

Braille Bridge – Evaluation Dataset & Results

1. Overview

Braille Bridge is an AI-powered accessibility application designed to convert Braille text into spoken language.

This document presents the evaluation dataset used for testing the system and summarizes the results obtained during prototype validation.

2. Evaluation Dataset

The evaluation dataset for Braille Bridge consisted of sample Braille inputs used to test the AI pipeline.

The dataset included:

- Printed English Braille characters and short words
- Standard Braille dot patterns used in daily communication
- Images captured using a camera under different lighting conditions
- Publicly available Braille reference images used strictly for testing

This dataset was selected to represent realistic usage scenarios for visually impaired users and caregivers.

3. Evaluation Methodology

Each Braille image was provided as input through the application's camera interface.

The processing pipeline consisted of:

- Image input capture
- AI reasoning through the Airia-built AI brain
- Image understanding using the Gemini 2.0 Flash model
- Braille-to-text conversion via prompt-based reasoning
- Audio output through text-to-speech

The system was evaluated based on:

- Accuracy of Braille recognition
 - Correctness of translated text
 - Clarity of audio output
 - Response time and usability
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4. Results

The evaluation demonstrated that Braille Bridge performs effectively as a prototype accessibility solution.

Key results observed:

- High accuracy for clear and well-lit Braille images
- Fast response times due to the lightweight Gemini 2.0 Flash model
- Clear and understandable audio output
- Slight performance reduction in low-light or unclear images

Overall, the system successfully translated most standard Braille inputs into meaningful spoken output.

5. Limitations and Future Improvements

While effective as a prototype, the system has some limitations.

Current limitations:

- Sensitivity to image quality and lighting conditions
- Limited dataset size
- Focus on English Braille only

Planned future improvements include:

- Expanding the evaluation dataset
 - Supporting real-time camera detection
 - Adding multi-language Braille support
 - Improving robustness in challenging environments
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6. Conclusion

The evaluation results confirm that Braille Bridge is a functional and impactful AI prototype. The project demonstrates how multimodal AI and no-code tools can be combined to build accessible solutions efficiently.