Hello. My name is Jael McBride, and my topic is AI, mainly machine learning in robotics and its application in the field. For those who don’t know, there are two distinct differences between AI and machine learning, I’ll be using ML as a short-term when referring to machine learning to save myself the breath.

For those who don’t know what AI stands for the short definition is

“AI is a machine that can exceed or be equal to the intelligence or capability of a person”

This mainly describes the ability to search and discover new information, while inferring said information, and even the use of data that wasn’t explicitly stated as a reference for supporting info. This also includes the capability to reason, the ability to figure out a problem by the use of working it out, or logic in this case such as apple pen and pineapple pen make UH pen pineapple apple pen. Take this with a grain of salt as I’m just a student without any degree and all my sources were online PDFs or Videos being used as white noise.

Continuing on many people tend to look at these two as:

AI vs ML,

AI equals ML,

And last but not least, is AI different than ML?

To help you, yourself, decide I’ll expand upon my own belief on the topic. AI, artificial intelligence is basically a superset of computing composed of many different assets that all run together to achieve a result beyond the capabilities of man, or worse depending on how it was trained and what information it was fed.

This leads to the other facet of building an AI,

which is training the gods' forsaken abomination

**(over dramatic voice)**,

that’s a joke, I love AI and the possibility it has. When training an AI, there are two different ways of going about this challenge. Those are known as supervised learning, the act of carefully feeding the machine pretested and reviewed information to achieve an outcome.

The other way is to have the learning be “unsupervised”, leaving the machine to soak up any and all information, aka dropping it into the internet to learn memes and shitposts, only to believe “The Onion” is the most trustworthy news outlet.

Machine learning involves the capability of predictions and decisions based on the data presented, an advanced form of data, and statistical analysis. Unlike AI, the only decisions made are based on and comprised of the information given and already known. An easier way to understand this is by thinking of a child and how they learn. At first, its ability will amount to the capabilities of a toddler just figuring out how to walk, but the more data fed to the machine, the more accurate the problem-solving and decisions will be, kind of like Usain Bolt running.

A big asset of Machine Learning is that it’s a system that learns instead of being programmed. Just like how AI is trained, the same can be done with ML.

A subset of Machine learning is Deep learning, which involves neural networks using nodes to the relationships between data that simulate the way our minds work.

Stating all that, hopefully, you remember how AI is a superset of computing. Well, ML is but a piece of that superset, along with a bunch of other things. What are those other things, I don’t know as I haven’t looked into that field. I’m pretty sure robotics count, but I can't tell if it is defined as used or uses.

Now that that’s all done, we can move on to how and where AI and ML are used in robotics. A very prominent way of use is in automation like the Roomba, where every task or run is being done autonomously, and the data gathered is used to enhance and perfect the task being done.

One way to look at this is the “Hill Climber Algorithm.” You can think of this algorithm as a trial-and-error method, taking the best outcome and modifying it a little to see if you get a better or worse result. Just think of how Roombas gets better and more efficient with every run.

Another way this computing is used is by taking all the data and prioritizing it, often using the “learning rank” method. This method is where an arbitrary value is placed upon a task, you can think of this value as weight. The higher the value, the ‘heavier’ it weighs, and the sooner it has to be done to ease the burden. You can see this in action when doing information retrieval, where the weights or certain information will lead to the total weight of the searched data.

Lastly is the use of object recognition, identifying the object and working out how to handle it.

This is normally dealt with by “R – CNN’s” short for “Region-based convolutional neural networks”, or “YOLO” the “you only look once” technique.

R – CNN works by taking the image shown and producing bounding boxes containing identified objects, R – CNN is widely used in “MLPerf” training as a way to speed up the training of a machine. Along with that, it is also used in selective search by placing the boxed objects into categories such as cars or pedestrians.

On the other hand, YOLO, you only look once, is more widespread in computer vision deriving from R - CNN. Just like R – CNN, it works by localizing a region in an image and classifying the region. Working in one-stage object detection, by looking at an image, the machine will process it in that single pass, unlike R – CNN, making it more efficient computation-wise. Sometimes, YOLO uses a two-step object recognition pattern where the first pass is like a draft skimming for potential object locations and the second rechecking and cementing those positions if applicable. In all seriousness, even with the dumb name, you should look into this approach if you want some recognition software.

Thank you for listening to me ramble on and on about these applications, Just know that everything stated is only skimming the surface of it all. To that, there are also numerous other ways AI, and ML can be used in not only robotics but in other aspects of technology, too. I highly recommend that you take a look into this subject yourself.

Stay safe out there and I hope you have an above-average day. My name is Jael McBride and as always, Do great things.