**Assignment\_12**

1. How does unsqueeze help us to solve certain broadcasting problems?

**Ans: unsqueeze "adds" a superficial 1 dimension to tensor (at the specified dimension), while torch. squeeze removes all superficial 1 dimensions from tensor. Looking at the image, you can get a glimpse of how things work. If you apply squeeze into any of the 3D tensors above, you'll get the same result.**

1. How can we use indexing to do the same operation as unsqueeze?

Ans:

**Steps**

1. **Import the required library. In all the following Python examples, the required Python library is torch. Make sure you have already installed it.**
2. **Create a tensor and print it.**
3. **Compute torch. squeeze(input).**
4. **Compute torch. unsqueeze(input, dim).**
5. **Print the squeezed and/or unsqueezed tensor.**
6. How do we show the actual contents of the memory used for a tensor?

**Ans: The commonly used way to store such data is in a single array that is laid out as a single, contiguous block within memory. More concretely, a 3x3x3 tensor would be stored simply as a single array of 27 values, one after the other.**

1. When adding a vector of size 3 to a matrix of size 3×3, are the elements of the vector added to each row or each column of the matrix? (Be sure to check your answer by running this code in a notebook.)
2. Do broadcasting and expand\_as result in increased memory use? Why or why not?

**Ans: The Broadcast mode is** **a unidirectional point-to-multipoint transmission of multimedia data from a single source entity to all users in a broadcast service area**

1. Implement matmul using Einstein summation.
2. What does a repeated index letter represent on the lefthand side of einsum?

**Ans: An index that appears exactly twice in a term is implicitly summed over; such an index is called a dummy index. The letter used for a dummy index is not important. An index that appears only once is called a free index. No index may appear three times or more in an expression**.

1. What are the three rules of Einstein summation notation? Why?

Ans: **There are essentially three rules of Einstein summation notation, namely:**

**1) Repeated indices are implicitly summed over.**

**2) Each index can appear at most twice in any term.**

**3) Each term must contain identical non-repeated indices.**

1. What are the forward pass and backward pass of a neural network?

**Ans: Backward and forward pass makes together one "iteration". During one iteration, you usually pass a subset of the data set, which is called "mini-batch" or "batch" (however, "batch" can also mean an entire set, hence the prefix "mini") "Epoch" means passing the entire data set in batches.**

1. Why do we need to store some of the activations calculated for intermediate layers in the forward pass?

**Ans:  It is used to cache the intermediate values of the cost function during training. We use it to pass variables computed during forward propagation to the corresponding backward propagation step.**

1. What is the downside of having activations with a standard deviation too far away from 1?

**Ans: Low standard deviation means data are clustered around the mean, and high standard deviation indicates data are more spread out. A standard deviation close to zero indicates that data points are close to the mean, whereas a high or low standard deviation indicates data points are respectively above or below the mean.**