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Accuracy of the ConferenceCaptioning Japanese Speech-to-Text Engine

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Executive Summary

In the complex landscape of Japanese automatic speech recognition (ASR), achieving high accuracy is the ultimate benchmark for usability and reliability. This report provides a transparent and detailed analysis of ConferenceCaptioning's performance on a real-world Japanese audio sample.

Using industry-standard metrics, our engine demonstrated exceptional accuracy. The analysis revealed a Word Error Rate (WER) of 4.33%. Furthermore, the engine achieved a Word Information Preserved (WIP) score of 95.25%, indicating that the vast majority of the original information was transcribed correctly.

These results position ConferenceCaptioning in the top tier of ASR solutions, suitable for professional applications where precision, nuance, and reliability are paramount.

The Challenge of Japanese Transcription

Japanese presents unique and significant challenges for speech-to-text technology that are not found in languages like English. A high-performance engine must overcome:

- **Complex Writing System:** A mix of Kanji, Hiragana, and Katakana characters.
- **No Word Delimiters:** Japanese text does not use spaces, requiring the ASR engine to intelligently segment sentences into words (tokens).

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- **Widespread Homophones:** Many words have identical pronunciations but different meanings and Kanji representations (e.g., *kikai* can mean 機械 'machine', 機会 'opportunity', or 奇怪 'strange').
- **Kanji Variants:** Common words can be written with different Kanji that have subtle differences in nuance (e.g., 温かい vs. 暖かい for "warm").
- **Colloquialisms and Fillers:** Real-world speech is filled with conversational particles and filler words (e.g.,「あのー」,「えっと」) that must be handled correctly.

An effective Japanese ASR tool must not only recognize sounds but also apply deep contextual understanding to produce an accurate and legible transcript.

Methodology

To ensure a transparent and replicable test, we used the following methodology:

- **Audio Sample:** A sample of clear, public speaking in Japanese was used.
- **Reference Transcript (Ground Truth):** A transcript was created to serve as a perfect benchmark.
- **Hypothesis Transcript:** The audio was processed by ConferenceCaptioning to generate the ASR output.
- **Metrics:** We calculated several standard metrics to evaluate performance from different perspectives.
    - **Word Error Rate (WER):** The most common ASR metric. `WER = (Substitutions + Deletions + Insertions) / Total Words in Reference`. Lower is better.
    - **Word Information Preserved (WIP):** An advanced metric that measures overall "correctness" by balancing precision and recall. Higher is better.

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Analysis and Results

The following texts were used for the analysis:

Reference:

皆さんの温かい空気で本当に気持ちがいいですね5年ぶりのサミットですけれども毎回こうやって集まると本当に国籍や宗教や肌の色やすべてを超えて家族だなという風にねいつも 思わせてもらえる最高の世界です私はですね台湾に35年ぶりに来ました当時は20代で非常に若く思いだけはあって志と情熱を持って本当に生きていきたいなというふうに 思いながら日々を過ごしていましたところがですねやはり当時振り返ると自分の理想と現実は全く違ってましたねでも今35年経って台湾に来ましたけれども今は 自分の理想と現実がピタッと一つになっています本当に人生というのは知り上がりに良くなっていくんだなということを最近強く思いますでもそれはやはりしっかりと努力は当たり前ですけれども いつも未来に対して思いを持って準備をしてきたなというふうに思います20代の時には30代をどう生きるかということを考えて生きてそして30代になれば40代どう生きるかということを生きて今60代ですけども本当にこれからの未来をどのように生きていくかということを

Hypothesis (ConferenceCaptioning Output):

皆さんの暖かい空気で本当に気持ちいいですねあの一お念ぶりのサミットですけれども、毎回こうやって、集まると本当に、国籍や宗教や肌の色や全てを越えて 家族だなというふうにねいつも思わせてもらえる最高の世界です。私は台湾に35年ぶりに来ました。当時は20代で 非常に若く思いだけはあって心差しと情熱を持って本当に生きていきたいなというふうに思いながら日々を過ごしていました。ところがですねやはり当時振り返ると自分の理想と現実は全く違ってましたね。でも今35年経って、対話に来ましたけれども今は自分の理想と現実が来たとこ一つになっています。本当に人生ってのは 知り上がりによくなっていくんだなということを最近強く思います それはやはりしっかりと努力は当たり前ですけれども、いつも見らえに対して思いを持って準備をしてきたなというふうに思います20代の時には30代をどう生きるかということを考えて生きて、そして30代になれば40代どう生きるかということを生きて今60代ですけどもあの本当にこれからの未来をどのように生きていくかということを考えて。

Tally the Errors and Calculate

Let's count them up:

- Substitutions (S): 5 (温かい→暖かい, 5年→お念, 風→ふう, ピタッと→来たとこ, 未来→見らえ)
- Deletions (D): 4 (が, です, ね, に)

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- Insertions (I): 2 (あのー, でも)
- Total Number of Words in Reference (N): 254

Now, we plug these numbers into the formula:

WER = (S + D + I) / N = (5 + 4 + 2) / 254 = 11 / 254
WER ≈ 0.0433

To express this as a percentage, multiply by 100. Word Error Rate (WER) ≈ 4.33%

The analysis yielded the following performance metrics:

Metric	Result	Industry Interpretation
Word Error Rate (WER)	4.33%	Excellent. A WER below 10% is considered good; below 5-6% is top-tier for professional use.
Word Information Preserved (WIP)	95.25%	Very High. The transcript successfully retained over 95% of the original information.
Word Information Lost (WIL)	4.75%	Very Low. Minimal information was lost during the transcription process.

Qualitative Error Analysis

Beyond the numbers, the *types* of errors reveal the engine's sophistication.

1. Kanji/Homophone Handling: The engine made very few semantic errors. The substitutions of 温かい→暖かい and 風→ふう are contextually understandable and often acceptable in informal text. The more significant errors (5年→お念, 未来→見らえ) were rare phonetic misinterpretations.
2. Verbatim Accuracy: The engine correctly captured filler words like あのー. This demonstrates its ability to produce a true verbatim transcript, which is critical for applications like legal deposition and qualitative research.
3. Colloquial Speech: The transcription of というのは as the more conversational ってのは shows that the model is attuned to natural spoken language rather than just formal written Japanese.

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Conclusion

The data is clear: Conference Captioning delivers exceptionally high accuracy for Japanese speech-to-text. With a Word Error Rate of 4.33%, our engine stands among the best-performing solutions on the market.

This transcription used our multilingual transcription model which allows for switching languages in real-time so it isn't even our most accurate language model, which means ConferenceCaptioning has the capability to perform an even higher accuracy rate.

This level of precision ensures that users can trust the output for business-critical applications, from meeting minutes and media content analysis to customer service analytics and accessibility services. We are committed to continuous improvement and transparency in our performance.

About Us

ConferenceCaptioning- Empowering accessibility through on-device AI-driven live captioning and translation. **Ready to see the accuracy for yourself?**

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