Report on Assignment 3 on CS689A : Computational Linguistics for Indian Languages

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Ques. 3. Learnings from the Assignment

Ans. By Running the model I get the Following Scores :

	Translation	BLEU	ROUGE-1 Recall	ROUGE-1 Precision	ROUGE-1 F1	ROUGE-2 Recall	ROUGE-2 Precision	ROUGE-2 F1	ROUGE-L Recall	ROUGE-L Precision	ROUGE-L F1
0	Chatgpt translated en_hi	0.729329	0.531472	0.555784	0.541155	0.281526	0.290554	0.284614	0.495290	0.517195	0.503938
1	Chatgpt translated gu_hi	0.722705	0.518689	0.535191	0.521883	0.276561	0.282618	0.276655	0.485841	0.501858	0.489109
2	Chatgpt translated hi_en	0.690157	0.761702	0.746226	0.751791	0.570784	0.560374	0.563808	0.726378	0.713010	0.717659
3	Chatgpt translated hi_gu	0.730674	0.396024	0.396360	0.393764	0.164179	0.163943	0.162737	0.384146	0.383932	0.381655
4	Distilled Translated gu_hi	0.741147	0.603237	0.651100	0.620937	0.381925	0.413457	0.394080	0.572497	0.616658	0.588820
5	Distilled Translated hi_gu	0.759606	0.492368	0.552014	0.514529	0.275591	0.312006	0.288327	0.485105	0.544123	0.506976
6	Distilled Translated en_hi	0.742791	0.586158	0.631268	0.603126	0.370865	0.397661	0.380790	0.552881	0.593261	0.567951
7	Distilled Translated hi_en	0.701872	0.620348	0.637969	0.625022	0.368677	0.371484	0.367543	0.583853	0.601216	0.588869
8	Indictrans Translated en_hi	0.733930	0.651276	0.670836	0.658193	0.438114	0.448319	0.441197	0.621918	0.639458	0.627967
9	Indictrans Translated gu_hi	0.733044	0.621599	0.644198	0.628874	0.402862	0.414246	0.405546	0.588944	0.609813	0.595537
10	Indictrans Translated hi_en	0.691164	0.693848	0.674303	0.681321	0.465186	0.446125	0.453555	0.661295	0.644129	0.650137
11	Indictrans Translated hi_gu	0.740070	0.539500	0.541407	0.537549	0.296568	0.291709	0.292085	0.522053	0.522114	0.519256

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             Translation      BLEU2      BLEU3      BLEU4
0     Chatgpt translated en_hi  0.531921   0.656771   0.729329
1     Chatgpt translated gu_hi  0.522302   0.648837   0.722705
2     Chatgpt translated hi_en  0.476316   0.610208   0.690157
3     Chatgpt translated hi_gu  0.533885   0.658385   0.730674
4     Distilled Translated gu_hi  0.549299   0.670985   0.741147
5     Distilled Translated hi_gu  0.577001   0.693336   0.759606
6     Distilled Translated en_hi  0.551738   0.672967   0.742791
7     Distilled Translated hi_en  0.492624   0.624044   0.701872
8     Indictrans Translated en_hi  0.538653   0.662296   0.733930
9     Indictrans Translated gu_hi  0.537354   0.661232   0.733044
10    Indictrans Translated hi_en  0.477707   0.611395   0.691164
11    Indictrans Translated hi_gu  0.547703   0.669686   0.740070
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1. **BLEU-2 (or BLEU2):** This refers to the BLEU score calculated based on bigrams, which are pairs of consecutive words in the translation.

2. **BLEU-3 (or BLEU3):** This refers to the BLEU score calculated based on trigrams, which are sequences of three consecutive words in the translation.

3. **BLEU-4 (or BLEU4):** This refers to the BLEU score calculated based on 4-grams, which are sequences of four consecutive words in the translation.

Learnings from the Assignment :

1. **Time Consuming :** Translation from one language to another is very time consuming process.

2. **High Memory Usage :** Translation requires a lot of memory. Use of

> CPU – Will give Memory Exhausted Error
> GPU – Will work good here and BATCH are processed simultaneously

3. **ChatGPT Prompt Problem** – When we give 10 sentences at a time to translate to other languages specially (gujrati). It gives very incorrect translation to last one. So translating one sentence at time gives good translation.

4. **Lower Quality Translation:** Translating English to Hindi has more score compared to Hindi to English and same for Hindi to Gujrati is more score compare to Gujrati to Hindi (BLEU Score). Reason may be -

- Training data is diverse.

5. **Comparisions between Models:**

- For translating English to Hindi – NLLB distilled performs better
- For Gujrati – Both NLLB and IndicTrans are comparable