**Example 5: Deep Learning and Hardware**

5a. Deep learning has many current limitations, some of which we discussed in the course. The biggest of course is the general lack of practical hardware. What are some other complicating factors we should be wary for when using deep learning to solve data science problems?

5b. The cloud is the most popular way to mitigate exorbitant hardware costs for smaller companies. Providers such as AWS, IBM, and Google have shown to be the most prolific in this domain. Is there an inherent ethical tradeoff in providing these companies such a large amount of information?

5c. Representational deep learning is the holy grail of deep learning; a panacea for all data-related problems. However, representational learning can only be approximated with current technology and paradigms. What are some things that can be done to improve on the current technology, both hardware and software, to get representational learning to a higher level?

5d. Python and R are the two most popular languages used to build machine learning models. However, Python has established itself due to being a general programming language. Overall, why might this generality be a big advantage over R?

5e. Field Programmable Gate Arrays (FPGAs) are commonly programmed to perform machine learning tasks remotely and attached to other hardware. However, software development for an FPGA is harder and more time-consuming? These devices can be attached to image retrieval tools such as satellites to gain reconnaissance and information. The FPGA can then segment the image information and perform useful analysis of image contents. Based on knowledge of GPUs, how would an FPGA perform differently than a GPU?

5f. Deep Learning presents many domains of information analysis that can be useful. Domains such as computer vision, natural language processing, and image segmentation are goals for large changes in their applications. However, they are not necessarily in the greatest of shape in creating