Fumbling in Babel:
An Investigation into ChatGPT's Language Identification Ability

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Abstract

ChatGPT has recently emerged as a powerful NLP tool that can carry out a variety of tasks. However, the range of languages ChatGPT can handle remains largely a mystery. To uncover which languages ChatGPT 'knows', we investigate its language identification (LID) abilities. For this purpose, we compile Babel-670, a benchmark comprising 670 languages representing 24 language families spoken in five continents. Languages in Babel-670 run the gamut from the very high-resource to the very low-resource. We then study ChatGPT's (both GPT-3.5 and GPT-4) ability to (i) identify language names and language codes (ii) under zero- and few-shot conditions (iii) with and without provision of a label set. When compared to smaller finetuned LID tools, we find that ChatGPT lags behind. For example, it has poor performance on African languages. We conclude that current large language models would benefit from further development before they can sufficiently serve diverse communities.

1 Introduction

ChatGPT (OpenAI, 2023) is a large language model (LLM) based on Generative Pre-training (GPT) (Brown et al., 2020). It has achieved remarkable success in a wide range of natural language processing (NLP) tasks, including text generation, question answering, and document summarization (Bubeck et al., 2023; OpenAI, 2023). The model has been shown to perform well on natural language understanding not only in English, but also Afrikaans, Arabic, Indonesian, Italian, Mandarin Chinese, and several more (OpenAI, 2023). However, while ChatGPT demonstrates strong language capabilities, it remains unclear what languages it actually 'knows'. Understanding languages recognized by current Large Language Models (LLMs) empowers the community to set realistic expectations for their applica-
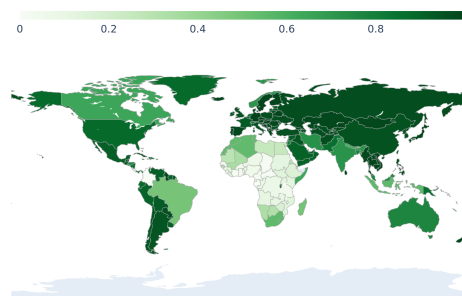

Figure 1: A choropleth map where the intensity indicates the averaged F_1 score of languages spoken in each region. It can be seen that the support of languages has geographical discrepancy, e.g. with African languages being strikingly less supported. The figure is drawn based on the results of one of our experimental settings: (Language Name Prompt [Alias-Dialect-accepting], GPT-4, hard, 0-shot; see Section 4 for more details). A larger map is available in Figure A.1 in the Appendix.

tion and guides the direction of future development efforts towards particular languages.

Language identification is a fundamental NLP task that plays a critical role in ensuring accurate processing of multilingual data by identifying the language to which a text or speech utterance belongs (Tjandra et al., 2021; Adebara et al., 2022, 2023a; Burchell et al., 2023; Madhani et al., 2023). The exponential growth of social media and other digital channels has provided researchers with an abundance of multilingual text. However, Kreutzer et al. (2022) observe datasets being mislabeled with incorrect language and suggest potential risk to downstream applications utilizing these datasets. Hence, LID can be an important step in effectively handling languages and can play a crucial role in the data pipeline of NLP systems (Kreutzer et al., 2022). For example, Radford et al. (2022) integrates LID into its pipeline to develop a speech system. LID also plays a vital role in various NLP applications involving dialects and

code-mixed datasets (Abdul-Mageed et al., 2020; Thara and Poornachandran, 2021). With the emergence of LLMs, there is growing interest in exploring the capabilities of these models for various tasks. Among these, LID, a fundamental NLP task, is notably important to explore.

This paper aims to evaluate the performance of ChatGPT on LID and provides insights into its strengths and limitations. For ChatGPT, we include two backend model checkpoints: `gpt-3.5-turbo-0613` and `gpt-4-0613`. Henceforth, we refer to these models as 'GPT-3.5' and 'GPT-4', respectively. We methodically conduct a series of experiments using diverse text samples from a collection of 670 languages. We evaluate the model's ability to accurately identify the language of each sample, experimenting with zero- and few-shot settings both with and without the provision of a set of labels. We also carry out a wide range of analyses, including from the perspective of dialectal variation, high-resource and low-resource languages, writing systems (i.e. scripts), and across different geographical locations. We observe that ChatGPT's ability varies remarkably between low-resource and high-resource languages and among different regions as can be seen in Figure 1.

2 Related Work

Traditional approaches to language identification involved rule-based methods (Shuyo, 2010), statistical models (Lui and Baldwin, 2012), and handcrafted features such as character combination co-occurrence (van der Lee and van den Bosch, 2017; Dongen, 2017; Martinc et al., 2017) and feature smoothing (Jauhiainen et al., 2019). Recently, deep learning has revolutionized language identification techniques by showing superior performance (Jurgens et al., 2017; Adebara et al., 2022).

The efficacy of deep learning methods in addressing LID for high-resource languages has generally been established as a resolved issue (Caswell et al., 2020). However, the domain of LID for low-resource languages remains significantly under served (Adebara and Abdul-Mageed, 2022). ChatGPT is a general-purpose language model that is capable of performing a variety of language tasks (OpenAI, 2023). It has been claimed to have the ability to solve any kind of task without task-specific training or in few-shot settings (Brown et al., 2020; Lin et al., 2022). In this work, we eval-

uate the performance of ChatGPT on LID on both low-resource and high-resource languages. To the best of our knowledge, there are no prior works that evaluate ChatGPT on LID. We now introduce Bable-670, our dataset for this work.

3 Dataset

We curate **Babel-670**, a dataset for our LID task compiled from three different datasets that cover a total 670 languages from 24 language families (shown in Appendix Table A.1) written in 30 different scripts (shown in Appendix Table A.2). A full list of languages included in Babel-670 can be seen in Appendix D.

3.1 Data Collection

Three datasets are curated to build Babel-670. **AmericasNLP2022** is a dataset that includes five low-resource South American Indigenous languages (Ebrahimi et al., 2022). **AfroLID** (Adebara et al., 2022) dataset is manually curated and covers 517 African languages and language varieties. The dataset is multi-domain and multi-script. **FLORES-200** (Costa-jussà et al., 2022) is a dataset specifically designed for addressing low-resource machine translation, covering ~ 200 languages. Since there are some languages included in more than one dataset, Bable-670 includes data in the order of AmericasNLP2022, AfroLID, and FLORES-200. That is, if a language is included in more than one dataset, only the data in the dataset of higher order is included. We order these three datasets by their released dates from newer to older as they reflect the chance of the dataset not being included in the training of ChatGPT models. This is to maximize the chance that Babel-670 is unseen during any of its training phases.

There are no duplicated languages between AmericasNLP2022 and AfroLID datasets, so all languages in these two datasets are included in Babel-670. There are two duplicated languages between AmericasNLP2022 and FLORES-200. There are 46 duplicated languages between AfroLID and Flores-200. For these duplicated languages, the data from AmericasNLP2022 and AfroLID is included. For languages in FLORES-200 which are written in two scripts (e.g. Acehnese as for ace_Arab and ace_Latn), we select the script that appears first in alphabetical order. Specifically, for the eight languages in this category, which are Acehnese (*ace*), Modern Standard Ara-
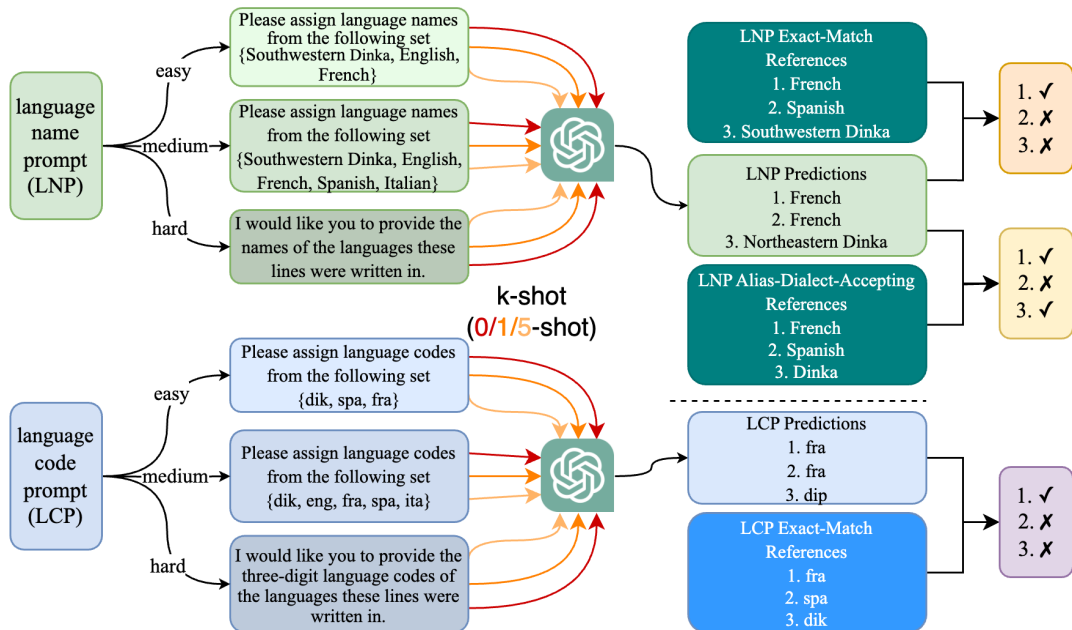
Figure 2: An Overview of different experimental settings with exemplified predictions and test examples in French (fra), Spanish (spa), Southwestern Dinka (dik). Language name prompt (LNP) has both exact-match and alias-dialect-accepting evaluation while language code prompt (LCP) has solely exact-match evaluation. The prediction of third test example (Northeastern Dinka) of LNP is considered incorrect in exact-match evaluation but correct in alias-dialect-accepting evaluation.

bic (*arb*), Banjar (*bjn*), Kashmiri (*kas*), Central Kanuri (*knc*), Minangkabau (*min*), Tamasheq (*taq*), and Chinese (*zho*), we select Arabic script for the first six languages, Latin for Tamasheq, and Hans for Chinese.

Name	#Langs	Train	Dev	Test
AmericasNLP'22	5	250	100	75
AfroLID	517	25,850	10,340	7,755
FLORES-200	148	7,400	2,960	2,220
Bable-670	670	33,350	13,400	10,050

Table 1: Data splits of our dataset Babel-670.

3.2 Data Preprocessing

For each language, there are 50 training datapoints, 20 dev datapoints, and 15 test datapoints extracted from one of the three dataset which is in higher order. Training datapoints are exemplars for few-shot demonstration learning; dev datapoints are used during the development stage when searching for proper prompt templates. All experimental results reported are based on test set. Each prompt contains ten test datapoints which we term a *batch*. A batch would most likely contain test datapoints in different languages since the members of a batch are randomly drawn from test datapoints across all languages without replacement. This design is to avoid having a whole batch of a same language which may affect the performance. However, a batch could occasionally contain datapoints of one language more than once. We keep creating batches until all test datapoints have joined a batch. We choose the batch size to be ten because we try to avoid exceeding the token limit of a API request ($4,096$ for `gpt-3.5-turbo-0613`, $8,192$ for `gpt-4-0613`).[1]

For few-shot learning settings, a pool of exemplars is created by incorporating every training data point from all languages. A different number of exemplars (one for 1-shot and five for 5-shot) is randomly drawn from the pool without replacement to join a prompt, along with a batch of test datapoints. For each prompt, there will be no duplication of the exemplars and the test datapoints so ChatGPT will be guided to follow the instruction and the required format without directly being given the answer.

4 Methodology

To explore ChatGPT's ability to identify languages, we design two major types of prompts: **lan-**

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[1] https://platform.openai.com/docs/models accessed on March, 2024

guage name prompt (LNP) and **language code prompt (LCP)**, each encompassing three numbers of shots and three different difficulty levels (See Section 4.2). An overview of our data pipeline is shown in Figure 2. LNP asks ChatGPT to predict language names while LCP asks it to produce three-digit IS0-693 language codes. Although most language identification research use language code as labels, we decide to also prompt ChatGPT to predict language name because (1) it will be a very strong assumption that ChatGPT knows all ISO language codes and (2) we hypothesize ChatGPT is more likely to be fed language names during pre-training. In fact, through analysis, we observe that ChatGPT predicts language names better than language codes given the same set of test examples (see Section 5.1.1).

4.1 Prompt Design

To interact with ChatGPT API effectively, we align our prompt style to the documentations and examples provided by OpenAI (Appendix Table A.3), and adopt temperature of zero to keep the randomness of generation at a low level. A request sent to the API consists of an arbitrary number of messages stored in an ordered json array. There are three types of messages we send to ChatGPT API: *system*, *user*, and *assistant* messages. System message is a high-level instruction to advise the model, typically placed first in the array. User message is where to store what we as users want to communicate with ChatGPT. The assistant message serves two purposes: (1) it records how Chat-GPT responds to our user message, and (2) it allows us, as users, to guide ChatGPT by showing the expected response we desire. In the context of few-shot learning, we use a pair of (user, assistant) messages to illustrate the desired behavior to Chat-GPT. This pair contains sentences in different languages in the user message and their corresponding gold labels in the assistant message. We structure our few-shot learning examples in a manner similar to ChatGPT's playground example[2]. This involves using two newline characters ('\n') to separate sentences and a colon to indicate that examples follow. Actual test examples are placed in a user message as the last message in the array. To address potential issues, such as irrelevant content or inconsistent outputs, we specify in our prompt that Chat-GPT should "never provide anything other than...".

This helps ensure precise listings of names or codes and avoids situations where ChatGPT might generate unnecessary information, such as including language codes in LNP or language names in LCP. An example of this is 'English (eng)' in a response to our LNP, where the '(eng)' part is unnecessary. For clarity, we provide templates and examples of prompts for different settings in Appendix B.

We test ChatGPT under three different k-shot settings: 0-shot, 1-shot, and 5-shot. For 0-shot, exemplars for demonstration learning is not present and ChatGPT is asked to directly predict the test examples given. For 1-shot and 5-shot, one and five exemplars are given, in a pair of (user, assistant) message, before asking it to predict, respectively. In addition to 'Please answer in ordered listing ...' which is the part in the instruction that specifies response format abstractly, the few shots not only serve as exemplars but also demonstrate to ChatGPT concretely what format we seek for a response.

4.2 Difficulty Levels

We design three levels of difficulty to test the ability of ChatGPT:

- Easy: A set of gold labels of the test examples is provided for ChatGPT to choose from.

- Medium: Same as easy level but with additional non-gold labels to confuse it.

- Hard: No set of labels provided.

For the easy and medium levels, a set of language labels (language names for LNP and language codes for LCP) is included in the prompt as a hint for ChatGPT to choose its predictions from. We refer to this set as **label set**. For the easy level, the size of the label set is equal to the number of unique gold labels for test examples in a batch. For each batch in the medium level, the size of the label set is always 30. That is, in addition to the ~ 10 unique gold labels, there are ~ 20 non-gold labels added to the label set[3] to make the task more challenging. We perceive the hard level as the most realistic setting, since it would be rare for the common public to provide a label set for ChatGPT to

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[3]The number of additional non-gold labels is not always exactly 20. It will be exactly 20 if the selected test examples each belongs to a different language. It will be > 20 if more than one test example belongs to the same language, as the repeated labels will be de-duplicated but the label set is always of size exactly 30.

choose from, instead of directly asking it for an answer. Within the hard level, 0-shot is the use case for average users and few-shot is the use case for researchers and practitioners who may include exemplars in the prompt. On the other hand, medium and easy settings are useful in the sense that they offer an empirical investigation of the text classification ability of ChatGPT when a set of labels is given.

4.3 Postprocessing and Evaluation

We report our results in accuracy and F_1 score for every experimental setting. Before we evaluate, we postprocess the output of ChatGPT as it is in textual format and cannot be compared with our labels directly.

Postprocessing. As ChatGPT is a generative model and produces output in textual format, it takes postprcoessing of the output to extract predictions which can be later used for evaluation. Since we ask ChatGPT to answer in ordered listing in our prompt, each pair of number and the following string are extracted where the latter is taken as prediction. We expect the number of extracted pairs to be identical to that of the batch size (i.e. 10). If not, a 'None' will be inserted along with the missing number.[4] Having pairs ready, we extract the content that follows each number. For LCP, a typical pair is such as '10. kmb'. We extract the first occurrence of alphabetical substring ('kmb') coming after the number and ignore the rest. This is to only extract language code itself as occasionally ChatGPT produces language name alongside language code (e.g. 'mkd [Macedonian]) despite being explicitly instructed not to do so. For LNP, we extract the alphabetical sequence that follows a digit. Unlike LCP, we include the whole following alphabetical sequence so language names consisting of more than one word can be extracted successfully, e.g. 'Egyptian Arabic'.

Evaluation. For LCP, only when the prediction and gold label is identical will it be considered a hit; otherwise, a miss. We name this **exact-match** evaluation. For LNP, we report results based on not only exact-match but also **alias-dialect-accepting** evaluation. We propose this because there is a fundamental difference between classification model and generative model. The prediction of a classification model always falls within

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[4]After an inspection, we found that all test examples are given a prediction. Therefore, no test example is assigned 'None'.

a preset closed space (i.e. the classes). However, the prediction of ChatGPT does not guarantee that. Additionally, unlike ISO language code system which in general follows the principle of having one language code per language, the fact that a language can have multiple names makes LNP evaluation more challenging. Given the discrepancy, an exact-match evaluation for LNP may not reflect the true ability of a generative model because of potentially considerable number of false negatives. Alias-dialect-accepting evaluation is a fuzzy matching strategy that reduces the number of false negatives. For example, under exact-match evaluation, it will be considered a miss if the model predicts 'Español' when the label is 'Spanish', even though they are referring to the same language entity and can be an alias for each other. Another example is if it predicts 'Northeastern Dinka' when the label is 'Southwestern Dinka'; they belong to the same language group Dinka as dialects. We propose alias-dialect-accepting evaluation to address these two issues. Under this setting, if ChatGPT's prediction is an alias of the ground truth or if prediction and ground truth belong to a same language group, it will be counted as a hit. Implementation details of the alias-dialect-accepting evaluation are in Appendix C.

5 Results and Analysis

5.1 Comparison of Different Settings

This section includes the experimental results for all settings (see Table 2) and the analyses conducted to compare each pair of different settings.

5.1.1 LNP vs. LCP

For easy and medium difficulty levels, LNP always has better performance than LCP across all settings. For hard level, the performance of LNP with exact-match evaluation is modestly inferior to LCP while LNP with alias-dialect-accepting is significantly better than LCP in all settings. For hard level where there is no label set provided, LNP with exact-match has a fundamental limitation as discussed in Section 4.3 which may contribute to it slightly underperforming LCP. We argue that when it comes to language identification, ChatGPT knows language names better than language codes. That is, for the same given piece of text, ChatGPT is more likely to correctly identify its language if it is asked to produce language name rather than language code. We speculate this is the case since

| Level | # | GPT-3.5-turbo-0613 | | | | | | GPT-4-0613 | | | | | |
| | | LNP (exact) | | LNP (ADA) | | LCP (exact) | | LNP (exact) | | LNP (ADA) | | LCP (exact) | |
		ACC	F_1	ACC	F_1	ACC	F_1	ACC	F_1	ACC	F_1	ACC	F_1
easy	0	24.86	28.28	24.90	28.14	14.63	17.63	65.82	65.36	65.97	65.92	47.16	46.29
	1	28.13	31.18	28.23	31.12	27.32	27.51	65.19	65.70	65.29	66.16	45.88	45.96
	5	33.82	34.46	33.96	34.97	27.37	27.17	68.29	68.05	68.42	68.69	47.95	47.31
medium	0	19.81	21.09	20.26	21.62	10.27	12.30	48.66	45.39	49.08	46.28	37.79	34.24
	1	25.30	22.63	26.32	23.58	22.88	19.60	48.02	45.57	48.40	46.22	38.19	34.64
	5	26.22	23.02	26.94	24.08	22.76	19.64	50.49	47.63	50.89	48.32	39.39	35.62
hard	0	12.70	12.17	17.39	16.36	2.47	3.82	20.02	17.80	28.32	24.16	21.47	18.93
	1	16.05	13.81	23.82	19.36	16.66	14.34	20.40	18.26	28.58	24.76	22.10	19.72
	5	17.12	14.65	25.36	20.25	17.71	15.09	20.94	18.97	28.79	25.31	22.52	20.26

Table 2: Accuracy values (%) and macro-averaged F_1 scores (%) of different experimental settings for GPT-3.5 and GPT-4. **Level**: difficulty level, **#**: number of shot(s), **LNP**: language name prompt, **LCP**: language code prompt, **exact**: exact-match evaluation, **ADA**: alias-dialect-accepting (ADA) evaluation. ADA is only applicable for LNP.

language names are much more likely to occur than language codes in the pretraining data of ChatGPT.

Furthermore, we observe that GPT-3.5 lacks a robust understanding of the concept of language codes. It faces challenges when tasked with identifying language codes in the absence of exemplars or label sets, correctly identifying only 2.47% of all test examples under the hard level and 0-shot conditions. However, its performance sees an improvement of $\sim 574\%$ when one exemplar is provided. This pattern of profound improvement going from 0-shot to 1-shot persists in medium and easy settings. In contrast, GPT-4 exhibits a more proficient understanding of language codes. The presence or absence of exemplars has a lesser impact on performance compared to GPT-3.5.

5.1.2 Difficulty levels

The difference between difficulty levels is the provision and size of a label set in the prompt. Since there are around 7,000 human languages, performing language identification without a label set is similar to performing a 7000-class text classification which can be challenging. The provision of a label set limits the range of output values and therefore improves the manageability of the task. Moreover, the smaller the provided label set, the less challenging the task. We observe a significant performance difference in the rank easy > medium > hard. For (LNP [alias-dialect-accepting], GPT-4, 0-shot) setting, the accuracy and F_1 score for easy level are 34.4% and 42.4% higher than those for medium level, respectively. The accuracy and F_1 score for medium level are 73.3% and 91.6% higher than those for hard level, respectively. Settings under GPT-3.5 and for LCP have show sim-

ilar performance patterns. However, if ChatGPT truly identifies those languages, it should perform similarly regardless of the provision and size of the label set.

We argue that significant performance disparities exist between different difficulty levels due to two primary reasons: (**1**) In cases where ChatGPT has no prior knowledge about the language of a test example, providing a label set increases the likelihood of correct guessing. This is because, when a smaller label set is available, ChatGPT can randomly assign a label from the set, resulting in a higher probability of a fortunate correct guess. Probabilistically, the average number of successful classifications for a set of examples randomly assigned to 10 classes (easy level) is much higher than that for 30 (medium level). (**2**) For test examples where ChatGPT possesses some knowledge but lacks confidence in determining the language due to factors such as code-switched text, brevity, or closely related languages with shared vocabulary and linguistic characteristics, the provision of a label set boosts confidence by eliminating numerous potential candidates. Smaller label sets reduce the number of candidates to consider. Given this analysis, we posit that the $\sim$ 70% accuracy achieved by ChatGPT under the setting (LNP[alias-dialect-accepting], GPT-4, easy, 5-shot) may present an overly optimistic estimation of its capabilities.

5.1.3 GPT-3.5 vs. GPT-4

As anticipated, GPT-4 consistently exhibits stronger performance than GPT-3.5 across all settings. Particularly in easy and medium difficulty levels, GPT-4 manages to double the

performance of GPT-3.5 in numerous scenarios, suggesting a potentially superior natural language understanding ability. However, in the hard level, GPT-4 outperforms GPT-3.5 by smaller margins. As discussed later in section 5.3, we argue that the hard level best reflects the true language identification capability of a model. Hence, we speculate that the narrow performance gap is likely due to GPT-4's slightly broader range of supported languages compared to GPT-3.5. In other words, if the number of supported languages were to increase significantly, we would expect a larger performance gap in the hard level.

Furthermore, GPT-4 proves to be a superior zero-shot learner compared to GPT-3.5, whose zero-shot performance is limited in comparison. GPT-3.5's improvement from 0-shot to 1-shot is much more substantial than that from 1-shot to 5-shot, indicating the necessity of including at least one exemplar for GPT-3.5. Conversely, for GPT-4, performance remains consistent across different numbers of shots, highlighting its enhanced capability to perform tasks without exemplars.

Tool	#lang	Acc	F_1	GPT-3.5		GPT-4	
				Acc	F_1	Acc	F_1
AfroLID	517	92.90	89.04	0.55	0.82	7.72	4.79
CLD2	66	96.03	91.22	15.05	8.45	95.45	83.81
CLD3	83	96.02	89.53	14.86	8.58	93.65	72.07
FastText	101	83.77	74.02	12.61	7.67	88.05	64.25
Franc	216	81.05	66.28	7.08	5.32	56.87	29.73
LangDetect	48	99.03	99.01	15.83	8.63	97.78	92.69
Langid.py	78	92.39	88.80	14.61	8.17	91.03	71.88

Table 3: Comparison of accuracy and macro-averaged F_1 score (%) to other language identification tools on languages supported by the tool and are included in Babel-670. For ChatGPT models, they are of setting (LCP, hard, 0-shot). GPT-3.5 performs poorly partially because of its inability of understanding the instruction under 0-shot (discussion can be seen in section 5.1.3).

5.2   Comparison to Other Tools

We conduct a performance comparison between GPT-3.5, GPT-4, and other language identification tools. Specifically, we compare with AfroLID (Adebara et al., 2022), CLD2, CLD3 (Salcianu et al., 2016), FastText (Joulin et al., 2016), Franc, LangDetect (Shuyo, 2010), and Langid.py (Lui and Baldwin, 2012).[5] For each tool, we evaluate only the languages that are both supported by the tool and are included in Babel-670. We only include the setting (LCP, hard, 0-

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shot) to have a fair comparison to other tools as the tools are all (1) language code-based (2) do not allow in-context learning (3) do not allow label set.

As shown in Table 3, all tools outperform GPT-3.5 and GPT-4, except FastText where GPT-4 demonstrates better performance in accuracy. Our assessment reveals the lowest performance exhibited by both GPT-3.5 and GPT-4 is in the context of African languages when comparing with AfroLID, which includes only African languages. GPT-3.5 has an extremely low F_1 score at 0.82% while GPT-4 has a better but still limited performance of F_1 score at 4.79%.

5.3   Error Analysis

To perform the error analysis, we analyze the (LNP [alias-dialect-accepting], GPT-4, hard, 0-shot) setting. We use this setting for three main reasons: **(1)** Alias-dialect-accepting evaluation provides a more accurate measure of a generative model's capabilities, as discussed in Section 4.3. **(2)** Hard level best reflects the actual LID ability of a model since there is little chance for a lucky guess as label set is not provided. **(3)** Hard level with 0-shot best reflects practical usage scenarios for the general public. In many scenarios, users may not have access to demonstration learning or the ability to provide a specific label set when attempting to identify a piece of text. In Figure 3, we show the F_1 scores of the languages that achieve an F_1 greater than zero.

We find that languages achieving the highest F_1 scores are those primarily categorized as "rising stars", "underdogs", and "winners", as defined by Joshi et al. (Joshi et al., 2020). Rising stars possess a substantial amount of unlabeled data but face constraints due to limited labeled data. In contrast, underdogs have a comparable quantity of unlabeled data to winners, but they have relatively fewer labeled examples. Winners which represent approximately seven languages globally, benefit from abundant resources for NLP tasks.

However, it is noteworthy that some languages classified as Winners exhibit unexpectedly low performance. For example, English and French have F_1 scores of 76.92% and 56.23%, respectively. In the case of English, while all English examples in our test data are correctly labeled, numerous examples of other languages are incorrectly classified as English, including English-based creoles (Adebara et al., 2022) like Nigerian Pidgin and Cameroonian Pidgin, as well as languages like Somali, Swahili, Harari, and Kinyarwanda,
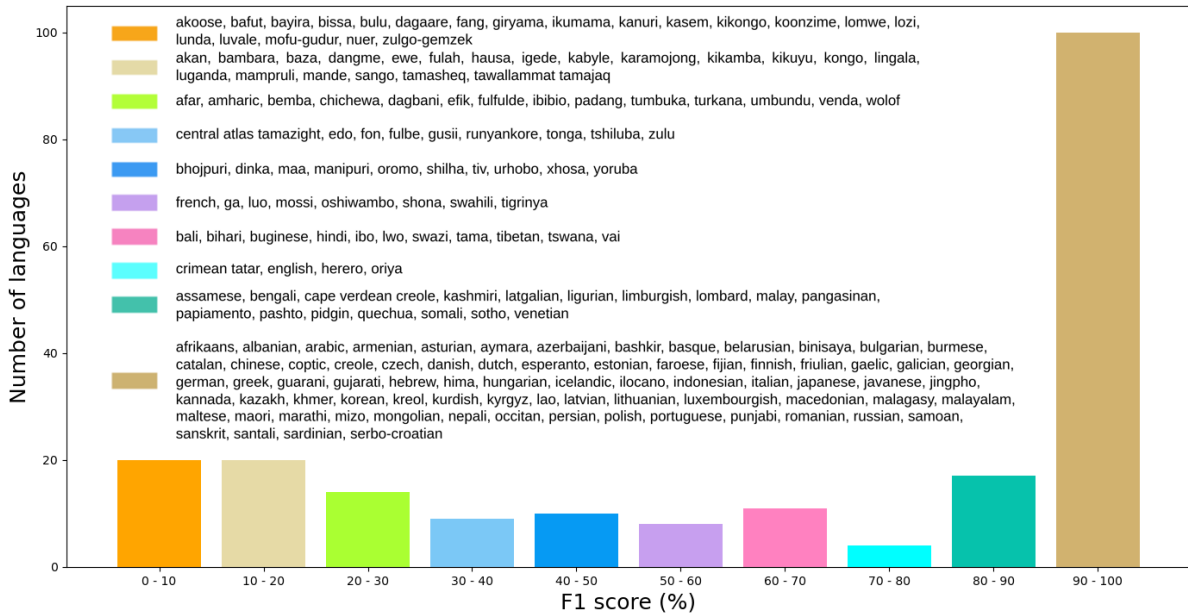
Figure 3: Languages with different ranges of F1 scores (%). 382 languages with zero F_1 score are not included in this figure but are reported in Appendix Table A.4. It shows a M-shape bimodal distribution where both extremes, zero F_1 score for 382 languages and $> 90\%$ F_1 score for 100 languages, take up most languages ($\sim$ 500 languages). This is of setting (LNP [alias-dialect-accepting], GPT-4, hard, 0-shot).

which feature some code-mixing in their data. Similarly, all French examples are correctly labeled as French, but several other languages are mistakenly classified as French. These misclassified languages are those spoken in Francophone Africa, which exhibit some degree of code-mixing with French (Amuzu and Singler, 2014).

Furthermore, we have observed that many African languages with diacritics in their orthographies are incorrectly predicted as Yoruba. For example, Gokana, Igala, Keliko, Yala, Igede, and several others are inaccurately labeled as Yoruba. Additionally, languages that share a few vocabulary items with Yoruba are also misclassified as Yoruba. Languages like Oshiwambo, Mogofin, and Rigwe fall under this category. This suggests that the models only adequately support a limited number of African languages with diacritics in their orthographies. Intriguingly, we have identified cases of very low-resource languages, falling into the categories of `left-behinds` and `scrapping-bys` achieving unexpectedly high F$_1$ scores. Languages like Gaelic, Guarani, Jingpho, and Kurdish fall into this category. It is plausible that the data used in our test set may have been included in the training data for the GPT models, resulting in these high F$_1$ scores. We make this assumption because `left-behinds` and `scrapping-bys` languages have exceptionally limited data for NLP work.

5.4 Geographical Analysis

We conduct an analysis from a geographical perspective, visualizing our model performance with a choropleth map as can be seen in Figure 1 (a large version of the same figure can be seen at Appendix Figure A.1). The map is drawn based on the results of (LNP [alias-dialect-accepting], GPT-4, hard, 0-shot) setting. We consult Ethnologue[6] to retrieve the region(s) in which each of our Babel-670 languages are primarily spoken. Certain regions remain uncolored either because there are no languages spoken in the region (e.g. Antarctica) or the languages spoken there are not covered in the Babel-670 dataset. It is important to highlight the limitation that Babel-670 does not cover all human languages and therefore the visualization can only reflect the state of languages included in our Babel-670 dataset. Notably, Africa demonstrates the lightest colors, aligning with the findings of the LCP setting discussed in section 5.2. This highlights ChatGPT's limited support for African languages, underscoring the importance of inclusion of languages with less digital resources and representation. It also indicates that ChatGPT has not reached the state of serving diverse communities.

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[6]https://www.ethnologue.com/

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Script	#	Avg F$_1$	Script	#	Avg F$_1$
Arabic	18	54.81	Hebrew	2	95.45
Armenian	1	100	Japanese	1	100
Bengali	3	69.12	Kannada	1	100
Burmese	2	100	Khmer	1	100
Coptic	1	96.77	Laoo	1	100
Cyrillic	11	98.78	Latin	581	17.64
Devanagari	8	64.34	Malayalam	1	100
Ethiopic	6	13.98	Odia	1	71.42
Georgian	1	100	Ol Chiki	1	100
Greek	1	100	Sinhala	1	100
Gujarati	1	100	Tamil	1	100
Gurmukhi	1	100	Telugu	1	96.77
Hangul	1	96.77	Thai	1	100
Hans	1	95.24	Tibetan	2	33.33
Hant	1	95.24	Vai	1	63.63

Table 4: 30 scripts and the number (#) and average F$_1$ scores (%) of languages written in each of these scripts in Babel-670.

5.5 Script-Wise Analysis

Previous research suggests that languages with unique writing systems are more easily distinguishable by language identification models (Jauhiainen et al., 2017; Adebara et al., 2022, 2023b). In our study, which spans 30 scripts, we investigate this observation further. Our analysis shows that languages utilizing distinct scripts generally achieve higher F$_1$ score, as demonstrated in Table 4. For example, scripts such as Japanese and Hangul, corresponding to Japanese and Korean languages respectively, attain perfect F$_1$ scores of 100%. Conversely, scripts shared by a larger number of languages, including Arabic, Devanagari, and Latin, are associated with lower F$_1$ scores. The Latin script, used by the most extensive array of languages in our study, notably averages an F$_1$ score of 17.64%.

Building upon this observation, we propose a hypothesis suggesting that scripts employed by fewer languages may be more easily identifiable by a language identification system, leading to higher F$_1$ scores owing to their inherent distinctiveness. Specifically, we posit a negative correlation between the number of languages utilizing a particular script and the average F$_1$ score of those languages. To validate this hypothesis, we perform correlation analysis on the 30 scripts employed by the languages in Babel-670, with the setting (LNP [alias-dialect-accepting], GPT-4, hard, 0-shot).

The correlation analysis shows a significant negative correlation across all three correlation methods: Pearson's r (-0.52), Kendall's τ (-0.54), and Spearman's rank (-0.63), all having p-value < .01. This confirms our hypothesis.

In contrast to Table A.2, some scripts in Table 4

have a smaller number of languages. This is because we exclude languages which belong to a language group having more than one script, after categorizing these by our proposed alias-dialect-accepting evaluation method (see Appendix C for details). For example, the language group Serbo-Croatian and its member languages (Serbian (*srp*), Bosnian (*bos*), Croatian (*hrv*)) are excluded because Serbian utilizes Cyrillic script while Bosnian and Croatian use Latin script. Including the F$_1$ score of Serbo-Croatian for computation of average F$_1$ for Cyrillic script is biased as the group Serbo-Croatian includes languages that use Latin script. For a similar reason, the F$_1$ of Serbo-Croatian is not included in the computation of average F$_1$ for Latin script.

To retrieve the script utilized by each language, we consult Ethnologue and the script information described in FLORES-200 webpage.[7] If it is not available in these two sources, we manually inspect the script in the data.

6 Conclusion

To investigate ChatGPT's ability to identify human languages, we curate *Babel-670*, which is a dataset that covers 670 languages spoken in five continents, belonging to 24 language families and are written in 30 different scripts. We prompt two versions of ChatGPT to produce language names and language codes, each with a different number of exemplars with and without provision of a label set. We conduct comprehensive analyses focusing on errors, geographic distribution, and script variations on the results retrieved with our proposed novel evaluation method that takes language aliases and dialects into consideration. We find that ChatGPT has an uneven ability at identifying languages. The model is able to identify one hundred languages at > 90% F$_1$ score but has entirely deficient knowledge for another 382 languages (where it achieves a zero F$_1$ score). Geographically, among the five continents, African languages have the least support by ChatGPT. The investigation demonstrates that ChatGPT is still a considerable distance away from serving wide and diverse communities adequately.

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[7]https://github.com/facebookresearch/flores/blob/main/flores200/README.md accessed on March, 2024.

Limitations

We identify the following limitaions for this work:

- **Representativeness of World Languages** Our goal is to encompass a broad spectrum of linguistic diversity by incorporating the Babel-670 collection, which represents a significant portion of global languages. Despite our efforts, it is important to acknowledge the inherent limitations of this approach, as the vast linguistic landscape of approximately 7,000 known human languages extends beyond our current scope. Therefore, the analyses covered in our work should therefore be interpreted as an illustration of the capabilities over the languages in Babel-670 dataset, rather than a comprehensive global linguistic representation. Also, ChatGPT's proficiency in language identification of one language does not necessarily translate to comparable performance in more complex downstream tasks in the same language.

- **Ethnologue Coverage.** For the alias-dialect-accepting evaluation, we curate a set of language names from Ethnologue and Python package `langcodes`. It is important to mention that there are seven codes not recognized by Ethnologue: ngo, nob, fat, ber, ajp, nno, and twi. Therefore, these seven languages have a single language name, unlike many other languages having multiple names.

- Creating the choropleth map involves utilizing data sourced from Ethnologue, which introduces several unique challenges. These challenges include:

  1. **Data Updates.** Ethnologue regularly updates its information on their website. Consequently, we cannot ensure that the data used in this work represent the most recent updates from Ethnologue as we access it at different points in time.
  2. **Divergence From Other Sources.** The information concerning languages, dialects, and their associated countries may differ from that found in other sources. This divergence may not always accurately reflect the actual linguistic landscape.
  3. **Equal Weights for All Languages.** In the process of constructing the map,

we assign equal weights to all languages spoken in a certain region, regardless of the number of speakers. For instance, languages like English and French, which have speaker populations of approximately 75% and 23%,[8] respectively, in Canada, receive the same weight. This approach can result in the map not fully reflecting the specific support that ChatGPT offers to different languages in various regions from the perspective of population.

Ethics Statement

We would like to make the following ethics-related statements about our work:

- Our research at its core aims at identifying limitations of current technologies and motivating expansion of their coverage. We perceive this objective as aligning with efforts to improve equity and diversity in AI, an important undertaking necessary for the wide populations of technology users.

- Another ethics-pertaining aspect is our datasets: The datasets we use are derived from previous research and are all collected from the public sphere. For these reasons, we do not have serious concerns about use of these for our research.

- As we do not develop models in this work, we do not have concerns related to model use.

Acknowledgements

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[8]According to https://www.canada.ca/en/canadian-heritage/services/official-languages-bilingualism/publications/statistics.html, accessed on Nov 5, 2023

[9]https://alliancecan.ca

[10]https://arc.ubc.ca/ubc-arc-sockeye

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Appendices

There are four sections in the appendix:

- Appendix A includes tables and figures that are referred in the main content.

- Appendix B covers the prompt templates for both language name prompt (LNP) and language code prompt (LCP) under different difficulty levels and number of shots. Example prompts are also given.

- Appendix C includes implementation details of proposed alias-dialect-accepting evaluation method.

- Appendix D includes a full list of languages included in Babel-670.

A   Miscellaneous

Family	#	%	Family	#	%
Afro-Asiatic	72	10.75	Koreanic	1	0.15
Austro-Asiatic	3	0.45	Kra-Dai	3	0.45
Austronesian	21	3.13	Language Isolate	1	0.15
Aymaran	1	0.15	Mongolic	1	0.15
Chibchan	1	0.15	Niger Congo	386	57.61
Creole	12	1.79	Nilo-Saharan	57	8.51
Constructed Language	1	0.15	Quechuan	1	0.15
Dravidian	4	0.60	Sino-Tibetan	9	1.34
Indo-European	74	11.04	Tucanoan	2	0.30
Japonic	1	0.15	Tupian	1	0.15
Kartvelian	1	0.15	Turkic	11	1.64
Khoe-Kwadi	3	0.45	Uralic	3	0.45

Table A.1: 24 Language families and the number (#) and proportion (%) of languages within each language family in Babel-670.

Script	#	%	Script	#	%
Arabic	23	3.43	Hebrew	2	0.30
Armenian	1	0.15	Japanese	1	0.15
Bengali	3	0.45	Kannada	1	0.15
Burmese	2	0.30	Khmer	1	0.15
Coptic	1	0.15	Laoo	1	0.15
Cyrillic	12	1.79	Latin	589	87.91
Devanagari	10	1.49	Malayalam	1	0.15
Ethiopic	6	0.9	Odia	1	0.15
Georgian	1	0.15	Ol Chiki	1	0.15
Greek	1	0.15	Sinhala	1	0.15
Gujarati	1	0.15	Tamil	1	0.15
Gurmukhi	1	0.15	Telugu	1	0.15
Hangle	1	0.15	Thai	1	0.15
Hans	1	0.15	Tibetan	2	0.30
Hant	1	0.15	Vai	1	0.15

Table A.2: 30 scripts and the number (#) and proportion (%) of languages written in each of these scripts in Babel-670.

```
messages=[
{"role": "system", "content": "You are a helpful assistant."},
{"role": "user", "content": "Who won the world series in 2020?"},
{"role": "assistant", "content": "The Los Angeles Dodgers won the World Series in 2020."},
{"role": "user", "content": "Where was it played?"}
]
```

Table A.3: The example request shown in OpenAI documentation for ChatGPT API. It is a json array with a system message, a pair of (user, assistant) messages, and a user message at last position which contains real question to ask ChatGPT. The pair of (user, assistant) messages is for demonstration learning, showing ChatGPT how the request sender wishes the conversation to be like. The documentation is accessed on July 12, 2023 at `https://platform.openai.com/docs/guides/gpt/chat-completions-api`.
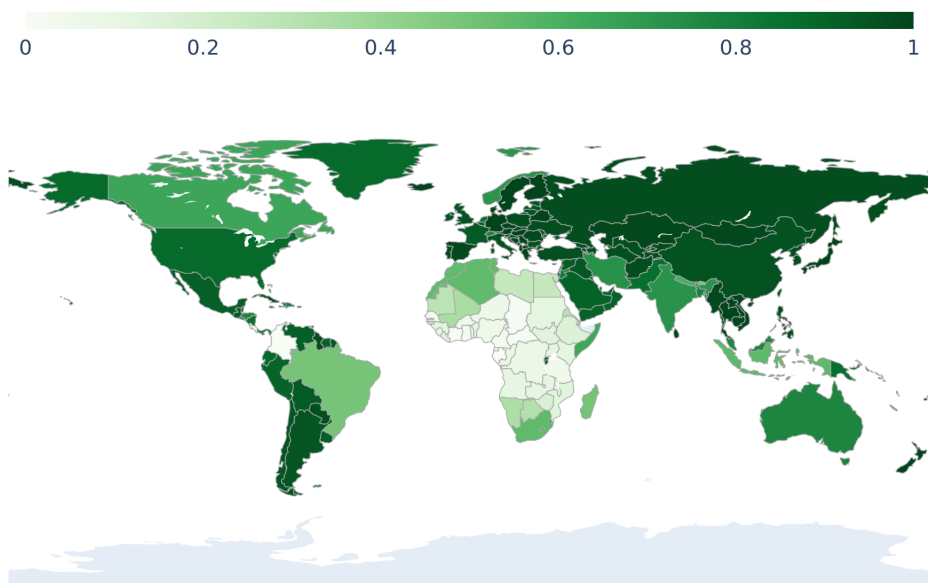
Figure A.1: A larger choropleth map where the intensity indicates the averaged F_1 score of languages spoken in each region. It can been that the support of languages has geographical discrepancy with African languages being less supported. The figure is drawn based on the results of one of our experimental setting: (Language Name Prompt [Alias-Dialect-accepting], GPT-4, hard, 0-shot)

Abua, Abukeia, Abé, Achehnese, Achikunda, Adhola, Adjukru, Afi ren'dille, Ahanta, Ajagbe, Ajibba, Akye, Akyode, Aringa ti, Asahyue, Atembuluwe, Avadhi, Azumeina, Babanki, Bacama, Bagangte, Baka, Bakong, Bamileke-ngombale, Banda, Bande, Banjar malay, Bari, Bariba, Basamia, Basari, Basketo, Bassa, Bassari, Baule, Bazande, Bebaroe, Bedjond, Bembe, Berber languages, Bete, Bindi, Birifo, Birifor, Bobo, Boko, Bom, Bowuri, Buem, Bukusu, Bura, Burungee, Cameroon, Caning, Cha mbémbe, Chakosi, Chasu, Cheke, Chibne, Chidigo, Chimbunda, Chindau, Chinsenga, Chipogolo, Chisoli, Chobba, Chrambo, Cifipa, Cikagulu, Cimwera, Ciokwe, Ciyoombe, Conhague, Coti, Dagari, Dangla, Datog, Dawrotsuwa, Dciriku, Dha anywak, Dhocolo, Didinga, Dimba, Diwala, Doowaayaayɔ, Duruma, Dzongkha, E lokop, Eastern karaboro, Echijita, Echuwabo, Eegimaa, Egbura, Egikuria, Egon, Ejagham, Ekajuk, Ekele, Ekiehe, Ekihâya, Ekikinga, Embo, Etakwane, Ethur, Ewundu, Ezzi, Fanti, Fiadidja-mahas, Fulero, Féri, Gabri-kimré, Gamotso, Gando, Gbaya, Gio, Gogo, Gokana, Gola, Goofa, Gor, Gouin, Goulmacema, Guang, Guiziga, Gulei, Gun, Gungu, Guragie, Gurenne, Guresha, Gurunsi, Gwari matai, Hanga, Harari, Heikum, Hiao, Hulo, Hun-ne, Hɔ morokodo, Ichilamba, Ici-ndali, Idoma, Igara, Ika, Ikota, Ikwerre, Ikwo, Imeetto, Ishan, Isindebele, Isoko, Iten, Iton, Ivbie north-okpela-arhe, Jalonke, Jari, Jibanci, Jo alur, Jola-karone, Jola-kasa, Jur, Kabɪyɛ tɔm, Kalaɓari bibi, Kalenjin, Kaliko, Kambari, Kamberchi, Kan, Kanoury, Karang, Kare, Kataf, Katcha-kadugli-miri, Kada, Kenyang, Kesukuma, Khana, Kibena, Kibyen, Kimeru, Kindamba, Kirike, Kisi, Kisongi, Kivunjo-chaga, Kixutu, Koma, Konde, Kono, Konosarola, Kouya, Kpa, Kpwessi, Kru, Krumen, Kuku-lumun, Kuo, Kurankokole, Kusale, Kuteb, Kutule, Kwal, Laka, Lambwa, Lega-mwenga, Liira, Likpakpaaln, Limbom, Limi, Logo, Lolobi-akpafu, Longandu, Lotuho, Loɓala, Luba kaonde, Lugbarati, Lugisu, Lugooli, Lunyole, Machambe, Madda, Madyɐgɐ, Mahum, Makalaka, Makhuwa-exirima, Makhuwwa of nampula, Malawi, Male (ethiopia), Maliko, Mambwe-lungu, Mankanha, Masa, Maslava, Matal, Mattokki, Matuumbi, Mbaï, Mboku, Mbula-bwazza, Mbundu, Mere, Migaama, Mina (cameroon), Mkaka, Mmani, Mo, Mofa, Mofu, Mogofin, Mu, Muaba, Muatiamvua, Mukulu, Mumuye, Muyang, Mwan, Mwimbi-muthambi, Mɔɔr, Məkaá, Namwanga, Nawuri, Nchimburu, Ndara, Ndebele, Ndogo, Ndút, Ndǰ mundàni, Neyo, Ngindo, Ngombe, Ngoni, Ngulu, Nguu, Ngwaw, Ngwele, Nhemba, Ninzo, Niramba, Nki, Nkoya, Nkunya, Noone, Northern grebo, Northern krahn, Norwegian bokmål, Norwegian nynorsk, Ntribu, Nuna, Nyabobɔgʊ, Nyaneka, Nyawezi, Nyiha (tanzania), Nyindi vitèé, Nyole, Nzima, Obolo, Obonya, Odual, Okpe, Olugwere, Olutsotso, Pessy, Pfokomo, Pheende, Psikye, Pökot, Rukwangari, Runyoro, Sambara, San maka, Sankaran maninka, Sara, Sara ngambai, Saraka, Saramo, Sele, Serer-noon, Sheetshwa, Sherbro, Shimalilia, Shingazija, Shironga, Shwoge, Sidaamu afoo, Sideme, Soga, Sonrhai, Soruba, Sose, South levantine arabic, Southern luba, Southern sisaala, Suba, Sungu, Supia, Sénoufo, Sẃíɲé-mbɔ́ndaa, Taar cɛŋe, Tagboussikan, Talamanca, Talinge, Tamashekin, Tampolem, Tchang, Teita, Tera, Teta, Tɐnnɐttɐ, Tim, Timmannee, Toro, Tsama, Tsivili, Tumulung, Tunen, Tungan, Tusian, Tutrugbu, Twi, Tɛgbɔ, Uta', Vidunda, Vwanji, Wanana-pirá, West-central limba, Wina, Xamir, Xilenge, Xədi, Yaka, Yala, Yambeʼtá, Yocoboué, Youré, Yum

Table A.4: Languages with zero F1 scores in (Language name prompt[alias-dialect-accepting], GPT-4, hard, 0-shot) setting. The languages are ordered in alphabetical order.

Artifect	Version	License	URL
AfroLID	2.1	Apache 2.0	https://github.com/UBC-NLP/afrolid
CLD2	0.41	Apache 2.0	https://github.com/aboSamoor/pycld2
CLD3	0.22	Apache 2.0	https://github.com/bsolomon1124/pycld3
FastText	0.9.2	MIT	https://github.com/facebookresearch/fastText
Franc	6.1.0	MIT	https://github.com/wooorm/franc
LangDetect	1.0.9	MIT	https://github.com/fedelopez77/langdetect
Langid.py	1.16	Copyright 2011 Marco Lui	https://github.com/saffsd/langid.py

Table A.5: Artifacts information. Our use of artifacts is consistent with their intended use, based on each their licenses.

B Prompt Template and Prompt Examples

This appendix contains prompt templates and examples. Table B.1 presents templates for Language Name Prompt (LNP) and Language Code Prompt (LCP). Tables B.2, B.3, and B.4 showcase actual prompt examples for LNP at easy, medium, and hard difficulty levels for LNP, respectively. Similarly, Tables B.5, B.6, and B.7 are for LCP.

Lv	Language Name Prompt (LNP) Template
easy	[{ "role": "user", "content": "I will give you k lines in ordered listing and I would like you to provide the names of the languages these lines were written in. Please assign language names from the following set {'$<c_1>$', '$<c_2>$', ... '$<c_k>$'}. Each language name may be assigned more than once. If you do not know the language name of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language names such as language codes. Here are the lines:\n\n 1. "$<S_1>$"\n\n 2. "$<S_2>$"\n\n ... $<S_k>$\n\n " }, { "role": "assistant", "content": "'$<L_1>$'\n\n 2. '$<L_2>$'\n\n ... n. '$<L_k>$'\n\n " }, { "role": "user", "content": "I will give you 10 lines in ordered listing and I would like you to provide the names of the languages these lines were written in. Please assign language names from the following set {'$<c_1>$', '$<c_2>$', ... '$<c_{10}>$'}. Each language name may be assigned more than once. If you do not know the language name of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language names such as language codes. Here are the lines:\n\n 1. "$<T_1>$"\n\n 2. "$<T_2>$"\n\n ... "$<T_{10}>$"\n\n " }]
medium	[{ "role": "user", "content": "I will give you k lines in ordered listing and I would like you to provide the names of the languages these lines were written in. Please assign language names from the following set {'$<c_1>$', '$<c_2>$', ... '$<c_{30}>$'}. Each language name may be assigned more than once. If you do not know the language name of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language names such as language codes. Here are the lines:\n\n 1. "$<S_1>$"\n\n 2. "$<S_2>$"\n\n ... $<S_k>$\n\n " }, { "role": "assistant", "content": "'$<L_1>$'\n\n 2. '$<L_2>$'\n\n ... n. '$<L_k>$'\n\n " }, { "role": "user", "content": "I will give you 10 lines in ordered listing and I would like you to provide the names of the languages these lines were written in. Please assign language names from the following set {'$<c_1>$', '$<c_2>$', ... '$<c_{30}>$'}. Each language name may be assigned more than once. If you do not know the language name of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language names such as language codes. Here are the lines:\n\n 1. "$<T_1>$"\n\n 2. "$<T_2>$"\n\n ... "$<T_{10}>$"\n\n " }]
hard	[{ "role": "user", "content": "I will give you k lines in ordered listing and I would like you to provide the names of the languages these lines were written in. If you do not know the language name of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language names such as language codes. Here are the lines:\n\n 1. "$<S_1>$"\n\n 2. "$<S_2>$"\n\n ... "$<S_k>$"\n\n " }, { "role": "assistant", "content": "1. '$<L_1>$'\n\n 2. '$<L_2>$'\n\n ... 5. '$<L_k>$'\n\n " }, { "role": "user", "content": "I will give you 10 lines in ordered listing and I would like you to provide the names of the languages these lines were written in. If you do not know the language name of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language names such as language codes. Here are the lines:\n\n 1. "$<T_1>$"\n\n 2. "$<T_2>$"\n\n ... "$<T_{10}>$"\n\n " }]

Lv	Language Code Prompt (LCP) Template
easy	[{ "role": "user", "content": "I will give you k lines in ordered listing and I would like you to provide the three-digit language codes of the languages these lines were written in. Please assign language codes from the following set {'$<c_1>$', '$<c_2>$', ... '$<c_k>$'}. Each language code may be assigned more than once. If you do not know the language code of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language codes such as language names. Here are the lines:\n\n 1. "$<S_1>$"\n\n 2. "$<S_2>$"\n\n ... $<S_k>$\n\n " }, { "role": "assistant", "content": "'$<L_1>$'\n\n 2. '$<L_2>$'\n\n ... n. '$<L_k>$'\n\n " }, { "role": "user", "content": "I will give you 10 lines in ordered listing and I would like you to provide the three-digit language codes of the languages these lines were written in. Please assign language codes from the following set {'$<c_1>$', '$<c_2>$', ... '$<c_{10}>$'}. Each language code may be assigned more than once. If you do not know the language code of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language codes such as language names. Here are the lines:\n\n 1. "$<T_1>$"\n\n 2. "$<T_2>$"\n\n ... "$<T_{10}>$"\n\n " }]
medium	[{ "role": "user", "content": "I will give you k lines in ordered listing and I would like you to provide the three-digit language codes of the languages these lines were written in. Please assign language codes from the following set {'$<c_1>$', '$<c_2>$', ... '$<c_{30}>$'}. Each language code may be assigned more than once. If you do not know the language code of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language codes such as language names. Here are the lines:\n\n 1. "$<S_1>$"\n\n 2. "$<S_2>$"\n\n ... $<S_k>$\n\n " }, { "role": "assistant", "content": "'$<L_1>$'\n\n 2. '$<L_2>$'\n\n ... n. '$<L_k>$'\n\n " }, { "role": "user", "content": "I will give you 10 lines in ordered listing and I would like you to provide the three-digit language codes of the languages these lines were written in. Please assign language codes from the following set {'$<c_1>$', '$<c_2>$', ... '$<c_{30}>$'}. Each language code may be assigned more than once. If you do not know the language code of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language codes such as language names. Here are the lines:\n\n 1. "$<T_1>$"\n\n 2. "$<T_2>$"\n\n ... "$<T_{10}>$"\n\n " }]
hard	[{ "role": "user", "content": "I will give you k lines in ordered listing and I would like you to provide the three-digit language codes of the languages these lines were written in. If you do not know the language code of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language codes such as language names. Here are the lines:\n\n 1. "$<S_1>$"\n\n 2. "$<S_2>$"\n\n ... "$<S_k>$"\n\n " }, { "role": "assistant", "content": "1. '$<L_1>$'\n\n 2. '$<L_2>$'\n\n ... 5. '$<L_k>$'\n\n " }, { "role": "user", "content": "I will give you 10 lines in ordered listing and I would like you to provide the three-digit language codes of the languages these lines were written in. If you do not know the language code of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language codes such as language names. Here are the lines:\n\n 1. "$<T_1>$"\n\n 2. "$<T_2>$"\n\n ... "$<T_{10}>$"\n\n " }]

Table B.1: Language name prompt (LNP) and language code prompt (LCP) templates of k-shot for three difficulty levels (Lv). $<S_i>$, $<c_i>$, $<L_i>$, $<T_i>$ are placeholders for i^{th} shot, i^{th} class label, i^{th} ground truth label for the ith shot, and i^{th} test example, respectively. $<c_i>$ and $<L_i>$ are both language names for LNP templates and both language codes for LCP templates. The text in blue is for demonstration learning which shows ChatGPT the format and the content of our question and the expected response. The blue text will not be present for zero-shot setting. The system message is "You are a system which performs language identification." for all settings.

Shot	Language Name Prompt (LNP) Examples
0	[{'role': 'user', 'content': 'I will give you 10 lines in ordered listing and I would like you to provide the names of the languages these lines were written in. Please assign language names from the following set {'Adhola', 'Adioukrou', 'Anuak', 'Gun', 'Krio', 'Psikye', 'Ngoni', 'Tahaggart Tamahaq', 'Vietnamese', 'Yambeta'}. Each language name may be assigned more than once. If you do not know the language name of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language names such as language codes. Here are the lines:\n\n1. "" 28kere omako nge swa munyo owinjo wac me ."\n\n2. "13kasefə ghena ta ka m ŋkwa ta nci , shala nde geze nda ghena ke h we ."\n\n3. "Nhà nước thành phố là tiền thân của các quốc gia. Văn hóa của nền văn minh ẩn chứa việc truyền thụ kiến thức qua nhiều thế hệ, một dấu ấn văn hóa còn sót lại và phổ biến tốt."\n\n4. "23táán s , p̃ľ̃ ná sédúk yésus kilí tus páboy̌ k n pəŋi pomóŋŋí pə́ə́s piim kiwiiyi aá !"\n\n5. "aw wi go yuz di baybul f ch k if wi j s bisin b t wis f n m ?"\n\n6. "28as yessenta awén , ebdedet , eṭkelet i efawen nwn édét el elas nwn yoheẓ ."\n\n7. "" nambu vakajovesana vene kwa vene , " tikajova , ‘ wahumili kunani kwa chapanga ?"\n\n8. "36ow am ibrm eke k nyn rm susu yec tŋ ke ´tur kokr yec a eke nyam am erur a , ke ´ŋan yec a eke l war l w es a ."\n\n9. "14 : 8) e noṭena obiọ míton hlan jiwheyẹwhe nado tindo ayihadawhẹnamẹnu dagbe de ."\n\n10. "31ni ö malkiya , ŋat mo ena røk rëëmme mo warkie , ni dwøk dëër kiir kare kanya ŋuut dhi cer mec[ul]lammi yie , këël mana këët ri øt jø wø tïïö yi øt jwøk , ni këël gø ri øt jø gath na en buut dhi kiir m"\n\n']
1	[{'role': 'user', 'content': 'I will give you 1 lines in ordered listing and I would like you to provide the names of the languages these lines were written in. Please assign language names from the following set {'Western Niger Fulfulde'}. Each language name may be assigned more than once. If you do not know the language name of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language names such as language codes. Here are the lines:\n\n1. "16aan debbo goon in o , a anndaa yalla a waawi hisinde gora ."\n\n'}, {'role': 'assistant', 'content': '1. 'Western Niger Fulfulde'\n\n'}, {'role': 'user', 'content': 'I will give you 10 lines in ordered listing and I would like you to provide the names of the languages these lines were written in. Please assign language names from the following set {'Adhola', 'Adioukrou', 'Anuak', 'Gun', 'Krio', 'Psikye', 'Ngoni', 'Tahaggart Tamahaq', 'Vietnamese', 'Yambeta'}. Each language name may be assigned more than once. If you do not know the language name of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language names such as language codes. Here are the lines:\n\n1. "" 28kere omako nge swa munyo owinjo wac me ."\n\n2. "13kasefə ghena ta ka m ŋkwa ta nci , shala nde geze nda ghena ke h we ."\n\n3. "Nhà nước thành phố là tiền thân của các quốc gia. Văn hóa của nền văn minh ẩn chứa việc truyền thụ kiến thức qua nhiều thế hệ, một dấu ấn văn hóa còn sót lại và phổ biến tốt."\n\n4. "23táán s , p̃ľ̃ ná sédúk yésus kilí tus páboy̌ k n pəŋi pomóŋŋí pə́ə́s piim kiwiiyi aá !"\n\n5. "aw wi go yuz di baybul f ch k if wi j s bisin b t wis f n m ?"\n\n6. "28as yessenta awén , ebdedet , eṭkelet i efawen nwn édét el elas nwn yoheẓ ."\n\n7. "" nambu vakajovesana vene kwa vene , " tikajova , ‘ wahumili kunani kwa chapanga ?"\n\n8. "36ow am ibrm eke k nyn rm susu yec tŋ ke ´tur kokr yec a eke nyam am erur a , ke ´ŋan yec a eke l war l w es a ."\n\n9. "14 : 8) e noṭena obiọ míton hlan jiwheyẹwhe nado tindo ayihadawhẹnamẹnu dagbe de ."\n\n10. "31ni ö malkiya , ŋat mo ena røk rëëmme mo warkie , ni dwøk dëër kiir kare kanya ŋuut dhi cer mec[ul]lammi yie , këël mana këët ri øt jø wø tïïö yi øt jwøk , ni këël gø ri øt jø gath na en buut dhi kiir m"\n\n']
5	[{'role': 'user', 'content': 'I will give you 5 lines in ordered listing and I would like you to provide the names of the languages these lines were written in. Please assign language names from the following set {'Anufo', 'Wamey', 'Kuria', 'Lamba', 'Yaouré'}. Each language name may be assigned more than once. If you do not know the language name of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language names such as language codes. Here are the lines:\n\n1. "* ukupusanako ne balembeshi aba lyashi lya kale , abatabalabilapo pali fyefyo aba mu mukoka wabo babacimfishe , abalembeshi ba baibolo balilabile ifya cine , balilembele ifi babifishe abene ne fyabifi"\n\n2. "" 10nkaaga haruni aarë gusumaacha na umuiraniö gua abhaisiraeri , bhonsui bhagatachëërra guiköngö , bhagatökëra bharamaaha ubhuhiku bhö ömönene kömasaaro ."\n\n3. "e - wee ' w ' wlid fui ' nan o yi – t ra ' e da - le ' w an ."\n\n4. "i fite abiya d ny m sa yoo wa d ŋgu yo f m as s n nu w ."\n\n5. "8fop njiniho sisikulu nowe hna : wule ye wufacah w̃a , gë wule wok wafacëna w̃a , gë wusëry w̃a do gë fop vihaw̃ary vile yasë nkal li , 9wuhi wuhi , ican g'icëval ; gante ntehnëkawo w̃ën nowe nti ka "\n\n'}, {'role': 'assistant', 'content': '1. 'Lamba'\n\n2. 'Kuria'\n\n3. 'Yaouré'\n\n4. 'Anufo'\n\n5. 'Wamey'\n\n'}, {'role': 'user', 'content': 'I will give you 10 lines in ordered listing and I would like you to provide the names of the languages these lines were written in. Please assign language names from the following set {'Adhola', 'Adioukrou', 'Anuak', 'Gun', 'Krio', 'Psikye', 'Ngoni', 'Tahaggart Tamahaq', 'Vietnamese', 'Yambeta'}. Each language name may be assigned more than once. If you do not know the language name of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language names such as language codes. Here are the lines:\n\n1. "" 28kere omako nge swa munyo owinjo wac me ."\n\n2. "13kasefə ghena ta ka m ŋkwa ta nci , shala nde geze nda ghena ke h we ."\n\n3. "Nhà nước thành phố là tiền thân của các quốc gia. Văn hóa của nền văn minh ẩn chứa việc truyền thụ kiến thức qua nhiều thế hệ, một dấu ấn văn hóa còn sót lại và phổ biến tốt."\n\n4. "23táán s , p̃ľ̃ ná sédúk yésus kilí tus páboy̌ k n pəŋi pomóŋŋí pə́ə́s piim kiwiiyi aá !"\n\n5. "aw wi go yuz di baybul f ch k if wi j s bisin b t wis f n m ?"\n\n6. "28as yessenta awén , ebdedet , eṭkelet i efawen nwn édét el elas nwn yoheẓ ."\n\n7. "" nambu vakajovesana vene kwa vene , " tikajova , ‘ wahumili kunani kwa chapanga ?"\n\n8. "36ow am ibrm eke k nyn rm susu yec tŋ ke ´tur kokr yec a eke nyam am erur a , ke ´ŋan yec a eke l war l w es a ."\n\n9. "14 : 8) e noṭena obiọ míton hlan jiwheyẹwhe nado tindo ayihadawhẹnamẹnu dagbe de ."\n\n10. "31ni ö malkiya , ŋat mo ena røk rëëmme mo warkie , ni dwøk dëër kiir kare kanya ŋuut dhi cer mec[ul]lammi yie , këël mana këët ri øt jø wø tïïö yi øt jwøk , ni këël gø ri øt jø gath na en buut dhi kiir m"\n\n']

Table B.2: Request Examples of language name prompt (LNP) under three different numbers of shot at easy level where a label set of size equal to the number of unique language names of the test examples (i.e. ~ 10) is provided to ChatGPT. The text in blue is for demonstration learning which shows ChatGPT the format and the content of our question and the expected response. We try to avoid harmful content by using Google Translate to translate its supported languages to English to inspect. However, not all languages included in a batch are supported by Google Translate. Therefore, the example may unintentionally include harmful content.

Shot	Language Name Prompt (LNP) Examples
0	[{'role': 'user', 'content': 'I will give you 10 lines in ordered listing and I would like you to provide the names of the languages these lines were written in. Please assign language names from the following set {'Adhola', 'Adioukrou', 'Siwu', 'Anuak', 'Bacama', 'Tibetan', 'Bulu', 'Zemba', 'Dan', 'Gun', 'Jita', 'Kabyle', 'Krio', 'Psikye', 'Otuho', 'Latgalian', 'Murle', 'Ndogo', 'Ngoni', 'Sanskrit', 'Nyarafolo Senoufo', 'Swahili', 'Tajik', 'Tahaggart Tamahaq', 'Umbundu', 'Vietnamese', 'Xamtanga', 'Hdi', 'Yambeta', 'Yoruba'}. Each language name may be assigned more than once. If you do not know the language name of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language names such as language codes. Here are the lines:\n\n1. "" 28kere omako nge swa munyo owinjo wac me ."\n\n2. "13kasefə ghena ta ka m ŋkwa ta nci , shala nde geze nda ghena ke h we ."\n\n3. "Nhà nước thành phố là tiền thân của các quốc gia. Văn hóa của nền văn minh ẩn chứa việc truyền thụ kiến thức qua nhiều thế hệ, một dấu ấn văn hóa còn sót lại và phổ biến tốt."\n\n4. "23táán s , p̓ľ ná sə́dúk yə́sus kilí tus páboy̓ k n pəŋi pomóŋŋí pə́ə́s piim kiwiiyi aá !"\n\n5. "aw wi go yuz di baybul f ch k if wi j s bisin b t wis f n m ?"\n\n6. "28as yessenta awén , ebdedet , eṭkelet i efawen nwn édét el elas nwn yoheẓ ."\n\n7. "" nambu vakajovesana vene kwa vene , " tikajova , ' wahumili kunani kwa chapanga ?"\n\n8. "36ow am ibrm eke k nyn rm susu yec tŋ ke ´tur kokr yec a eke nyam am erur a , ke ´ŋan yec a eke l war l w es a ."\n\n9. "14 : 8) e noṭena obiọ míṭon hlan jiwheyẹwhe nado tindo ayihadawhẹnamẹnu dagbe de ."\n\n10. "31ni ö malkiya , ŋat mo ena rǿk rëëmme mo warkie , ni dwǿk dëër kiir kare kanya ŋuut dhi cer meculammi yie , këël mana këët ri ǿt jǿ wǿ tïïö yi ǿt jwǿk , ni këël gǿ ri ǿt jǿ gath na en buut dhi kiir m"\n\n']
1	[{'role': 'user', 'content': 'I will give you 1 lines in ordered listing and I would like you to provide the names of the languages these lines were written in. Please assign language names from the following set {'South Levantine Arabic', 'Najdi Arabic', 'Baoulé', 'Burunge', 'Beembe', 'Bedjond', 'Bokyi', 'Ntcham', 'Southern Dagaare', 'Northeastern Dinka', 'Western Niger Fulfulde', 'Javanese', 'Jita', 'Limbum', 'Lobala', 'Mwan', 'Majang', 'North Ndebele', 'Nkoya', 'Romanian', 'Sangu', 'Nyarafolo Senoufo', 'Serbian', 'Swahili (individual language)', 'Tafi', 'Tiv', 'Turkish', 'Waray', 'Vwanji', 'Kuo'}. Each language name may be assigned more than once. If you do not know the language name of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language names such as language codes. Here are the lines:\n\n1. "16aan debbo goon in o , a anndaa yalla a a waawi hisinde gora ."\n\n'}, {'role': 'assistant', 'content': '1. 'Western Niger Fulfulde\n\n'}, {'role': 'user', 'content': 'I will give you 10 lines in ordered listing and I would like you to provide the names of the languages these lines were written in. Please assign language names from the following set {'Adhola', 'Adioukrou', 'Siwu', 'Anuak', 'Bacama', 'Tibetan', 'Bulu', 'Zemba', 'Dan', 'Gun', 'Jita', 'Kabyle', 'Krio', 'Psikye', 'Otuho', 'Latgalian', 'Murle', 'Ndogo', 'Ngoni', 'Sanskrit', 'Nyarafolo Senoufo', 'Swahili', 'Tajik', 'Tahaggart Tamahaq', 'Umbundu', 'Vietnamese', 'Xamtanga', 'Hdi', 'Yambeta', 'Yoruba'}. Each language name may be assigned more than once. If you do not know the language name of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language names such as language codes. Here are the lines:\n\n1. "" 28kere omako nge swa munyo owinjo wac me ."\n\n2. "13kasefə ghena ta ka m ŋkwa ta nci , shala nde geze nda ghena ke h we ."\n\n3. "Nhà nước thành phố là tiền thân của các quốc gia. Văn hóa của nền văn minh ẩn chứa việc truyền thụ kiến thức qua nhiều thế hệ, một dấu ấn văn hóa còn sót lại và phổ biến tốt."\n\n4. "23táán s , p̓ľ ná sə́dúk yə́sus kilí tus páboy̓ k n pəŋi pomóŋŋí pə́ə́s piim kiwiiyi aá !"\n\n5. "aw wi go yuz di baybul f ch k if wi j s bisin b t wis f n m ?"\n\n6. "28as yessenta awén , ebdedet , eṭkelet i efawen nwn édét el elas nwn yoheẓ ."\n\n7. "" nambu vakajovesana vene kwa vene , " tikajova , ' wahumili kunani kwa chapanga ?"\n\n8. "36ow am ibrm eke k nyn rm susu yec tŋ ke ´tur kokr yec a eke nyam am erur a , ke ´ŋan yec a eke l war l w es a ."\n\n9. "14 : 8) e noṭena obiọ míṭon hlan jiwheyẹwhe nado tindo ayihadawhẹnamẹnu dagbe de ."\n\n10. "31ni ö malkiya , ŋat mo ena rǿk rëëmme mo warkie , ni dwǿk dëër kiir kare kanya ŋuut dhi cer meculammi yie , këël mana këët ri ǿt jǿ wǿ tïïö yi ǿt jwǿk , ni këël gǿ ri ǿt jǿ gath na en buut dhi kiir m"\n\n']
5	[{'role': 'user', 'content': 'I will give you 5 lines in ordered listing and I would like you to provide the names of the languages these lines were written in. Please assign language names from the following set {'South Levantine Arabic', 'Najdi Arabic', 'Baoulé', 'Burunge', 'Bedjond', 'Bokyi', 'Ntcham', 'Anufo', 'Wamey', 'Northern Dagara', 'Southeastern Dinka', 'Ngomba', 'Machame', 'Kuria', 'Lamba', 'Loma (Liberia)', 'Laro', 'Māori', 'Ndonga', 'Russian', 'Sicilian', 'Tachelhit', 'Sundanese', 'Timne', 'Tetela', 'Twi', 'Cameroon Pidgin', 'Southern Toussian', 'Yao', 'Yaouré'}. Each language name may be assigned more than once. If you do not know the language name of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language names such as language codes. Here are the lines:\n\n1. "* ukupusanako ne balembeshi aba lyashi lya kale , abatabalabilapo pali fyefyo aba mu mukoka wabo babacimfishe , abalembeshi ba baibolo balilabile ifya cine , balilembele ifi babifishe abene ne fyabifi"\n\n2. "" 10nkaaga haruni aarë gusumaacha na umuiraniö gua abhaisiraeri , bhonsui bhagatachëërra guiköngö , bhagatökëra bharamaaha ubhuhiku bhö ömönene kömasaaro ."\n\n3. "e - wee ' w ' wlid fui ' nan o yi - t ra ' e da - le ' w an ."\n\n4. "i fite abiya d ny m sa yoo wa d ŋgu yo f m as s n nu w ."\n\n5. "8fop njiniho sisikulu nowe hna : wule ye wufacah w̃a , gë wule wok wafacëna w̃a , gë wusëry w̃a do gë fop vihaw̃ary vile yasë nkal li , 9wuhi wuhi , ican g'icëval ; gante ntehnëkawo w̃ën nowe nti ka "\n\n'}, {'role': 'assistant', 'content': '1. 'Lamba'\n\n2. 'Kuria'\n\n3. 'Yaouré'\n\n4. 'Anufo'\n\n5. 'Wamey'\n\n'}, {'role': 'user', 'content': 'I will give you 10 lines in ordered listing and I would like you to provide the names of the languages these lines were written in. Please assign language names from the following set {'Adhola', 'Adioukrou', 'Siwu', 'Anuak', 'Bacama', 'Tibetan', 'Bulu', 'Zemba', 'Dan', 'Gun', 'Jita', 'Kabyle', 'Krio', 'Psikye', 'Otuho', 'Latgalian', 'Murle', 'Ndogo', 'Ngoni', 'Sanskrit', 'Nyarafolo Senoufo', 'Swahili', 'Tajik', 'Tahaggart Tamahaq', 'Umbundu', 'Vietnamese', 'Xamtanga', 'Hdi', 'Yambeta', 'Yoruba'}. Each language name may be assigned more than once. If you do not know the language name of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language names such as language codes. Here are the lines:\n\n1. "" 28kere omako nge swa munyo owinjo wac me ."\n\n2. "13kasefə ghena ta ka m ŋkwa ta nci , shala nde geze nda ghena ke h we ."\n\n3. "Nhà nước thành phố là tiền thân của các quốc gia. Văn hóa của nền văn minh ẩn chứa việc truyền thụ kiến thức qua nhiều thế hệ, một dấu ấn văn hóa còn sót lại và phổ biến tốt."\n\n4. "23táán s , p̓ľ ná sə́dúk yə́sus kilí tus páboy̓ k n pəŋi pomóŋŋí pə́ə́s piim kiwiiyi aá !"\n\n5. "aw wi go yuz di baybul f ch k if wi j s bisin b t wis f n m ?"\n\n6. "28as yessenta awén , ebdedet , eṭkelet i efawen nwn édét el elas nwn yoheẓ ."\n\n7. "" nambu vakajovesana vene kwa vene , " tikajova , ' wahumili kunani kwa chapanga ?"\n\n8. "36ow am ibrm eke k nyn rm susu yec tŋ ke ´tur kokr yec a eke nyam am erur a , ke ´ŋan yec a eke l war l w es a ."\n\n9. "14 : 8) e noṭena obiọ míṭon hlan jiwheyẹwhe nado tindo ayihadawhẹnamẹnu dagbe de ."\n\n10. "31ni ö malkiya , ŋat mo ena rǿk rëëmme mo warkie , ni dwǿk dëër kiir kare kanya ŋuut dhi cer meculammi yie , këël mana këët ri ǿt jǿ wǿ tïïö yi ǿt jwǿk , ni këël gǿ ri ǿt jǿ gath na en buut dhi kiir m"\n\n']

Table B.3: Request Examples of language name prompt (LNP) under three different numbers of shot at medium level where a label set of size 30 is provided to ChatGPT. The text in blue is for demonstration learning which shows ChatGPT the format and the content of our question and the expected response. We try to avoid harmful content by using Google Translate to translate its supported languages to English to inspect. However, not all languages included in a batch are supported by Google Translate. Therefore, the example may unintentionally include harmful content.

Shot	Language Name Prompt (LNP) Examples
0	[{'role': 'user', 'content': 'I will give you 10 lines in ordered listing and I would like you to provide the names of the languages these lines were written in. If you do not know the language name of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language names such as language codes. Here are the lines:\n\n1. "" 28kere omako nge swa munyo owinjo wac me ."\n\n2. "13kasefə ghena ta ka m ŋkwa ta nci , shala nde geze nda ghena ke h we ."\n\n3. "Nhà nước thành phố là tiền thân của các quốc gia. Văn hóa của nền văn minh ẩn chứa việc truyền thụ kiến thức qua nhiều thế hệ, một dấu ấn văn hóa còn sót lại và phổ biến tốt."\n\n4. "23táán s , p̓ǐ ná sédúk yésus kilí tus páboy̓ k n pəŋi pomóŋ̓ŋí pə́ə́s piim kiwiiyi aá !"\n\n5. "aw wi go yuz di baybul f ch k if wi j s bisin b t wis f n m ?"\n\n6. "28as yessenta awén , ebdedet , ẹṭkelet i efawen nwn édét el elas nwn yoheẓ ."\n\n7. "" nambu vakajovesana vene kwa vene , " tikajova , ' wahumili kunani kwa chapanga ?"\n\n8. "36ow am ibrm eke k nyn rm susu yec tŋ ke ́tur kokr yec a eke nyam am erur a , ke ́ŋan yec a eke l war l w es a ."\n\n9. "14 : 8) e nọtena obiọ mítọn hlan jiwheyẹwhe nado tindo ayihadawhẹnamẹnu dagbe de ."\n\n10. "31ni ö malkiya , ŋat mo ena rɔ́k rëëmme mo warkie , ni dwɔ́k dëër kiir kare kanya ŋuut dhi cer meculammi yie , këël mana këët ri ɸt jɸ wɸ tïïö yi ɸt jwɸk , ni këël gɸ ri ɸt jɸ gath na en buut dhi kiir m"\n\n']
1	[{'role': 'user', 'content': 'I will give you 1 lines in ordered listing and I would like you to provide the names of the languages these lines were written in. If you do not know the language name of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language names such as language codes. Here are the lines:\n\n1. "16aan debbo goon in o , a anndaa yalla a a waawi hisinde gora ."\n\n'}, {'role': 'assistant', 'content': '1. 'Western Niger Fulfulde'\n\n'}, {'role': 'user', 'content': 'I will give you 10 lines in ordered listing and I would like you to provide the names of the languages these lines were written in. If you do not know the language name of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language names such as language codes. Here are the lines:\n\n1. "" 28kere omako nge swa munyo owinjo wac me ."\n\n2. "13kasefə ghena ta ka m ŋkwa ta nci , shala nde geze nda ghena ke h we ."\n\n3. "Nhà nước thành phố là tiền thân của các quốc gia. Văn hóa của nền văn minh ẩn chứa việc truyền thụ kiến thức qua nhiều thế hệ, một dấu ấn văn hóa còn sót lại và phổ biến tốt."\n\n4. "23táán s , p̓ǐ ná sédúk yésus kilí tus páboy̓ k n pəŋi pomóŋ̓ŋí pə́ə́s piim kiwiiyi aá !"\n\n5. "aw wi go yuz di baybul f ch k if wi j s bisin b t wis f n m ?"\n\n6. "28as yessenta awén , ebdedet , ẹṭkelet i efawen nwn édét el elas nwn yoheẓ ."\n\n7. "" nambu vakajovesana vene kwa vene , " tikajova , ' wahumili kunani kwa chapanga ?"\n\n8. "36ow am ibrm eke k nyn rm susu yec tŋ ke ́tur kokr yec a eke l war l w es a ."\n\n9. "14 : 8) e nọtena obiọ mítọn hlan jiwheyẹwhe nado tindo ayihadawhẹnamẹnu dagbe de ."\n\n10. "31ni ö malkiya , ŋat mo ena rɔ́k rëëmme mo warkie , ni dwɔ́k dëër kiir kare kanya ŋuut dhi cer meculammi yie , këël mana këët ri ɸt jɸ wɸ tïïö yi ɸt jwɸk , ni këël gɸ ri ɸt jɸ gath na en buut dhi kiir m"\n\n']
5	[{'role': 'user', 'content': 'I will give you 5 lines in ordered listing and I would like you to provide the names of the languages these lines were written in. If you do not know the language name of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language names such as language codes. Here are the lines:\n\n1. "* ukupusanako ne balembeshi aba lyashi lya kale , abatabalabilapo pali fyefyo aba mu mukoka wabo babacimfeya , abalembeshi ba baibolo balilabile ifya cine , balilembele ifi babifishe abene ne fyabifi"\n\n2. "" 10nkaaga haruni aarë gusumaacha na umuiraniö gua abhaisiraeri , bhonsui bhagatachëërra guiköngö , bhagatökëra bharamaaha ubhuhiku bhö ömönene kömasaaro ."\n\n3. "e - wee ' w ' wlid fui ' nan o yi - t ra ' e da - le ' w an ."\n\n4. "i fite abiya d ny m sa yoo wa d ŋgu yo f m as s n nu w ."\n\n5. "8fop njiniho sisikulu nowe hna : wule ye wufacah w̃a , gë wule wok wafacëna w̃a , gë wusëry w̃a do gë fop vihaw̃ary vile yasë nkal li , 9wuhi wuhi , ican g'icëval ; gante ntehnëkawo w̃ën nowe nti ka "\n\n'}, {'role': 'assistant', 'content': '1. 'Lamba'\n\n2. 'Kuria'\n\n3. 'Yaouré'\n\n4. 'Anufo'\n\n5. 'Wamey'\n\n'}, {'role': 'user', 'content': 'I will give you 10 lines in ordered listing and I would like you to provide the names of the languages these lines were written in. If you do not know the language name of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language names such as language codes. Here are the lines:\n\n1. "" 28kere omako nge swa munyo owinjo wac me ."\n\n2. "13kasefə ghena ta ka m ŋkwa ta nci , shala nde geze nda ghena ke h we ."\n\n3. "Nhà nước thành phố là tiền thân của các quốc gia. Văn hóa của nền văn minh ẩn chứa việc truyền thụ kiến thức qua nhiều thế hệ, một dấu ấn văn hóa còn sót lại và phổ biến tốt."\n\n4. "23táán s , p̓ǐ ná sédúk yésus kilí tus páboy̓ k n pəŋi pomóŋ̓ŋí pə́ə́s piim kiwiiyi aá !"\n\n5. "aw wi go yuz di baybul f ch k if wi j s bisin b t wis f n m ?"\n\n6. "28as yessenta awén , ebdedet , ẹṭkelet i efawen nwn édét el elas nwn yoheẓ ."\n\n7. "" nambu vakajovesana vene kwa vene , " tikajova , ' wahumili kunani kwa chapanga ?"\n\n8. "36ow am ibrm eke k nyn rm susu yec tŋ ke ́tur kokr yec a eke nyam am erur a , ke ́ŋan yec a eke l war l w es a ."\n\n9. "14 : 8) e nọtena obiọ mítọn hlan jiwheyẹwhe nado tindo ayihadawhẹnamẹnu dagbe de ."\n\n10. "31ni ö malkiya , ŋat mo ena rɔ́k rëëmme mo warkie , ni dwɔ́k dëër kiir kare kanya ŋuut dhi cer meculammi yie , këël mana këët ri ɸt jɸ wɸ tïïö yi ɸt jwɸk , ni këël gɸ ri ɸt jɸ gath na en buut dhi kiir m"\n\n']

Table B.4: Request Examples of language name prompt (LNP) under three different numbers of shot at hard level where no label set is provided to ChatGPT. The text in blue is for demonstration learning which shows ChatGPT the format and the content of our question and the expected response. We try to avoid harmful content by using Google Translate to translate its supported languages to English to inspect. However, not all languages included in a batch are supported by Google Translate. Therefore, the example may unintentionally include harmful content.

Shot	Language Code Prompt (LCP) Examples
0	[{'role': 'user', 'content': 'I will give you 10 lines in ordered listing and I would like you to provide the three-digit language codes of the languages these lines were written in. Please assign language codes from the following set {'adh', 'adj', 'anu', 'guw', 'kri', 'kvj', 'ngo', 'thv', 'vie', 'yat'}. Each language code may be assigned more than once. If you do not know the language code of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language codes such as language names. Here are the lines:\n\n1. "" 28kere omako nge swa munyo owinjo wac me ."\n\n2. "13kasefə ghena ta ka m ŋkwa ta nci , shala nde geze nda ghena ke h we ."\n\n3. "Nhà nước thành phố là tiền thân của các quốc gia. Văn hóa của nền văn minh ẩn chứa việc truyền thụ kiến thức qua nhiều thế hệ, một dấu ấn văn hóa còn sót lại và phổ biến tốt."\n\n4. "23táán s , p͈ĺ ná sédúk yésus kilí tus páboy͈ k n pəŋi pomóŋŋí pə́ə́s piim kiwiiyi aá !"\n\n5. "aw wi go yuz di baybul f ch k if wi j s bisin b t wis f n m ?"\n\n6. "28as yessenta awén , ebdedet , eṭkelet i efawen nwn édét el elas nwn yoheẓ ."\n\n7. "" nambu vakajovesana vene kwa vene , " tikajova , ' wahumili kunani kwa chapanga ?"\n\n8. "36ow am ibrm eke k nyn rm susu yec tŋ ke ´tur kokr yec a eke nyam am erur a , ke ´ŋan yec a eke l war l w es a ."\n\n9. "14 : 8) e nǫtena obiǫ mítǫn hlan jiwheyęwhe nado tindo ayihadawhẹnamęnu dagbe de ."\n\n10. "31ni ö malkiya , ŋat mo ena rǿk rëëmme mo warkie , ni dwǿk dëër kiir kare kanya ŋuut dhi cer meculammi yie , këël mana këët ri ǿt jǿ wǿ tïïö yi ǿt jwǿk , ni këël gǿ ri ǿt jǿ gath na en buut dhi kiir m"\n\n']
1	[{'role': 'user', 'content': 'I will give you 1 lines in ordered listing and I would like you to provide the three-digit language codes of the languages these lines were written in. Please assign language codes from the following set {'fuh'}. Each language code may be assigned more than once. If you do not know the language code of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language codes such as language names. Here are the lines:\n\n1. "16aan debbo goon in o , a anndaa yalla a a waawi hisinde gora ."\n\n'}, {'role': 'assistant', 'content': "1. 'fuh'\n\n"}, {'role': 'user', 'content': 'I will give you 10 lines in ordered listing and I would like you to provide the three-digit language codes of the languages these lines were written in. Please assign language codes from the following set {'adh', 'adj', 'anu', 'guw', 'kri', 'kvj', 'ngo', 'thv', 'vie', 'yat'}. Each language code may be assigned more than once. If you do not know the language code of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language codes such as language names. Here are the lines:\n\n1. "" 28kere omako nge swa munyo owinjo wac me ."\n\n2. "13kasefə ghena ta ka m ŋkwa ta nci , shala nde geze nda ghena ke h we ."\n\n3. "Nhà nước thành phố là tiền thân của các quốc gia. Văn hóa của nền văn minh ẩn chứa việc truyền thụ kiến thức qua nhiều thế hệ, một dấu ấn văn hóa còn sót lại và phổ biến tốt."\n\n4. "23táán s , p͈ĺ ná sédúk yésus kilí tus páboy͈ k n pəŋi pomóŋŋí pə́ə́s piim kiwiiyi aá !"\n\n5. "aw wi go yuz di baybul f ch k if wi j s bisin b t wis f n m ?"\n\n6. "28as yessenta awén , ebdedet , eṭkelet i efawen nwn édét el elas nwn yoheẓ ."\n\n7. "" nambu vakajovesana vene kwa vene , " tikajova , ' wahumili kunani kwa chapanga ?"\n\n8. "36ow am ibrm eke k nyn rm susu yec tŋ ke ´tur kokr yec a eke nyam am erur a , ke ´ŋan yec a eke l war l w es a ."\n\n9. "14 : 8) e nǫtena obiǫ mítǫn hlan jiwheyęwhe nado tindo ayihadawhẹnamęnu dagbe de ."\n\n10. "31ni ö malkiya , ŋat mo ena rǿk rëëmme mo warkie , ni dwǿk dëër kiir kare kanya ŋuut dhi cer meculammi yie , këël mana këët ri ǿt jǿ wǿ tïïö yi ǿt jwǿk , ni këël gǿ ri ǿt jǿ gath na en buut dhi kiir m"\n\n']
5	[{'role': 'user', 'content': 'I will give you 5 lines in ordered listing and I would like you to provide the three-digit language codes of the languages these lines were written in. Please assign language codes from the following set {'cko', 'cou', 'kuj', 'lam', 'yre'}. Each language code may be assigned more than once. If you do not know the language code of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language codes such as language names. Here are the lines:\n\n1. "* ukupusanako ne balembeshi aba lyashi lya kale , abatabalabilapo pali fyefyo aba mu mukoka wabo babacimfishe , abalembeshi ba baibolo balilabile ifya cine , balilembele ifi babifishe abene ne fyabifi"\n\n2. "" 10nkaaga haruni aarë gusumaacha na umuiraniö gua abhaisiraeri , bhonsui bhagatachëërra guiköngö , bhagatökëra bharamaaha ubhuhiku bhö ömönene kömasaaro ."\n\n3. "e - wee ' w ' wlid fui ' nan o yi - t ra ' e da - le ' w an ."\n\n4. "i fite abiya d ny m sa yoo wa d ŋgu yo f m as s n nu w ."\n\n5. "8fop njiniho sisikulu nowe hna : wule ye wufacah w̃a , gë wule wok wafacëna w̃a , gë wusëry w̃a do gë fop vihaw̃ary vile yasë nkal li , 9wuhi wuhi , ican g'icëval ; gante ntehnëkawo w̃ën nowe nti ka "\n\n'}, {'role': 'assistant', 'content': "1. 'lam'\n\n2. 'kuj'\n\n3. 'yre'\n\n4. 'cko'\n\n5. 'cou'\n\n"}, {'role': 'user', 'content': 'I will give you 10 lines in ordered listing and I would like you to provide the three-digit language codes of the languages these lines were written in. Please assign language codes from the following set {'adh', 'adj', 'anu', 'guw', 'kri', 'kvj', 'ngo', 'thv', 'vie', 'yat'}. Each language code may be assigned more than once. If you do not know the language code of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language codes such as language names. Here are the lines:\n\n1. "" 28kere omako nge swa munyo owinjo wac me ."\n\n2. "13kasefə ghena ta ka m ŋkwa ta nci , shala nde geze nda ghena ke h we ."\n\n3. "Nhà nước thành phố là tiền thân của các quốc gia. Văn hóa của nền văn minh ẩn chứa việc truyền thụ kiến thức qua nhiều thế hệ, một dấu ấn văn hóa còn sót lại và phổ biến tốt."\n\n4. "23táán s , p͈ĺ ná sédúk yésus kilí tus páboy͈ k n pəŋi pomóŋŋí pə́ə́s piim kiwiiyi aá !"\n\n5. "aw wi go yuz di baybul f ch k if wi j s bisin b t wis f n m ?"\n\n6. "28as yessenta awén , ebdedet , eṭkelet i efawen nwn édét el elas nwn yoheẓ ."\n\n7. "" nambu vakajovesana vene kwa vene , " tikajova , ' wahumili kunani kwa chapanga ?"\n\n8. "36ow am ibrm eke k nyn rm susu yec tŋ ke ´tur kokr yec a eke nyam am erur a , ke ´ŋan yec a eke l war l w es a ."\n\n9. "14 : 8) e nǫtena obiǫ mítǫn hlan jiwheyęwhe nado tindo ayihadawhẹnamęnu dagbe de ."\n\n10. "31ni ö malkiya , ŋat mo ena rǿk rëëmme mo warkie , ni dwǿk dëër kiir kare kanya ŋuut dhi cer meculammi yie , këël mana këët ri ǿt jǿ wǿ tïïö yi ǿt jwǿk , ni këël gǿ ri ǿt jǿ gath na en buut dhi kiir m"\n\n']

Table B.5: Request Examples of language code prompt (LCP) under three different numbers of shot at easy level where a label set of size equal to the number of unique language names of the test examples (i.e. ~ 10) is provided to ChatGPT. The text in blue is for demonstration learning which shows ChatGPT the format and the content of our question and the expected response. We try to avoid harmful content by using Google Translate to translate its supported languages to English to inspect. However, not all languages included in a batch are supported by Google Translate. Therefore, the example may unintentionally include harmful content.

Shot	Language Code Prompt (LCP) Examples
0	[{'role': 'user', 'content': 'I will give you 10 lines in ordered listing and I would like you to provide the three-digit language codes of the languages these lines were written in. Please assign language codes from the following set {'adh', 'adj', 'akp', 'anu', 'bcy', 'bod', 'bum', 'dhm', 'dnj', 'guw', 'jit', 'kab', 'kri', 'kvj', 'lot', 'ltg', 'mur', 'ndz', 'ngo', 'san', 'sev', 'swc', 'tgk', 'thv', 'umb', 'vie', 'xan', 'xed', 'yat', 'yor'}. Each language code may be assigned more than once. If you do not know the language code of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language codes such as language names. Here are the lines:\n\n1. "" 28kere omako nge swa munyo owinjo wac me ."\n\n2. "13kasefə ghena ta ka m ŋkwa ta nci , shala nde geze nda ghena ke h we ."\n\n3. "Nhà nước thành phố là tiền thân của các quốc gia. Văn hóa của nền văn minh ẩn chứa việc truyền thụ kiến thức qua nhiều thế hệ, một dấu ấn văn hóa còn sót lại và phổ biến tốt."\n\n4. "23táán s , p̉ĺ ná sédúk yésus kilí tus páboу́ k n pəŋi pomóŋŋí péés piim kiwiiyi aá !"\n\n5. "aw wi go yuz di baybul f ch k if wi j s bisin b t wis f n m ?"\n\n6. "28as yessenta awén , ebdedet , eṭkelet i efawen nwn édét el elas nwn yoheẓ ."\n\n7. "" nambu vakajovesana vene kwa vene , " tikajova , ' wahumili kunani kwa chapanga ?"\n\n8. "36ow am ibrm eke k nyn rm susu yec tŋ ke ´tur kokr yec a eke nyam am erur a , ke ´ŋan yec a eke l war l w es a ."\n\n9. "14 : 8) e noṭena obiọ míton hlan jiwheyẹwhe nado tindo ayihadawhẹnamẹnu dagbe de ."\n\n10. "31ni ö malkiya , ŋat mo ena rǿk rëëmme mo warkie , ni dwǿk dëër kiir kare kanya ŋuut dhi cer meculammi yie , këël mana këët ri ǿt jǿ wǿ tïïö yi ǿt jwǿk , ni këël gǿ ri ǿt jǿ gath na en buut dhi kiir m"\n\n']
1	[{'role': 'user', 'content': 'I will give you 1 lines in ordered listing and I would like you to provide the three-digit language codes of the languages these lines were written in. Please assign language codes from the following set {'ajp', 'ars', 'bci', 'bds', 'beq', 'bjv', 'bky', 'bud', 'dga', 'dip', 'fuh', 'jav', 'jit', 'lmp', 'loq', 'moa', 'mpe', 'nde', 'nka', 'ron', 'sbp', 'sev', 'srp', 'swh', 'tcd', 'tiv', 'tur', 'war', 'wbi', 'xuo'}. Each language code may be assigned more than once. If you do not know the language code of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language codes such as language names. Here are the lines:\n\n1. "16aan debbo goon in o , a anndaa yalla a a waawi hisinde gora ."\n\n'}, {'role': 'assistant', 'content': '1. fuh\n\n'}, {'role': 'user', 'content': 'I will give you 10 lines in ordered listing and I would like you to provide the three-digit language codes of the languages these lines were written in. Please assign language codes from the following set {'adh', 'adj', 'akp', 'anu', 'bcy', 'bod', 'bum', 'dhm', 'dnj', 'guw', 'jit', 'kab', 'kri', 'kvj', 'lot', 'ltg', 'mur', 'ndz', 'ngo', 'san', 'sev', 'swc', 'tgk', 'thv', 'umb', 'vie', 'xan', 'xed', 'yat', 'yor'}. Each language code may be assigned more than once. If you do not know the language code of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language codes such as language names. Here are the lines:\n\n1. "" 28kere omako nge swa munyo owinjo wac me ."\n\n2. "13kasefə ghena ta ka m ŋkwa ta nci , shala nde geze nda ghena ke h we ."\n\n3. "Nhà nước thành phố là tiền thân của các quốc gia. Văn hóa của nền văn minh ẩn chứa việc truyền thụ kiến thức qua nhiều thế hệ, một dấu ấn văn hóa còn sót lại và phổ biến tốt."\n\n4. "23táán s , p̉ĺ ná sédúk yésus kilí tus páboу́ k n pəŋi pomóŋŋí péés piim kiwiiyi aá !"\n\n5. "aw wi go yuz di baybul f ch k if wi j s bisin b t wis f n m ?"\n\n6. "28as yessenta awén , ebdedet , eṭkelet i efawen nwn édét el elas nwn yoheẓ ."\n\n7. "" nambu vakajovesana vene kwa vene , " tikajova , ' wahumili kunani kwa chapanga ?"\n\n8. "36ow am ibrm eke k nyn rm susu yec tŋ ke ´tur kokr yec a eke nyam am erur a , ke ´ŋan yec a eke l war l w es a ."\n\n9. "14 : 8) e noṭena obiọ míton hlan jiwheyẹwhe nado tindo ayihadawhẹnamẹnu dagbe de ."\n\n10. "31ni ö malkiya , ŋat mo ena rǿk rëëmme mo warkie , ni dwǿk dëër kiir kare kanya ŋuut dhi cer meculammi yie , këël mana këët ri ǿt jǿ wǿ tïïö yi ǿt jwǿk , ni këël gǿ ri ǿt jǿ gath na en buut dhi kiir m"\n\n']
5	[{'role': 'user', 'content': 'I will give you 5 lines in ordered listing and I would like you to provide the three-digit language codes of the languages these lines were written in. Please assign language codes from the following set {'ajp', 'ars', 'bci', 'bds', 'bjv', 'bky', 'bud', 'cko', 'cou', 'dgi', 'dks', 'jgo', 'jmc', 'kuj', 'lam', 'lom', 'lro', 'mri', 'ndo', 'rus', 'scn', 'shi', 'sun', 'tem', 'tll', 'twi', 'wes', 'wib', 'yao', 'yre'}. Each language code may be assigned more than once. If you do not know the language code of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language codes such as language names. Here are the lines:\n\n1. "* ukupusanako ne balembeshi aba lyashi lya kale , abatabalabilapo pali fyefyo aba mu mukoka wabo babacimfishe , abalembeshi ba baibolo balilabile ifya cine , balilembele ifi babifishe abene ne fyabifi"\n\n2. "" 10nkaaga haruni aarë gusumaacha na umuiranio̎ gua abhaisiraeri , bhonsui bhagatachëërra guiköngö , bhagatökëra bharamaaha ubhuhiku bhö ömönene kömasaaro ."\n\n3. "e - wee ' w ' wlid fui ' nan o yi - t ra ' e da - le ' w an ."\n\n4. "i fite abiya d ny m sa yoo wa d ŋgu yo f m as s n nu w ."\n\n5. "8fop njiniho sisikulu nowe hna : wule ye wufacah w̄a , gë wule wok wafacëna w̄a , gë wusëry w̄a do gë fop vihaw̄ary vile yasë nkal li , 9wuhi wuhi , ican g'icëval ; gante ntehnëkawo w̄ën nowe nti ka "\n\n'}, {'role': 'assistant', 'content': "1. lam\n\n2. kuj\n\n3. yre\n\n4. cko\n\n5. cou\n\n"}, {'role': 'user', 'content': 'I will give you 10 lines in ordered listing and I would like you to provide the three-digit language codes of the languages these lines were written in. Please assign language codes from the following set {'adh', 'adj', 'akp', 'anu', 'bcy', 'bod', 'bum', 'dhm', 'dnj', 'guw', 'jit', 'kab', 'kri', 'kvj', 'lot', 'ltg', 'mur', 'ndz', 'ngo', 'san', 'sev', 'swc', 'tgk', 'thv', 'umb', 'vie', 'xan', 'xed', 'yat', 'yor'}. Each language code may be assigned more than once. If you do not know the language code of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language codes such as language names. Here are the lines:\n\n1. "" 28kere omako nge swa munyo owinjo wac me ."\n\n2. "13kasefə ghena ta ka m ŋkwa ta nci , shala nde geze nda ghena ke h we ."\n\n3. "Nhà nước thành phố là tiền thân của các quốc gia. Văn hóa của nền văn minh ẩn chứa việc truyền thụ kiến thức qua nhiều thế hệ, một dấu ấn văn hóa còn sót lại và phổ biến tốt."\n\n4. "23táán s , p̉ĺ ná sédúk yésus kilí tus páboу́ k n pəŋi pomóŋŋí péés piim kiwiiyi aá !"\n\n5. "aw wi go yuz di baybul f ch k if wi j s bisin b t wis f n m ?"\n\n6. "28as yessenta awén , ebdedet , eṭkelet i efawen nwn édét el elas nwn yoheẓ ."\n\n7. "" nambu vakajovesana vene kwa vene , " tikajova , ' wahumili kunani kwa chapanga ?"\n\n8. "36ow am ibrm eke k nyn rm susu yec tŋ ke ´tur kokr yec a eke nyam am erur a , ke ´ŋan yec a eke l war l w es a ."\n\n9. "14 : 8) e noṭena obiọ míton hlan jiwheyẹwhe nado tindo ayihadawhẹnamẹnu dagbe de ."\n\n10. "31ni ö malkiya , ŋat mo ena rǿk rëëmme mo warkie , ni dwǿk dëër kiir kare kanya ŋuut dhi cer meculammi yie , këël mana këët ri ǿt jǿ wǿ tïïö yi ǿt jwǿk , ni këël gǿ ri ǿt jǿ gath na en buut dhi kiir m"\n\n']

Table B.6: Request Examples of language code prompt (LCP) under three different numbers of shot at medium level where a label set of size 30 is provided to ChatGPT. The text in blue is for demonstration learning which shows ChatGPT the format and the content of our question and the expected response. We try to avoid harmful content by using Google Translate to translate its supported languages to English to inspect. However, not all languages included in a batch are supported by Google Translate. Therefore, the example may unintentionally include harmful content.

Shot	Language Code Prompt (LCP) Examples
0	[{'role': 'user', 'content': 'I will give you 10 lines in ordered listing and I would like you to provide the three-digit language codes of the languages these lines were written in. If you do not know the language code of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language codes such as language names. Here are the lines:\n\n1. "" 28kere omako nge swa munyo owinjo wac me ."\n2. "13kasefə ghena ta ka m ŋkwa ta nci , shala nde geze nda ghena ke h we ."\n3. "Nhà nước thành phố là tiền thân của các quốc gia. Văn hóa của nền văn minh ẩn chứa việc truyền thụ kiến thức qua nhiều thế hệ, một dấu ấn văn hóa còn sót lại và phổ biến tốt."\n4. "23táán s , ṕ ĺ ná sédúk yésus kilí tus páboý k n pəŋi pomóŋŋí páés piim kiwiiyi aá !"\n5. "aw wi go yuz di baybul f ch k if wi j s bisin b t wis f n m ?"\n6. "28as yessenta awén , ebdedet , eṭkelet i efawen nwn édét el elas nwn yohez ."\n7. "" nambu vakajovesana vene kwa vene , " tikajova , ' wahumili kunani kwa chapanga ?"\n8. "36ow am ibrm eke k nyn rm susu yec tŋ ke ´tur kokr yec a eke nyam am erur a , ke ´ŋan yec a eke l war l w es a ."\n9. "14 : 8) e nǫtena obiǫ mítǫn hlan jiwheyẹwhe nado tindo ayihadawhẹnamẹnu dagbe de ."\n10. "31ni ö malkiya , ŋat mo ena rǿk rëëmme mo warkie , ni dwǿk dëër kiir kare kanya ŋuut dhi cer meculammi yie , këël mana këët ri ǿt jǿ wǿ tïïö yi ǿt jwǿk , ni këël gǿ ri ǿt jǿ gath na en buut dhi kiir m"\n\n']
1	[{'role': 'user', 'content': 'I will give you 1 lines in ordered listing and I would like you to provide the three-digit language codes of the languages these lines were written in. If you do not know the language code of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language codes such as language names. Here are the lines:\n\n1. "16aan debbo goon in o , a anndaa yalla a a waawi hisinde gora ."\n\n'}, {'role': 'assistant', 'content': "1. 'fuh'\n\n"}, {'role': 'user', 'content': 'I will give you 10 lines in ordered listing and I would like you to provide the three-digit language codes of the languages these lines were written in. If you do not know the language code of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language codes such as language names. Here are the lines:\n\n1. "" 28kere omako nge swa munyo owinjo wac me ."\n2. "13kasefə ghena ta ka m ŋkwa ta nci , shala nde geze nda ghena ke h we ."\n3. "Nhà nước thành phố là tiền thân của các quốc gia. Văn hóa của nền văn minh ẩn chứa việc truyền thụ kiến thức qua nhiều thế hệ, một dấu ấn văn hóa còn sót lại và phổ biến tốt."\n4. "23táán s , ṕ ĺ ná sédúk yésus kilí tus páboý k n pəŋi pomóŋŋí páés piim kiwiiyi aá !"\n5. "aw wi go yuz di baybul f ch k if wi j s bisin b t wis f n m ?"\n6. "28as yessenta awén , ebdedet , eṭkelet i efawen nwn édét el elas nwn yohez ."\n7. "" nambu vakajovesana vene kwa vene , " tikajova , ' wahumili kunani kwa chapanga ?"\n8. "36ow am ibrm eke k nyn rm susu yec tŋ ke ´tur kokr yec a eke nyam am erur a , ke ´ŋan yec a eke l war l w es a ."\n9. "14 : 8) e nǫtena obiǫ mítǫn hlan jiwheyẹwhe nado tindo ayihadawhẹnamẹnu dagbe de ."\n10. "31ni ö malkiya , ŋat mo ena rǿk rëëmme mo warkie , ni dwǿk dëër kiir kare kanya ŋuut dhi cer meculammi yie , këël mana këët ri ǿt jǿ wǿ tïïö yi ǿt jwǿk , ni këël gǿ ri ǿt jǿ gath na en buut dhi kiir m"\n\n']
5	[{'role': 'user', 'content': 'I will give you 5 lines in ordered listing and I would like you to provide the three-digit language codes of the languages these lines were written in. If you do not know the language code of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language codes such as language names. Here are the lines:\n\n1. "* ukupusanako ne balembeshi aba lyashi lya kale , abatabalabilapo pali fyefyo aba mu mukoka wabo babacimfishe , abalembeshi ba baibolo balilabile ifya cine , balilembele ifi babifishe abene ne fyabifi"\n2. "" 10nkaaga haruni aarë gusumaacha na umuiraniö gua abhaisiraeri , bhonsui bhagatachëërra guiköngö , bhagatökëra bharamaaha ubhuhiku bhö ömönene kömasaaro ."\n3. "e - wee ' w ' wlid fui ' nan o yi - t ra ' e da - le ' w an ."\n4. "i fite abiya d ny m sa yoo wa d ŋgu yo f m as s n nu w ."\n5. "8fop njiniho sisikulu nowe hna : wule ye wufacah w̃a , gë wule wok wafacëna w̃a , gë wusëry w̃a do gë fop vihaw̃ary vile yasë nkal li , 9wuhi wuhi , ican g'icëval ; gante ntehnëkawo w̃ën nowe nti ka "\n\n'}, {'role': 'assistant', 'content': "1. 'lam'\n2. 'kuj'\n3. 'yre'\n4. 'cko'\n5. 'cou'\n\n"}, {'role': 'user', 'content': 'I will give you 10 lines in ordered listing and I would like you to provide the three-digit language codes of the languages these lines were written in. If you do not know the language code of a certain line, please provide 'Unknown'. Please answer in ordered listing and never provide anything other than language codes such as language names. Here are the lines:\n\n1. "" 28kere omako nge swa munyo owinjo wac me ."\n2. "13kasefə ghena ta ka m ŋkwa ta nci , shala nde geze nda ghena ke h we ."\n3. "Nhà nước thành phố là tiền thân của các quốc gia. Văn hóa của nền văn minh ẩn chứa việc truyền thụ kiến thức qua nhiều thế hệ, một dấu ấn văn hóa còn sót lại và phổ biến tốt."\n4. "23táán s , ṕ ĺ ná sédúk yésus kilí tus páboý k n pəŋi pomóŋŋí páés piim kiwiiyi aá !"\n5. "aw wi go yuz di baybul f ch k if wi j s bisin b t wis f n m ?"\n6. "28as yessenta awén , ebdedet , eṭkelet i efawen nwn édét el elas nwn yohez ."\n7. "" nambu vakajovesana vene kwa vene , " tikajova , ' wahumili kunani kwa chapanga ?"\n8. "36ow am ibrm eke k nyn rm susu yec tŋ ke ´tur kokr yec a eke nyam am erur a , ke ´ŋan yec a eke l war l w es a ."\n9. "14 : 8) e nǫtena obiǫ mítǫn hlan jiwheyẹwhe nado tindo ayihadawhẹnamẹnu dagbe de ."\n10. "31ni ö malkiya , ŋat mo ena rǿk rëëmme mo warkie , ni dwǿk dëër kiir kare kanya ŋuut dhi cer meculammi yie , këël mana këët ri ǿt jǿ wǿ tïïö yi ǿt jwǿk , ni këël gǿ ri ǿt jǿ gath na en buut dhi kiir m"\n\n']

Table B.7: Request Examples of language code prompt (LCP) under three different numbers of shot at hard level where no label set is provided to ChatGPT. The text in blue is for demonstration learning which shows ChatGPT the format and the content of our question and the expected response. We try to avoid harmful content by using Google Translate to translate its supported languages to English to inspect. However, not all languages included in a batch are supported by Google Translate. Therefore, the example may unintentionally include harmful content.

C Alias-Dialect-Accepting Evaluation

When prompting ChatGPT to predict language names, exact-match evaluation may not be the best approach to assess its language identification ability as dicussed in Section 4.3. We propose alias-dialect-accepting evaluation, which counts a prediction to be a hit if it is an alias or a dialect that belongs to the same language group as ground truth label, to provide a fuzzy matching strategy. We introduce the two main components of this evaluation methods in two sections: accepting aliases in C.1 and accepting dialects in C.2. An overview can be seen at Figure C.1.
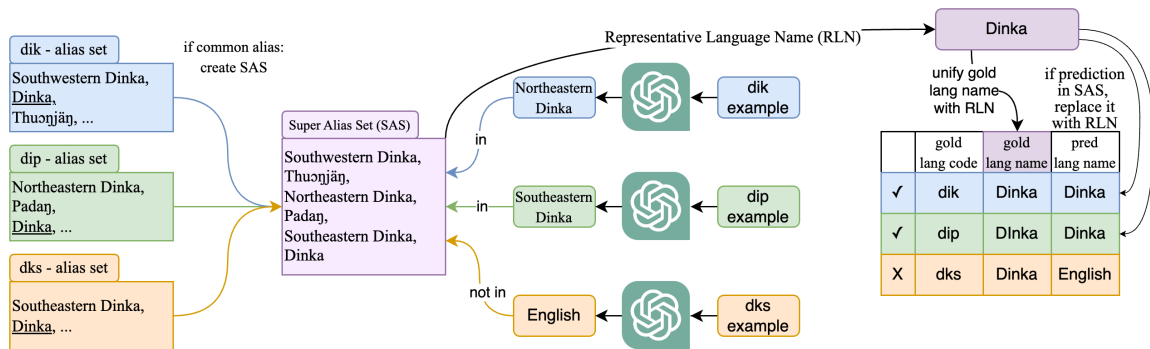
Figure C.1: An overview of alias-dialect-accepting (ADA) evaluation for language name prompt (LNP).

C.1 Accepting Aliases

A language can have more than one name, e.g. Español and Spanish. In fact, many languages have more than one name (636 out of 670 languages in Babel-670). The set of name(s) that belongs to a language code is referred to as the **alias set**. For example, for language code 'spa', its alias set is {Spanish, Español, Castellano, Castilian}. To build an alias set for each language, we use the language code as unique identifier to consult *Ethnologue* and the Python package `langcodes`[11]. An alias set is a union of the set from Ethnologue and that from `langcodes`. For Ethnologue, we take the values in three fields in each language page: *Language Name*, *Alternate Names* and *Autonym* [12]. For `langcodes`, language name is retrieved by `Language.get(<code>).language_name()`. For exact-match evaluation, if ChatGPT predicts 'Español' when the label is 'Spanish', it is counted a miss despite that they refer to the same language entity. With the design of accepting aliases, predicting 'Español' will be counted as a hit for a Spanish example since 'Español' is a member of the alias set of the language code 'spa'.

Besides names such as Spanish and Español which both refer to the same language entity, some alias sets include names that are referring to a group of languages. For example, the alias set of dik (Southwestern Dinka) includes 'Dinka', which refers to a group of languages. This phenomenon often occurs when the language code belongs to a macrolanguage, e.g. dik (Southwestern Dinka) belongs to a macrolanguage Dinka (din). Besides, dip (Northeastern Dinka) and dks (Southeastern Dinka) both have 'Dinka' in their alias sets and belong to macrolanguage Dinka.

Besides theoretical motivations as mentioned above, we have empirical motivations to accept aliases. We observe that ChatGPT tends to be conservative for languages that belong to a language group by predicting only its group name without giving dialectal information. For example, out of all test examples of dik, 87% of them are predicted as 'Dinka', instead of the more detailed 'Southwestern Dinka' that includes dialectal information. Similar phenomenon occurs for a wide range of languages as can be seen in Table C.1. We observe that some of these languages are clustered into groups, e.g. Dinka, Arabic, Kurdish, and Azerbaijani. These language groups include members that are linguistically related to each other. The grouping effect inspires us to propose to accept dialects which is covered in Section C.2.

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[11] https://github.com/rspeer/langcodes
[12] Following the definition of Ethnologue, an autonym is 'the name of the language in the language itself'. For example, Español and Castellano are autonyms of Spanish

Lang Code	Most Predicted Name	Gold Label	Rate
dik	Dinka	Southwestern Dinka	87%
dip	Dinka	Northeastern Dinka	73%
dks	Dinka	Southeastern Dinka	53%
acm	Arabic	Mesopotamian Arabic	100%
ars	Arabic	Najdi Arabic	100%
apc	Arabic	North Levantine Arabic	100%
acq	Arabic	Ta`izzi-Adeni Arabic	93%
aeb	Arabic	Tunisian Arabic	87%
arz	Arabic	Egyptian Arabic	73%
ary	Arabic	Moroccan Arabic	53%
kmr	Kurdish	Northern Kurdish	100%
ckb	Kurdish	Central Kurdish	93%
azb	Azerbaijani	South Azerbaijani	100%
azj	Azerbaijani	North Azerbaijani	100%
pes	Persian	Iranian Persian	100%
ydd	Yiddish	Eastern Yiddish	100%
khk	Mongolian	Halh Mongolian	100%
ayr	Aymara	Central Aymara	87%
als	Albanian	Tosk Albanian	100%
gaz	Oromo	West Central Oromo	100%
plt	Malagasy	Plateau Malagasy	100%
uzn	Uzbek	Northern Uzbek	100%
yue	Chinese	Cantonese	100%
pbt	Pashto	Southern Pashto	93%
quy	Quechua	Ayacucho Quechua	93%

Table C.1: Languages with more than half of their predictions (≥ 8 datapoints as each language has 15 test examples) considered as misses in exact-match evaluation, but considered as hits when aliases are accepted (i.e. when prediction is a member of the alias set). *Most Predicted Name* is the language name that is predicted by ChatGPT most frequently. *Rate* refers to the ratio of the number of these predictions, out of 15 test examples. This analysis is based on (LNP, GPT-4, hard, 0-shot) setting.

C.2 Accepting Dialects

Following the observation of grouping effect when accepting alias as discussed in section C.1, we propose to accept dialects and count a prediction as a hit if the ground truth label and the prediction are dialects of a common language. We take Southwestern Dinka as an example and illustrate how its example is counted as a hit when accepting dialect in Figure C.1. Implementation Details are shown in Algorithm 1.

First, we assume that whenever a common language name occurs in the alias sets of two languages, they are linguistically related in a certain degree. They will form a language group and their alias sets will be merged. For one language x, after iterating through each pair of x and the other languages, a **super alias set (SAS)** of x is formed by merging all the alias set(s) having at least one common language name with the alias set of x. After the merges, out of 670 languages, 595 language groups are formed with 48 of them having more than one languages in a group, and 547 of them having one single language in the group. Second, we select a **representative language name (RLN)** to represent each language group by picking the most frequently occurred name in the SAS (more details covered in Phase 2 in Algorithm 1). This is reasonable because we observe that the most common name among alias sets of a language group is often the name of the macrolanguage. Third, we use RLN as the gold label for a language group and replace any predicted names with the RLN if they are in the SAS. Fourth, we compute F_1 score for each language group and a macro-averaged F_1 to present the overall system performance. The macro-averaged (by language group) F_1 scores for (LNP [alias-dialect-accepting], hard, 0-shot) setting of both GPT-3.5 and GPT-4 are included in Table 2.

It is noteworthy a difference in accepting alias and accepting dialect. Accepting aliases allows a test example of Southwestern Dinka to be predicted as 'Dinka' because 'Dinka' is in its alias set. For the same example, accepting dialects allows it to be predicted as 'Northeasten Dinka' because they are both dialects of Dinka and are merged under the RLN Dinka.

Algorithm 1 Alias-Dialect-Accepting Evaluation Algorithm

Require:

$AS_1, AS_2, \ldots AS_n$ where AS_i is the alias set, in multiset structure, of ith language (details in C.1)

$Golds_1, Golds_2, \ldots Golds_n$ where $Golds_i$ is a m-sized list of gold names of ith language

$Preds_1, Preds_2, \ldots Preds_n$ where $Preds_i$ is a m-sized list of predicted names of ith language

---

Phase 1 – Create super alias set (SAS) and forming language groups

---

```
 1: for i = 1 to n do
 2:     SAS_i = AS_i                                          ▷ SAS_i is also a multiset
 3:     for j = 1 to n do
 4:         if i==j then
 5:             continue
 6:         end if
 7:         if AS_i ∩ AS_j ≠ ∅ then                          ▷ if at least one common language name exists
 8:             SAS_i = SAS_i ⊎ AS_j    ▷ add new aliases and multiplicity into SAS with multiset union
 9:         end if
10:     end for
11: end for
```

Phase 2 – Select representative language name (RLN) for each language group

---

12: $Candidates_i = \arg\max_x(m_{SAS_i}(x))$ ▷ Get name(s) with highest multiplicity as candidates of RLN

13: **if** $|Candidates_i| == 1$ **then**   ▷ if there is one single candidate, it is assigned as RLN

14:     $RLN_i = Candidates_i[0]$

15: **else**   ▷ if more than one candidate, pick the most frequently predicted name that is in SAS

16:     $CPN_i = \{name \mid name \in SAS_i \wedge name \in Preds_i\}$ ▷ CPN: Correctly predicted name(s)

17:     **if** $|CPN_i| == 0$ **then**   ▷ if none of the predictions is in SAS

18:         $RLN_i \sim Uniform(Candidates_i)$ ▷ Uniformly drawing one name out of $Candidates_i$

19:     **else**

20:         $MFCPN_i = \arg\max_x(m_{CPN_i}(x))$ ▷ MFCPN: Most frequent correctly predicted name(s)

21:         **if** $|MFCPN_i| == 1$ **then**

22:             $RLN_i = MFCPN_i[0]$

23:         **else**

24:             $RLN_i \sim Uniform(MFCPN_i)$ ▷ Uniformly drawing one name out of $MFCPN_i$

25:         **end if**

26:     **end if**

27: **end if**

Phase 3 – Replace gold and predicted name (if in SAS) with RLN for each datapoint

---

```
28: for i = 1 to n do
29:     for j = 1 to m do
30:         Golds_{i,j} = RLN_i
31:         if Preds_{i,j} ∈ SAS_i then
32:             Preds_{i,j} = RLN_i
33:         end if
34:     end for
35: end for
```

Phase 4 – Evaluation of F_1 for each language group K and macro-averaged F_1 for the system

---

36: $F_{1_K} = F_1(Golds_{k \in K}, Preds_{k \in K})$ ▷ $k \in K$ represents member language's lists concatenated

37: $F_{1_{sys}} = mean(\{F_{1_K} \mid 1 \le K \le N\})$ ▷ N is the total number of language groups

---

D Languages in Babel-670

ISO-3	Language	ISO-3	Language	ISO-3	Language	ISO-3	Language
aar	Afar / Qafar	bky	Bokyi	ego	Eggon	heb	Hebrew
aba	Abe / Abbey	bmo	Bambalang	eka	Ekajuk	heh	Hehe
abn	Abua	bmv	Bum	eko	Koti	her	Herero
acd	Gikyode	bod	Standard Tibetan	ell	Greek	hgm	Haillom
ace	Acehnese	bom	Berom	eng	English	hin	Hindi
ach	Acholi	bos	Bosnian	epo	Esperanto	hna	Mina
acm	Mesopotamian Arabic	bov	Tuwuli	est	Estonian	hne	Chhattisgarhi
acq	Ta'izzi-Adeni Arabic	box	Bwamu / Buamu	eto	Eton	hrv	Croatian
ada	Dangme	bqc	Boko	etu	Ejagham	hun	Hungarian
adh	Jopadhola / Adhola	bqj	Bandial	etx	Iten / Eten	hye	Armenian
adj	Adjukru / Adioukrou	bsc	Oniyan	eus	Basque	ibb	Ibibio
aeb	Tunisian Arabic	bsp	Bagag Sitemu	ewe	Ewe	ibo	Igbo
afr	Afrikaans	bss	Akose	ewo	Ewondo	idu	Idoma
agq	Aghem	bst	Basketo	fak	Fang	igb	Ebira
aha	Ahanta	bud	Ntcham	fao	Faroese	ige	Igede
ajg	Aja	bug	Buginese	fat	Fante	igl	Igala
ajp	South Levantine Arabic	bul	Bulgarian	ffm	Fulfulde, Maasina	ijn	Kalabari
akp	Siwu	bum	Bulu	fia	Nobiin	ikk	Ika
als	Tosk Albanian	bun	Sherbro	fij	Fijian	ikw	Ikwere
alz	Alur	buy	Bullom So	fin	Finnish	ilo	Ilocano
amh	Amharic	bwr	Bura Pabir	fip	Fipa	ind	Indonesian
ann	Obolo	bwu	Buli	flr	Fuliiru	iqw	Ikwo
anu	Anyuak / Anuak	bxk	Bukusu	fon	Fon	iso	Isoko
anv	Denya	byf	Bete	fra	French	isl	Icelandic
apc	North Levantine Arabic	byv	Medumba	fub	Fulfulde, Adamawa	ita	Italian
arb	Modern Standard Arabic	bza	Bandi	fue	Fulfulde, Borgu	iyx	Yaka
ars	Najdi Arabic	bzd	Bribri	fuf	Pular	izr	Izere
ary	Moroccan Arabic	bzw	Basa	fuh	Fulfulde, Western Niger	izz	Izii
arz	Egyptian Arabic	cat	Catalan	ful	Fulah	jav	Javanese
asa	Asu	cce	Chopi	fur	Friulian	jgo	Ngomba
asg	Cishingini	ceb	Cebuano	fuv	Fulfude Nigeria	jib	Jibu
asm	Assamese	ces	Czech	gaa	Ga	jit	Jita
ast	Asturian	chw	Chuabo	gax	Oromo, Borana-Arsi-Guji	jmc	Machame
atg	Ivbie North-Okpela-Arhe	cjk	Chokwe	gaz	Oromo, West Central	jpn	Japanese
ati	Attie	ckb	Central Kurdish	gbo	Grebo, Northern	kab	Kabyle
avn	Avatime	cko	Anufo	gbr	Gbagyi	kac	Jingpho
avu	Avokaya	cme	Cerma	gde	Gude	kam	Kikamba
awa	Awadhi	cop	Coptic	gid	Gidar	kan	Kannada
ayr	Central Aymara	crh	Crimean Tatar	giz	South Giziga	kas	Kashmiri
azb	South Azerbaijani	crs	Seychelles	gjn	Gonja	kat	Georgian
azj	North Azerbaijani	csk	Jola Kasa	gkn	Gokana	kaz	Kazakh
azo	Awing	cwe	Kwere	gkp	Kpelle, Guinea	kbn	Kare
bak	Bashkir	cym	Welsh	gla	Scottish Gaelic	kbo	Keliko
bam	Bambara	daa	Dangaleat	gle	Irish	kbp	Kabiye
ban	Balinese	dag	Dagbani	glg	Galician	kby	Kanuri, Manga
bav	Vengo	dan	Danish	gmv	Gamo	kcg	Tyap
bba	Baatonum	dav	Dawida / Taita	gna	Kaansa	kck	Kalanga
bbj	Ghomala	deu	German	gnd	Zulgo-gemzek	kdc	Kutu
bbk	Babanki	dga	Dagaare	gng	Ngangam	kde	Makonde
bcn	Bali	dgd	Dagaari Dioula	gof	Goofa	kdh	Tem
bcw	Bana	dgi	Dagara, Northern	gog	Gogo	kdi	Kumam
bcy	Bacama	dhm	Dhimba	gol	Gola	kdj	Ng'akarimojong
bdh	Baka	dib	Dinka, South Central	gqr	Gor	kdl	Tsikimba
bds	Burunge	did	Didinga	grn	Guarani	kdn	Kunda
bel	Belarusian	dig	Chidigo	gso	Gbaya, Southwest	kea	Kabuverdianu
bem	Bemba / Chibemba	dik	Dinka, Southwestern	gud	Dida, Yocoboue	ken	Kenyang
ben	Bengali	dip	Dinka, Northeastern	guj	Gujarati	khk	Halh Mongolian
beq	Beembe	diu	Gciriku	gur	Farefare	khm	Khmer
ber	Berber	dks	Dinka, Southeastern	guw	Gun	khy	Kele / Lokele
bex	Jur Modo	dnj	Dan	gux	Gourmanchema	kia	Kim
bez	Bena	dow	Doyayo	guz	Ekegusii	kik	Gikuyu / Kikuyu
bfa	Bari	dsh	Daasanach	gvc	Wanano	kin	Kinyarwanda
bfd	Bafut	dua	Douala	gvl	Gulay	kir	Kyrgyz
bfo	Birifor, Malba	dug	Chiduruma	gwr	Gwere	kiz	Kisi
bho	Bhojpuri	dwr	Dawro	gya	Gbaya, Northwest	kkl	Kagulu
bib	Bisa	dyi	Sénoufo, Djimini	hag	Hanga	kkj	Kako

Table D.1: List of languages in Babel-670 - Part I.

ISO-3	Language	ISO-3	Language	ISO-3	Language	ISO-3	Language
bim	Bimoba	dyu	Jula	har	Harari	kln	Kalenjin
bin	Edo	dzo	Dzongkha	hat	Haitian Creole	klu	Klao
biv	Birifor, Southern	ebr	Ebrie	hau	Hausa	kma	Konni
bjn	Banjar	ebu	Kiembu / Embu	hay	Haya	kmb	Kimbudu
bjv	Bedjond	efo	Efik	hbb	Nya Huba	kmr	Northern Kurdish
kmy	Koma	lmp	Limbum	mfz	Mabaan	ndv	Ndut
knf	Mankanya	lnl	Banda, South Central	mgc	Morokodo	ndz	Ndogo
kng	Kongo	log	Logo	mgh	Makhuwa-Meetto	ngb	Ngbandi, Northern
knk	Kuranko	lom	Loma	mgo	Meta'	ngc	Ngombe
kno	Kono	loq	Lobala	mgq	Malila	ngl	Lomwe
koo	Konzo	lot	Latuka	mgr	Mambwe-Lungu	ngn	Bassa
koq	Kota	loz	Silozi	mgw	Matumbi	ngo	Ngoni
kor	Korean	lmo	Lombard	mif	Mofu-Gudur	ngp	Ngulu
kqn	Kikaonde	lro	Laro	min	Minangkabau	nhr	Naro
kqp	Kimré	lsm	Saamya-Gwe / Saamia	mkd	Macedonian	nhu	Noone
kqs	Kisi	ltg	Latgalian	mkl	Mokole	nih	Nyiha
kqy	Koorete	lth	Thur / Acholi-Labwor	mlg	Malagasy	nim	Nilamba / kinilyamba
kri	Krio	lto	Tsotso	mlr	Vame	nin	Ninzo
krs	Gbaya	ltz	Luxembourgish	mlt	Maltese	niy	Ngiti
krw	Krahn, Western	lua	Tshiluba	mmy	Migaama	nka	Nkoya / ShiNkoya
krx	Karon	luc	Aringa	mnf	Mundani	nko	Nkonya
ksb	Shambala / Kishambala	lue	Luvale	mnk	Mandinka	nla	Ngombale
ksf	Bafia	lug	Luganda	mni	Meitei	nld	Dutch
ksp	Kabba	lun	Lunda	moa	Mwan	nnb	Nande / Ndandi
ktj	Krumen, Plapo	luo	Dholuo/ Luo	mos	Moore	nnh	Ngiemboon
ktu	Kikongo	lus	Mizo	moy	Shekkacho	nno	Norwegian Nynorsk
kua	Oshiwambo	lwg	Wanga / Saamia	moz	Mukulu	nnq	Ngindo
kub	Kutep	lwo	Luwo	mpe	Majang	nob	Norwegian Bokmål
kuj	Kuria	lvs	Standard Latvian	mpg	Marba	npi	Nepali
kus	Kusaal	maf	Mafa	mqb	Mbuko	nse	Chinsenga
kvj	Psikye	mag	Magahi	mri	Maori	nnw	Nuni, Southern
kwn	Kwangali	mai	Maithili	msc	Maninka, Sankaran	nso	Sepedi
kyf	Kouya	mal	Malayalam	mur	Murle	ntr	Delo
kyq	Kenga	mar	Marathi	muy	Muyang	nuj	Nyole
kzr	Karang	mas	Maasai	mwe	Mwera	nus	Nuer
lai	Lambya	maw	Mampruli	mwm	Cinamwanga	nwb	Nyabwa
laj	Lango	mbu	Mbula-Bwazza	mwn	Cinamwanga	nxd	Ngando
lam	Lamba	mck	Mbunda	mws	Mwimbi-Muthambi	nya	Chichewa
lao	Lao	mcn	Masana / Massana	mya	Burmese	nyb	Nyangbo
lap	Laka	mcp	Makaa	myb	Mbay	nyd	Olunyole / Nyore
lee	Lyélé	mcu	Mambila, Cameroon	myk	Sénoufo, Mamara	nyf	Giryama
lef	Lelemi	mda	Mada	myx	Masaaba	nyk	Nyaneka
lem	Nomaande	mdm	Mayogo	mzm	Mumuye	nym	Nyamwezi
lgg	Lugbara	mdy	Maale	mzw	Deg	nyn	Nyankore / Nyankole
lgm	Lega-mwenga	men	Mende	naq	Khoekhoe	nyo	Nyoro
lij	Ligurian	meq	Merey	naw	Nawuri	nyu	Nyungwe
lik	Lika	mer	Kimiiru	nba	Nyemba	nyy	Nyakyusa-Ngonde / Kyangonde
lim	Limburgish	mev	Maan / Mann	nbl	IsiNdebele	nza	Mbembe, Tigon
lin	Lingala	mfe	Morisyen / Mauritian Creole	nzi	Nzema	oci	Occitan
lip	Sekpele	mfg	Mogofin	ndc	Ndau	odu	Odual
lit	Lithuanian	mfh	Matal	nde	IsiNdebele	ogo	Khana
lla	Limba, West-Central	mfi	Wandala	ndh	Ndali	oke	Okpe
lmd	Lumun	mfk	Mofu, North	ndj	Ndamba	okr	Kirike
lmo	Lombard	mfq	Moba	ndo	Ndonga	oku	Oku

Table D.2: List of languages in Babel-670 - Part II

ISO-3	Language	ISO-3	Language	ISO-3	Language	ISO-3	Language
ncu	Chunburung	shk	Shilluk	teo	Teso	vmk	Makhuwa-Shirima
orm	Oromo	shn	Shan	tex	Tennet	vmw	Macua
ory	Odia	sid	Sidama	tgk	Tajik	vun	Kivunjo
ozm	Koonzime	sig	Paasaal	tgl	Tagalog	vut	Vute
pag	Pangasinan	sil	Sisaala, Tumulung	tgw	Senoufo, Tagwana	wal	Wolaytta
pan	Eastern Panjabi	sin	Sinhala	tha	Thai	war	Waray
pap	Papiamento	slk	Slovak	thk	Tharaka	wal	Wolaytta
pbt	Southern Pashto	slv	Slovenian	thv	Tamahaq, Tahaggart	wbi	Vwanji
pcm	Nigerian Pidgin	smo	Samoan	tke	Takwane	wec	Guere
pem	Kipende	sna	Shona	tir	Tigrinya	wes	Pidgin, Cameroon
pes	Western Persian	snd	Sindhi	tiv	Tiv	wib	Toussian, Southern
pir	Piratapuyo	snf	Noon	tlj	Talinga-Bwisi	wmw	Mwani
pkb	Kipfokomo / Pokomo	sng	Sanga / Kiluba	tll	Otetela	wol	Wolof
plt	Plateau Malagasy	snw	Selee	tog	Tonga	won	Wongo
pol	Polish	som	Somali	toh	Gitonga	xan	Xamtanga
por	Portuguese	sop	Kisonge	toi	Chitonga	xed	Hdi
pov	Guinea-Bissau Creole	sor	Somrai	tpi	Tok Pisin	xho	Isixhosa
poy	Pogolo / Shipogoro-Pogolo	sot	Sesotho	tpm	Tampulma	xnz	Mattokki
quy	Ayacucho Quechua	soy	Miyobe	tsc	Tshwa	xog	Soga
rag	Lulogooli	spa	Spanish	tsn	Setswana	xon	Konkomba
rel	Rendille	spp	Senoufo, Supyire	tso	Tsonga	xpe	Kpelle
rif	Tarifit	srd	Sardinian	tsw	Tsishingini	xrb	Karaboro, Eastern
rim	Nyaturu	srp	Serbian	ttj	Toro / Rutoro	xsm	Kasem
rnd	Uruund	ssw	Siswati	ttq	Tawallammat	xtc	Katcha-Kadugli-Miri
rng	Ronga / ShiRonga	suk	Sukuma	ttr	Nyimatli	xuo	Kuo
ron	Romanian	sun	Sundanese	tui	Toupouri	yal	Yalunka
rub	Gungu	sus	Sosoxui	tuk	Turkmen	yam	Yamba
run	Rundi / Kirundi	swa	Swahili	tul	Kutule	yao	Yao / Chiyao
rus	Russian	swc	Swahili Congo	tum	Chitumbuka	yat	Yambeta
rwk	Rwa	swe	Swedish	tur	Turkish	yba	Yala
sag	Sango	swh	Swahili	tuv	Turkana	ybb	Yemba
saq	Samburu	swa	Swahili	tvu	Tunen	ydd	Eastern Yiddish
san	Sanskrit	swc	Swahili Congo	twi	Twi	yom	Ibinda
sat	Santali	swe	Swedish	uig	Uyghur	yor	Yoruba
sba	Ngambay	swh	Swahili	ukr	Ukrainian	yre	Yaoure
sbd	Samo, Southern	swk	Sena, Malawi	umb	Umbundu	yue	Yue Chinese
sbp	Sangu	sxb	Suba	urd	Urdu	zaj	Zaramo
sbs	Kuhane	szl	Silesian	urh	Urhobo	zdj	Comorian, Ngazidja
sby	Soli	tam	Tamil	uth	ut-Hun	zga	Kinga
scn	Sicilian	taq	Tamasheq	uzn	Northern Uzbek	zho	Chinese (Simplified)
sef	Sénoufo, Cebaara	tat	Tatar	vag	Vagla	ziw	Zigula
ses	Songhay, Koyraboro Senni	tel	Telugu	vai	Vai	zne	Zande / paZande
sev	Sénoufo, Nyarafolo	tcc	Datooga	vec	Venetian	zsm	Standard Malay
sfw	Sehwi	tcd	Tafi	ven	Tshivenda	zul	Isizulu
sgw	Sebat Bet Gurage	ted	Krumen, Tepo	vid	Chividunda		
shi	Tachelhit	tem	Timne	vie	Vietnamese		
shj	Shatt	tel	Telugu	vif	Vili		

Table D.3: List of languages in Babel-670 - Part III.