Methodology

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1. Language Pair Selection

Language pairs were selected based on the objectives of the study:

- Fijian ↔ English
- English ↔ Fijian

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2. Sample Data Preparation

A diverse set of sentences was curated for translation. The dataset included:

- Short and long sentences
- Idiomatic expressions
- Domain-specific terminology (e.g., legal, medical)

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3. Translation Execution

Each selected sentence was translated using various machine translation systems.

3.1 Large Language Models (LLMs)
LLMs (prominent models: GPT-4 and Gemini 1.5 Pro) were prompted using the format:

"Translate the following sentence to [target language]: [sentence]"

3.2 Neural Machine Translation Systems (NMTs)
Translation was performed using APIs and open-source toolkits such as Google & Microsoft Translate. Preprocessing and tokenization steps were standardized across systems where applicable.

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4. Automatic Evaluation

Machine-generated outputs were compared to human reference translations using standard automatic evaluation metrics:

- BLEU
- CHRF++
- TER

These metrics provided quantitative assessments of translation accuracy and fluency.

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5. Human Evaluation

Where feasible, bilingual speakers assessed the translations. Each output was rated based on:

- **Fluency** (grammatical correctness and naturalness) on a 1–5 scale
- **Adequacy** (faithfulness to the source meaning) on a 1–5 scale
- **Cohesion/Discourse** (for long texts), evaluated through qualitative feedback or an extended scale

Multiple evaluators were used to ensure consistency and reduce subjective bias.

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6. Performance Quantification

For each model or system, the following performance indicators were calculated:

- Average BLEU, CHRF++, and TER scores
- Mean human evaluation scores

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7. Reporting

Results were compiled into tables and visualizations to highlight:

- Comparative performance across systems
- Specific strengths and weaknesses
- Observations in domain-specific or low-resource contexts
- Recommendations or future research
