















Table 7. Time for training

Sr.No	Method	Time
1	NBT without Normalization	2536
2	NBT with Batch Normalization	2172
3	NBT with Cosine Normalization	2215
4	NBT with Group Normalization	2183
5	NBT with Layer Normalization	2216
6	NBT with Instance Normalization	2289

Table 8 shows the impact of normalization on the detection rate. The detection rate is improved by normalization. The detection rate for batch normalization is maximum and minimum for layer normalization.

Table 8. Detection Rate

Sr.No	Method	Detection rate
1	NBT without Normalization	93.5
2	NBT with Batch Normalization	95.8
3	NBT with Cosine Normalization	95.2
4	NBT with Group Normalization	95.1
5	NBT with Layer Normalization	89.6
6	NBT with Instance Normalization	95.7

### 5. Conclusion:

SLU takes part in a significant role in understanding user objectives. To understand user goals, SLU utilizes deep learning models from machine learning. These machine learning models are affected by the internal covariant shift. There are techniques in machine learning to reduce the internal covariant shift and improve model performance. There is a significant improvement in model performance by applying these techniques.

The work in this paper extends ICS reducing normalization techniques from machine learning to deep models in SLU. Overall performance of SLU was improved by incorporating ICS reducing techniques. The results were obtained for the area and price range slot. The results were similar for both slots. The F-score learning graph for both the indicates there is an improvement in SLU performance. The least change in value of F-score for varying training data was reported with the model with instance normalization for both the slots. The next observation from the learning curve of both slots is the generalization ability of the model is improved with normalization. At minimum training data for both slots best results were obtained by instance normalization and for maximum training, data was obtained by batch normalization and group normalization. In experiments conducted for both slots, the detection rate was maximum for the model incorporating batch normalization and minimum for layer normalization. The results show that reducing covariant shifts in SLU results in enhanced learning and improvement in performance.

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