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# Explained: Five skills you need to make a career in machine learning

The focus should be on what can be implemented and not what is the most accurate.

The above five mantras may appear generic at the first glance, but following them, in the sequence, is what makes a successful ML professional.

**By Bappaditya Mukhopadhyay**

There is a significant interest related to career opportunities in machine learning (ML). A recent Gartner report estimated more than 2 million jobs in artificial intelligence (AI) and ML by 2020. While the numbers, by themselves, may not sound extraordinary, compare it with the fact that, for most sectors, there is a projected negative job growth rate, and so the excitement about a career in ML is notable. But what are the key skills needed for people who want to make career transitions? One would put them as the ABCDE to make a career

in ML. While it may not hint at anything new than that is needed to excel in almost any field, in this article I will try and present them in the context of ML.

Attitude: While this might sound trite, the importance to have the right attitude is as nuanced in ML as ever. Applying ML to solve problems requires one to cover the entire gamut from the mundane data cleaning to sophisticated model building. How well those sophisticated models depend upon how well one has understood the data. One cannot go back and fix the data gathering or cleaning process if the solutions are not satisfactory. Indeed, hours must be spent, more than 80% of ones' time towards data understanding and cleaning than on applying algorithms. It is only when one prepares the data that one understands what can be done with it.

Basics: ML is not about picking the best algorithm to solve a problem; instead, it is the best way to solve any problem. Often, we approach problem-solving as akin to trying various algorithms and proposing the best. However, the solution is often a mixture of techniques—ensemble modelling in ML parlance. This requires a thorough understanding of the algorithms as well as a knowledge of its applications.

Connecting: What makes ML exciting is how it draws knowledge, information and data from various sources. Take the example of assessing farm-level productivity. One uses satellite imagery combined with ML algorithms to get excellent results. The analysis often involves a fine balance from physics (optical properties), chemistry (soil composition) and economics (strategic behaviour). Failure to connect all the three would mean developing algorithms that will not have longevity. It is the role of ML managers to draw information from as many domains they can.

Domain: To a machine, a data is just rows and columns without any insight. Left to itself, the machine, in its pursuit towards accuracy, will include all information, irrespective of its relevance. Only our understanding of the domain helps us in proposing meaningful solutions. While developing a model that decides between who should be given a loan and who should be denied, ML will propose models that will include variables that have the potential to cause enormous damage. It would build a model that is based on ethnicity or religion of the applicant, a case racial or ethnic profiling. The focus should be on what can be implemented and not what is the most accurate. That brings us to the final skill, the plan to execute.

Execution: ML solutions are all about the final solution and how will that be executed. Will the final solution be a simple scorecard or an app that gives real-time solutions to a problem? So, while proposing solutions, one has to address the issue: “How will the final product look like?” ML solutions are not academic exercises; they need a roadmap of implementation. The above five mantras may appear generic at the first glance, but following them, in the sequence, is what makes a successful ML professional.

***The author is professor, Great Lakes Institute of Management, Gurgaon***

The article can be read online here.