**Scenario One: Assume that you implement a resume filtering tool using machine learning models. However, your model starts rejecting applicants based on their gender. What is the potential reason(s) why your model biases against a particular gender, and how can you solve it?**

If the data set is skewed towards one gender; for example, if the job was a more male focused profession, then the dataset will become biases more towards males for that job role. Bias is something to track and make sure this doesn’t creep into an existing dataset. One way to solve this is to take more sampling data, evaluate the data, and try to eliminate bias. Have a diverse team and a strategy in place to prevent bias with an open and ethical plan and documentation for your application with an ongoing monitoring for bias and using debiasing algorithms for datasets.

**Assume that you want to detect attack samples over the internet by implementing an AI system. However, your training dataset is imbalanced where it consists of a small number of attack inostances. In such circumstances, it is challenging to classify samples as an attack or non-attack using traditional machine learning algorithms since state-of-the-art machine learning models cannot learn the characteristic behavior of the minority attack class. As a result, models are easily biased to the majority class. One naïve solution is to remove the necessary amount of non-attack samples and make the dataset balanced with a small size. What is the limitation of this solution? How can the GAN idea be integrated into this imbalanced training dataset issue to produce a more ecient solution?**

Decreasing the size can help with balancing the data, but also can decrease the accuracy of the AI system, decreasing performance especially in a small data set to begin with. A GAN could be developed to create more representations of attack data that emulates the dataset, this will enhance the dataset and enhance the minority data in the sample.

**Assume that you want to create an AI system to improve production of your company. However, you don’t have enough training samples to implement an AI system. You propose using a pre-trained model to reduce the computational demands of learning. Such an approach is often associated with the idea of transfer learning. Provide a thorough description of transfer learning and how and why it works including a concrete example?**

**Assumption Two: Assume that you generate an AI system to create a fully automated model for your company's needs. Your model initially works fine as it is. However, your company produces new training data daily that is rapidly or slightly dierent from your initial training samples. Therefore, your AI model is not suitable to solve the problem for new samples in a dynamic setting. Provide a thorough description of online learning and how and why it solves the problem under the a forementioned circumstances**

**Choose a problem that you want to solve with the help of AI. As an AI-based model solution to your problem, you need to think about the data-gathering eorts, infrastructure, storage, ETL, and cleaning you may want to conduct. Think about what your project may require to complete this step. You can also search various resources like research papers and other publications that might help you in this process. P**

**This step involves incorporating the higher steps in the pyramid that we have defined as the AI hierarchy of needs. This step involves, among other actions, employing data analytics, aggregating the data, and training the data. Other parts of this step involve running A/B testing and simple ML algorithms to understand what to expect from your data. Finally, you will need to think about which AI deep learning method to apply to achieve your goals. Depending on your project, this step may also include designing an HCI.**

Now, write a short paragraph about the second part.

**Another fundamental step when designing an AI product involves thinking about the humans in the loop, not in terms of a gathering of data, as you have described in the previous step—but more as a way of thinking about how humans may be involved in decision making (think about the example presented in Week 7 about autonomous vehicles). Describe the number of ways you think that humans and your idea will be interacting and document them in a point-wise manner**

**The last step of designing an AI product may involve thinking about facing the possible challenges, solving the problems, and extending the ongoing research to improve your product. Congratulations on designing your first AI product! Describe the points mentioned above based on the AI product you want to design.**