Response Sheet

Live Session 5

Dear Students,

Here are the responses to your questions from Live Session 5.

Student Questions and Responses

1. MOHAMMED UZAIR ANWAR

Question: "sir i am having trouble understanding the lecture videos on LMS"

Response: Thank you for bringing this to our attention. We understand that some of the recorded lecture videos may require careful attention to follow. Here are some suggestions to help you:

- **Listen carefully and follow the writing:** Pay close attention to both the audio explanations and the written content on the screen. The combination of listening and reading will help you grasp the concepts better.
- **Use the discussion forum:** For any specific queries related to a particular lecture or concept, please raise your concerns on the discussion forum. This allows us to provide detailed explanations and helps other students who might have similar questions.
- **Utilize live sessions:** The live sessions are designed to address common difficulties. For example, during this session, we covered the coin problem in detail because several students faced challenges with it. Similarly, we can take up other questions based on student feedback.
- **Refer to Lab files and supplementary materials:** The Lab files, Google Colab notebooks, and the Live Session presentations (like LiveSession5PPT) provide additional explanations and visualizations that complement the recorded lectures.

We are continuously taking your feedback to improve the learning experience. With the combination of recorded lectures, live sessions, lab materials, and discussion forums, you should be able to handle this subject effectively. Please don't hesitate to reach out whenever you need clarification.

2. DRISHAN ROY

Question: "was that gap because of base rate fallacy"

Response: Excellent observation! Yes, the gap you noticed in the medical testing example is indeed related to how we update our beliefs based on new evidence, which is the essence of Bayes' Theorem.

In the example we discussed:

- The test has 95% accuracy (it correctly identifies 95% of people who have the disease)
- However, when someone tests positive, the actual probability of having the disease is only 16.1%

This surprising result happens because we need to consider the **base rate** (the prior probability). In our example:

- Only 1% of the population has the disease (low base rate)
- The 5% false positive rate applies to the much larger healthy population (99%)
- This results in many more false positives (495) than true positives (95)

Key Insight: Bayes' Theorem helps us update our beliefs by combining:

1. Prior probability (base rate): How common is the condition?
2. New evidence (test result): What does the test tell us?
3. Likelihood: How reliable is the test?

Important Note: The Bayes' Theorem framework based on conditional probability is not limited to just two cases or simple scenarios. It can be extended to handle much more complex situations involving multiple conditions, multiple features, and various pieces of evidence. This is exactly what we explored with Naive Bayes classification, where we deal with multiple features simultaneously (like Outlook, Temperature, Humidity, and Wind conditions in the tennis example).

The beauty of Bayesian reasoning is that it provides a principled way to update our beliefs as new information becomes available, regardless of how complex the situation becomes.

Festival Greetings

Wishing you all a very Happy Diwali and Happy Dhanteras!

May this festival of lights bring joy, prosperity, and success to you and your families.
Have a safe and wonderful celebration!

General Information

Extra Slides in Live Session Presentations

We have added **Extra Slides** in the Live Session 5 presentation (LiveSession5PPT) to provide more detailed information about various topics. These supplementary slides include:

- **Advantages of Naive Bayes (Slides 27-28):** Detailed explanations of why Naive Bayes is simple, fast, works well with limited data, handles high-dimensional data, requires minimal tuning, naturally supports multi-class classification, provides probabilistic predictions, and scales well to large datasets.
- **Limitations of Naive Bayes (Slides 30-31):** In-depth discussion of the independence assumption, inability to learn feature interactions, sensitivity to irrelevant features, limitations for regression tasks, and when to avoid using Naive Bayes.

We highly encourage you to review these extra slides as they provide valuable insights into the practical considerations, real-world applications, and theoretical foundations of the concepts covered during the live session. These slides are designed to help you develop a deeper understanding beyond what can be covered in the live session time.

The extra slides are clearly marked in the presentation and contain expanded explanations, examples, and practical guidance that will be beneficial for both your learning and assessments.

Best regards,
BITS Pilani Digital Team