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CS446

HW3

1. 2. The output dimension of the encoder should be 2, since .
   4. The KL divergence is non-symmetric and non-negative. Also when and are the same distribution.
   5. No, they will not be the same because the Equation 2 is more computationally expensive than Equation 1 but will be more accurate in the end.
   6. No, we build the encoder because it allows us to compute a better Gaussian distribution for our data and slowly improve its accuracy in representing the data. This allows us to reduce our lower bound giving us an overall more accurate representation of our data’s distribution.
   7. The KL-divergence because , This is a basic property of the KL-divergence. It makes sense intuitively because if the distributions are the same then we have a perfect representation of our data so the lower-bound between them would be 0.
   8. Since   
      I am stuck here trying to do it without integrals but eventually we reach that.
   9. The Lagrangian is:  
      If we substitute in :  
      Thus,
   10. should be (3) because according to Bayes Rule:
2. 1. Code
   2. Code
   3. Code
   4. Code
   5. Next page
      1. Calendar

         Description automatically generated with medium confidence
      2. Chart, scatter chart

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      3. Calendar

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   6. The cost function for GANs is:
   7. Source: lecture slides
   8. Using Euler-Lagrange formalism:  
      Since there are no :  
      So,
   9. Using JSD,  
      and  
       with   
      Thus, the optimal Generator generates the distribution , such that .
   10. The KL divergence would be undefined for both since there are some values of x for which the probability in is 0 or is 0 and same for and , while the other is nonzero. This would lead to a division by 0 in the KL divergence equation.
3. 1. Code
   2. Code
   3. Code
   4. Code
   5. Code
   6. Epoch: 10  
      A picture containing keyboard, electronics

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      Epoch: 30  
      Shape, arrow

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      Epoch: 50  
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      Epoch: 90  
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