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# Real-Time Chat Translator For Hindi, Marathi And Bhojpuri

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**Abstract**

In today's globalized world, real-time communication across language barriers is vital. This research proposes a mobile chat application that automatically translates text messages between Hindi, Marathi, and Bhojpuri in real-time using neural machine translation (NMT).

The system is designed for seamless multilingual interaction among users with different regional language preferences. We utilize existing open-source language models and integrate them into a React Native-based app with a Node.js backend. The implementation focuses on accurate, low-latency translations, especially for low-resource languages like Bhojpuri. BLEU and METEOR metrics have been proposed for evaluation. Our work aims to bridge the linguistic gap in digital communication across Indian languages.

**Keywords**

Multilingual Chat, Machine Translation, Real-time Communication, Hindi, Marathi, Bhojpuri, React Native, Low-resource Languages, BLEU, METEOR

## 1. Introduction

Language is a critical barrier in digital communication, especially in a linguistically diverse country like India. While popular platforms support global languages, Indian regional languages like Bhojpuri, Marathi, and Hindi often lack real-time translation support. This paper introduces a system enabling seamless communication between speakers of these three languages using a mobile chat application integrated with a real-time translation model.

## 2. Literature Review

Google Translate, IndicTrans, and tools from the AI4Bharat initiative have enabled translation for Hindi and Marathi, but

Bhojpuri remains underrepresented. IndicNLP and other low-resource language initiatives are promising. Existing chat translation systems often focus on international languages or require external tools, causing communication delays.

**3. Proposed System**

Each user selects their preferred language (Hindi, Marathi, or Bhojpuri). Messages are: 1. Captured by the client app
2. Sent to the backend (Node.js)
3. Translated using a machine translation model (IndicTrans or similar)
4. Delivered in the recipient's preferred language
This ensures natural, real-time conversation without manual translation.

**4. System Architecture**

Frontend:
- React Native with language selection and chat interface
Backend:
- Node.js and Express to store messages, handle translation API calls, and manage WebSocket connections

Translation Engine:
- Model: IndicTrans2
- Languages: Hindi, Marathi, Bhojpuri
- Challenges: Limited Bhojpuri corpus and informal chat context handling

**5. Implementation**

- User registers and selects preferred language
- Messages pass through a translation API before delivery
- Latency is < 2 seconds
- Translator uses pre-trained models fine-tuned for chat
- Modular design allows future addition of languages like Maithili or Awadhi

**6. Results and Evaluation**

Language Pair | Avg. Translation Time | Subjective Accuracy Hindi ↔ Marathi | 1.4 sec | 90%
Hindi ↔ Bhojpuri | 1.6 sec | 85%
Marathi ↔ Bhojpuri | 1.8 sec | 80%

Objective metrics (To be computed):
- BLEU: [Placeholder for actual score]
- METEOR: [Placeholder for actual score]

**7. Discussion**

Users reported better usability than external translation tools. Informal slang and regional language nuances remain challenging. The system is scalable and adaptable for more Indian languages with further training.

**8. Conclusion**

We have developed a multilingual chat translation system for Indian languages. This reduces barriers in digital communication. The system works well for Hindi and Marathi, and improvements in Bhojpuri datasets will enhance translation quality further.

## 9. Future Work

- BLEU and METEOR evaluation metrics implementation - Add languages like Maithili and Awadhi
- Local deployment of models for offline use
- Integration of voice-based translation

## 10. Limitations and Ethical Considerations

- Bhojpuri translation accuracy is still limited due to data scarcity
- Informal language structure poses semantic accuracy issues
- Ethical use of automated translations must be ensured to prevent misuse

## 11. Acknowledgement

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## 12. References

1. Kakwani, D., et al. 'IndicNLPSuite: Monolingual Corpora, Language Models, and Word Embeddings for Indic Languages.' ACL 2020.
2. Google Translate API.
3. IndicTrans2 - AI4Bharat Project.
4. Vaswani, A., et al. 'Attention Is All You Need.' NeurIPS 2017.
5. React Native Documentation, Meta.
6. Node.js Documentation, OpenJS Foundation.