but requires the skills of machine learning andAI. Digital twins are especially useful when working with equipment from a remote distance.

VIRTUAL REALITY

Virtual reality will enable new tools that help to perform testing in the virtualworld. It allows people, remotely located, to connect and jointly work on situations thatrequire trouble shooting. Simulation and product-creation can help reduce themanufacturing time drastically.

AUTOMATION

Automation will help the manufacturing industry reach a high level of accuracyand productivity, a level that is even beyond human ability (Haskovic et al., 2018). Itcan even work in environments that are otherwise dangerous, tedious or complicatedfor humans. Robotics, which is expected in the future, will have capabilities like voice and image recognition that can be used to re-create complex humantasks.

QUALITY

Quality involves the use of AI algorithms to notify manufacturing teams ofemerging production faults that are likely to cause product quality issues.Machine-vision tools can find microscopic defects in products at resolutions wellbeyond human vision, using a machine-learning algorithm trained on remarkably smallvolumes of sample images. When integrated with a cloud-based data processingframework, defects are instantly flagged and a response is automatically coordinated(Xue et al.,2018).

SMART MAINTENANCE

In manufacturing, ongoing maintenance of production line machinery andequipment represents a major expense, having a crucial impact on the bottom line ofany asset-reliant production operation. Therefore, predictive maintenance has becomea must-have solution for manufacturers.

K. Ram Prasad
19BF1A0326
IV-ME A

Machine Learning

Machine learning is an application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed. Machine learning focuses on the development of computer programs that can access data and use it learn for themselves.

The process of learning begins with observations or data, such as examples, direct experience, or instruction, in order to look for patterns in data and make better decisions in the future based on the examples that we provide. The primary aim is to allow the computers learn automatically without human intervention or assistance and adjust actions accordingly.
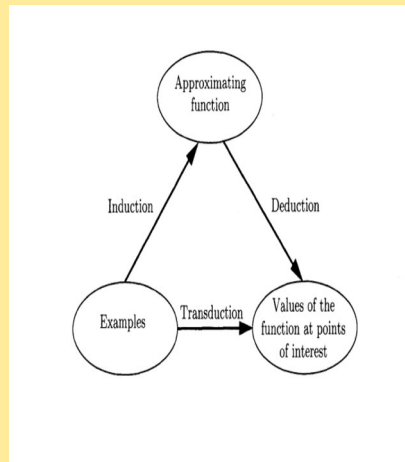
Requirements of good machine learning

- Data preparation capabilities
- Algorithms – basic and advanced.
- Automation and iterative processes.
- Scalability.Ensemble modeling.

Supervised learning describes a class of problem that involves using a model to learn a mapping between input examples and the target variable.

Unsupervised learning describes a class of problems that involves using a model to describe or extract relationships in data.

Reinforcement learning describes a class of problems where an agent operates in an environment and must learn to operate using feedback.

Semi Supervised learning is supervised learning where the training data contains very few labeled examples and a large number of unlabeled examples.

Relationship Between Induction, Deduction, and Transduction.

Multi –task learning is a type of supervised learning that involves fitting a model on one dataset that addresses multiple related problems.

Active learning is a type of supervised learning that involves fitting a model on one dataset that addresses multiple related problems.

Online –learning is a type of supervised learning that involves fitting a model on one dataset that addresses multiple related problems.

Transfer learning is a type of learning where a model is first trained on one task, then some or all of the model is used as the starting point for a related task.

Ensemble learning is an approach where two or more modes are fit on the same data and the predictions from each model are combined.

They are highly capable of integrating machine controllers and sensors into their mechanical products and with a good multidisciplinary project team make it all work within the specs, on time and in the money.

N.Hemanth, 20BF1A0393
III-ME A

Driver Less Car

Driver less is best known for its electric cars. The company is also known for specialising in solar panels and Lithium-ion battery energy storage.

Tesla Model S is the world's first premium sedan built from the ground up as an electric vehicle. It has been engineered to deliver unprecedented range and a thrilling drive experience. Model S is the world's fastest four-door vehicle ever built .

Tesla Model 3 interiors are now completely free of leather.The company began by offering leather-free seats as an option. Two years ago, Tesla made the synthetic material standard in its Model 3, Model X and Model S vehicles.

Tesla Model 3 has standard automatic emergency braking it pocess eight air bags & Wi-Fi and LTE Internet connectivity, voice-activated controls, keyless entry, dual-zone climate control, and a centre console with two USB ports.

The newest ambitious project from Tesla is the all-electric Model Y compact crossover. Tesla model Y has a driving range of up to 300 miles and a zero-to-60-mph time of as low as 3.5 seconds .

The Model Y's fuel-economy ratings haven't been released, nor have we had the chance to test one on our 200-mile highway fuel-economy test route. The Model 3 sedan hasn't lived up to its claimed range during highway driving, and we have even lower expectations for the Model Y SUV.

The Model Y's fuel-economy ratings haven't been released, nor have we had the chance to test one on our 200-mile highway fuel-economy test route. The Model 3 sedan hasn't lived up to its claimed range during highway driving, and we have even lower expectations for the Model Y SUV.

In the Model Y, almost every function is managed through the large, slim infotainment display that's in the middle of the dashboard. Everything from climate control to the speedometer is shown on this display, which takes some getting used to.

We expect the Model Y to offer the same entertainment functions as the Model 3, which should include embedded Netflix, Hulu, and YouTube apps as well as video games that are perfect for killing time while waiting for the battery to charge at the public charging station. even more advanced features such as a self-parking feature and a Summon feature will be optional.

Key safety features include:

- Standard automated emergency braking with pedestrian detection.

- Standard lane-departure warning with lane-keeping assist.

- Standard adaptive cruise control with semi-autonomous driving mode.

Model Y will ship with an EPA range of 315 miles. Earlier estimates had set the range at 280 miles. A 35-mile range bump is impressive. During the quarterly call, Musk announced that the car has an efficiency of 4.1 miles per kilowatt-hour driver less model X steering.

While the cars on today's roads offer many high-tech safety features and are loosely called "self-driving," they still require a person to keep their eyes on the road at all times. That means that none of them are fully autonomous vehicles by NHTSA's standards.

- Tesla Model S: One Of The Most Advanced Autonomous Cars..

- The 2022 Cadillac Escalade Offers Super Cruise For Effortless Progress.

Ford's F-150 And Mustang Mach-E Feature Autonomous Systems.

A.Jaya Kumar,
20BF1A0305
II-ME A