

I need AI! What is AI?

Artificial intelligence is undoubtedly one of the most hyped technologies of recent times, and with market hype comes a lot of confusion. Luckily, at Pleora we have the benefit of learning from a leading expert in the field of AI for machine learning.

In this brief Q&A, Pleora artificial intelligence engineer Wassim El Ahmar provides some of the basics on AI.

Q: What is AI?

Wassim: Artificial Intelligence, or what I'll refer to as AI, is broadly defined as a machine being able to solve a problem or complete a task in a way that we consider "intelligent", like solving a math problem for example.

Machine learning, or what I'll refer to as ML, is a branch of AI that refers to solutions where machines are able to learn how to solve a specific problem without human intervention, given that they are supplied with data.

Deep learning is then a branch of ML that refers to neural networks, which are composed of artificial neurons inspired by how the human brain works. Neural networks are characterized by the ability of the network to "learn" the features relevant to the problem being solved as it sees more and more data.

Q: Is all AI autonomous?

Wassim: AI has an end-goal of being autonomous. Machines may not be capable of immediately being fully autonomous, but through training the goal is to develop AI capabilities that can function and process decision-making skills independent of human intervention. In an inspection application, for example, the goal is to be able to train the system to the point where it can begin learning errors and independently identifying a defective product.

Q: What is traditional AI?

Wassim: AI is a very broad category, and includes applications such as natural language processing, speech recognition, and eCommerce. When you buy a product online, the platform often has "recommended" products or "you may also like" suggestions. That is AI, but an expert

needs to engineer each feature and capability, including all variations and circumstances to a rule. If customer A buys product XY, they may also like product Z. Traditional machine vision applications require a similar degree of hardcoded engineering to identify faults or issues. The introduction of improved GPU technology and increased availability of larger datasets for training are now machine learning to evolve to include deep learning capabilities.

Q: What is Deep Learning?

Wassim: Deep learning, also defined as deep neural learning, is a branch of AI where machine learning methods are based on powerful neural networks that are inspired by the way neurons in our brains function. Neural networks are characterized by the ability of the network to "learn" the features relevant to the problem being solved as it sees more and more data.

Q: How does deep learning work?

Wassim: A neural network is able to improve its performance and "teach itself" as it sees more and more data, like we do as humans (a child learning how to ride a bike becomes better and better each time they try). As the neural network has to make a decision, it will analyze all of the data available and make a prediction. The more decisions the network makes, the more it learns to correct itself via validation and confirmation. Over time the machine improves its abilities and prediction skills.

Q: Where is machine learning used today?

Wassim: There is a significant amount of research now targeted towards machine vision capabilities, such as object classification, detection, and segmentation. By adding AI skills alongside traditional vision processes, manufacturers can significantly reduce quality inspection errors that cost money in terms of human capital and scrap product. For a large manufacturer, false positives are a significant issue that result in product line downtime and costly secondary human inspection. Classification with a simple two classes — pass/fail — is the quickest and least complex application to train when starting out with AI.



LEARN MORE Register for our on-demand webinar, "I need AI! What is AI?" where Wassim dives deeper into the evolution of AI, key research areas, and potential applications for the vision market. pleora.com/resources/webinars/