

MANDATE: 3

CONTRIBUTION CREATION OF INDIAN PENAL CODES SECTIONWISE DATASET AND FINDING COSINE SIMILARITY BETWEEN IPCs AND GIVEN QUESTION.

Keywords NLP, Cosine Similarity, BERTForQuestionAnswering, Context Prediction, SQuAD Dataset, IPC Dataset

1 INDIAN PENAL CODES SECTION-WISE DATASET:

The below image contains few entries of the dataset prepared:

| | | |
|-----|-----|--|
| 141 | 142 | Being member of unlawful assembly.—Whoever, being aware of facts which render any assembly an unlawful assembly, intentionally joins that assembly, or continues in it, is said to be a member of an un |
| 142 | 143 | Punishment.—Whoever is a member of an unlawful assembly, shall be punished with imprisonment of either description for a term which may extend to six months, or with fine, or with both. |
| 143 | 144 | Joining unlawful assembly armed with deadly weapon.—Whoever, being armed with any deadly weapon, or with anything which, used as a weapon of offence, is likely to cause death, is a member of an u |
| 144 | 145 | Joining or continuing in unlawful assembly, knowing it has been commanded to disperse.—Whoever joins or continues in an unlawful assembly, knowing that such unlawful assembly has been commande |
| 145 | 146 | Rioting.—Whenever force or violence is used by an unlawful assembly, or by any member thereof, in prosecution of the common object of such assembly, every member of such assembly is guilty of the o |
| 146 | 147 | Punishment for rioting.—Whoever is guilty of rioting, shall be punished with imprisonment of either description for a term which may extend to two years, or with fine, or with both. |
| 147 | 148 | Rioting, armed with deadly weapon.—Whoever is guilty of rioting, being armed with a deadly weapon or with anything which, used as a weapon of offence, is likely to cause death, shall be punished with in |
| 148 | 149 | Every member of unlawful assembly guilty of offence committed in prosecution of common object.—If an offence is committed by any member of an unlawful assembly in prosecution of the common objec |
| 149 | 150 | Hiring, or conniving at hiring, of persons to join unlawful assembly.—Whoever hires or engages, or employs, or promotes, or connives at the hiring, engagement or employment of any person to join or beco |

1.1 GENERATING EMBEDDING FOR EACH INDIAN PENAL CODE SECTION

Below image contains few entries of embedding created:

```
dict_values([array([[ 0.00746889,  0.01060649,  0.1079904 , ...,  0.0540575 ,
                    -0.01554108,  0.01930236]], dtype=float32), array([[ 0.00746889,  0.0034254 ,  0.07756367, ...,  0.0
                    8142837,
                    0.01243714, -0.00434407]], dtype=float32), array([[ 0.00746889,  0.02760393,  0.02980195, ...,  0.0
                    341953 ,
                    0.01465572, -0.00434407]], dtype=float32), array([[ 0.00746889, -0.03242395,  0.0938218 , ...,  0.0
                    5192651,
                    0.02483455,  0.00369469]], dtype=float32), array([[ 0.00746889,  0.00632952,  0.10000675, ...,  0.0
                    677682 ,
                    -0.00886437,  0.00843539]], dtype=float32), array([[ 0.00746889,  0.01942558,  0.05182144, ...,  0.0
                    3993455,
                    -0.01262833, -0.01604824]], dtype=float32), array([[ 0.00746889, -0.00630547,  0.06269889, ...,  0.0
                    0621588,
                    -0.00339004, -0.00347104]], dtype=float32), array([[ 0.00746889,  0.21320617,  0.03461584, ...,  0.0
```

Embedding are generated using InferSent function in model.py script and stored in dictionary embedding.

1.2 COSINE SIMILARITY:

Using COSINE SIMILARITY we will predict the context that the question provided will belong to. In our case context is IPC section description.

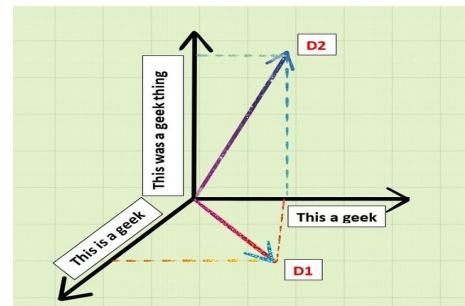
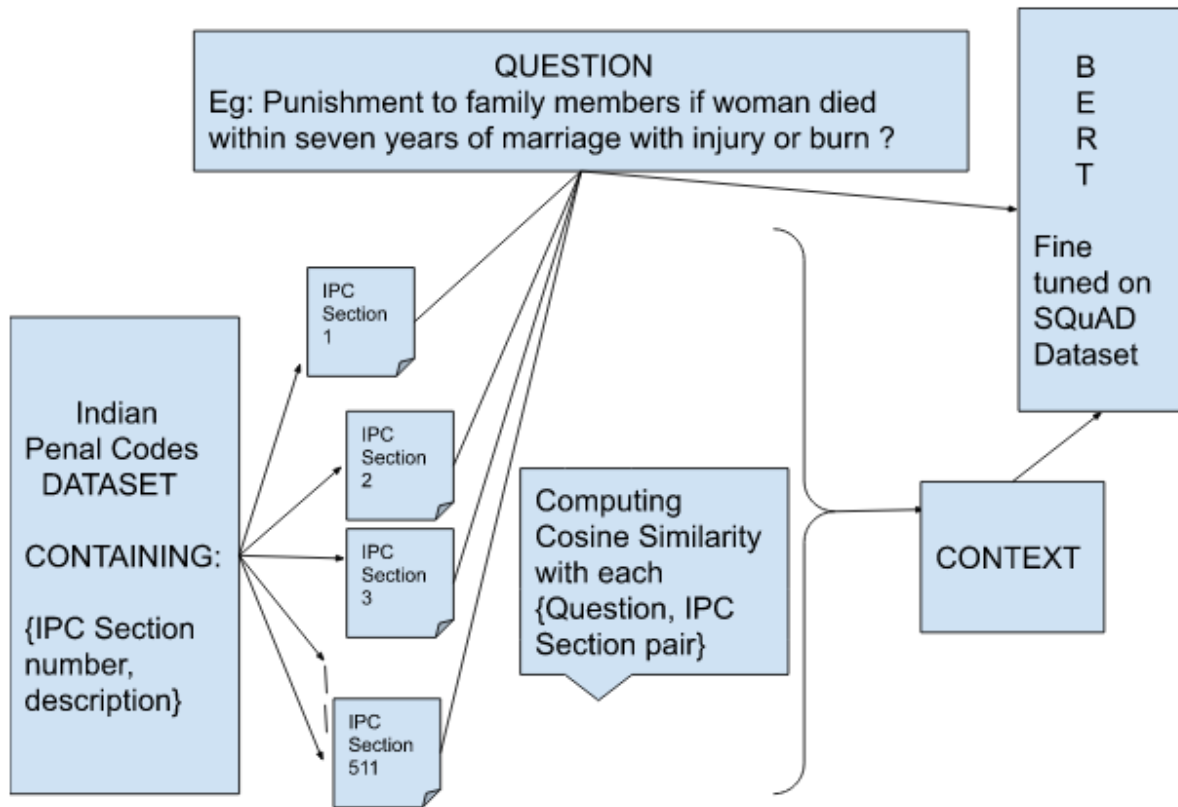


image source: geeksforgeeks

2 ARCHITECTURE:



2.1 SAMPLE OUTPUT:

```
Question : Punishment to family members if woman died within seven years of marriage with injury or burn ?
Predicted Context : Dowry death.â€“(1) Where death woman caused burns bodily injury occurs normal circumstances seven years marriage show
n soon death subjected cruelty harassment husband relative husband for, connection with, demand dowry, death called â€œdowry deathâ€”, hus
band relative deemed caused death. Explanation.â€œ“For purposes sub-section, â€œdowryâ€” meaning section 2 Dowry Prohibition Act, 1961 (28
1961). (2) Whoever commits dowry death punished imprisonment term seven years extend imprisonment life.]
```

3 FUTURE WORK:

1. Predicting the answer of given question using BERT trained on SQuAD Dataset by providing context predicted in this mandate using cosine similarity.

2. Refinement of Dataset -some words' frequency of occurring in dataset is very much high which is directly affecting cosine similarity.

4 NOTEBOOK:

LINK TO .ipynb file: https://github.com/TusharSNagpal/NLP-Indian_Penal_Codes_QA_System/blob/05d5ff80c513ae6abdd77507a7f967ff1a8a5395/mandate-3-mt2022125.ipynb

References

- [1] Government of India. "https://legislative.gov.in", Indian Penal Code and laws[[Dataset](#)]
- [2] "https://towardsdatascience.com/building-a-question-answering-system-part-1-9388aadff507", InferSent [[Cosine Similarity Approach](#)]