5. Bayesian Information Criterion

Project due Apr 26, 2023 08:59 -03 Completed

So far we have simply set the number of mixture components K but this is also a para estimate from data. How does the log-likelihood of the data vary as a function of K as optimal solutions?

To compensate, we need a selection criterion that penalizes the number of parameters Bayesian information criterion (BIC) is a criterion for model selection. It captures the tra likelihood of the data, and the number of parameters that the model uses. The BIC of a

$$\text{BIC}\,(M) = l - \frac{1}{2} p \log n$$

where l is the log-likelihood of the data under the current model (highest log-likelihood adjusting the parameters in the model), p is the number of free parameters, and n is th This score rewards a larger log-likelihood, but penalizes the number of parameters use situation where we wish to select models, we want a model with the the highest BIC.

Implementing the Bayesian Information Criterion

0.0/1.0 point (graded)

Fill in the missing Bayesian Information Criterion (BIC) calculation (`bic` function) in `c`

Available Functions: You have access to the NumPy python library as `np` , to the `Gau` and to typing annotation `typing.Tuple` as `Tuple` .

```
def bic(X: np.ndarray, mixture: GaussianMixture,
        log_likelihood: float) -> float:
    """Computes the Bayesian Information Criterion for a
    mixture of gaussians

    Args:
        X: (n, d) array holding the data
        mixture: a mixture of spherical gaussian
        log_likelihood: the log-likelihood of the data

    Returns:
        float: the BIC for this mixture
    """
    n, d = X.shape
    k = mixture.mu.shape[0]
```

Press ESC then TAB or click outside of the code editor to exit

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