

# Investigate Predictive AAC with Sequence to Sequence Network on Small Conversational Datasets

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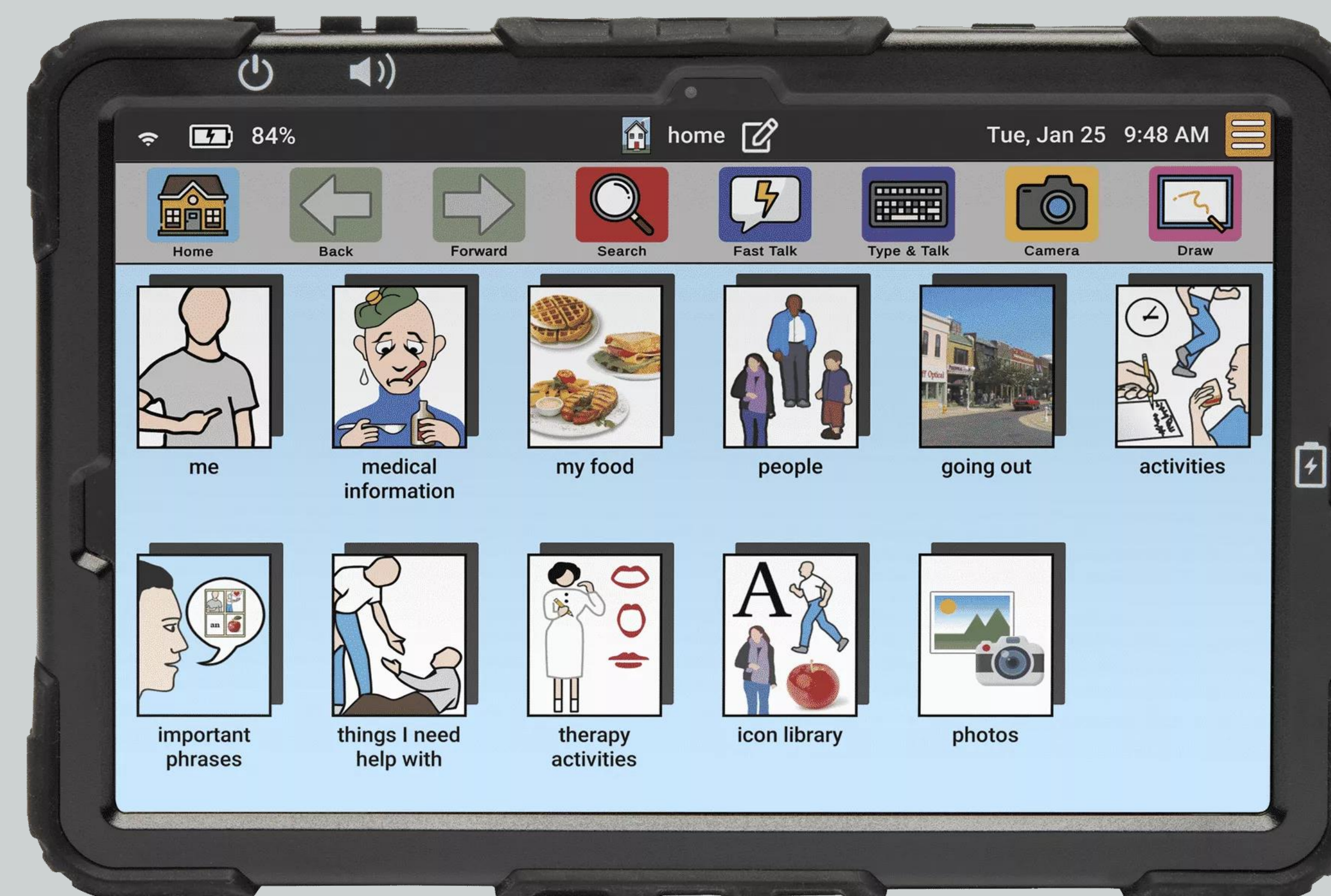
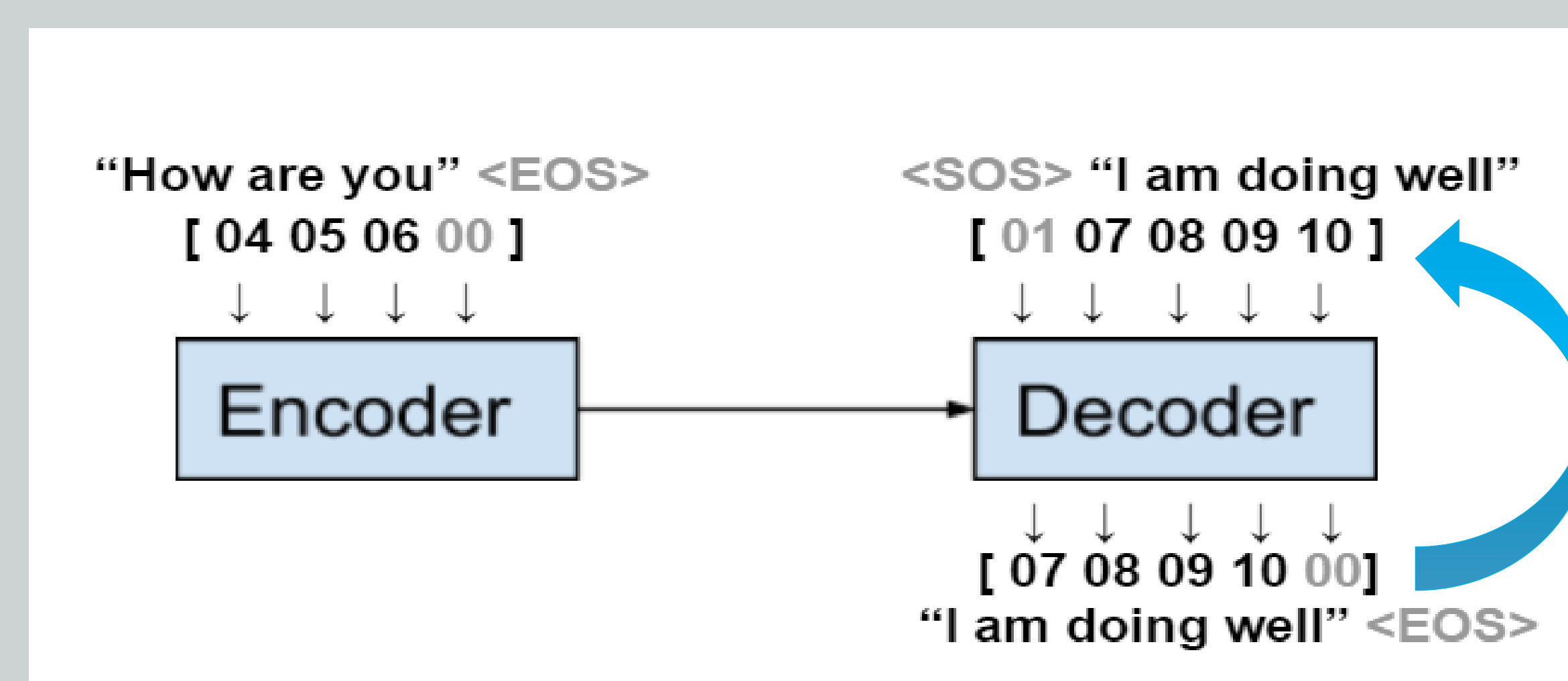
## Introduction

An **Augmentative and Alternative Communication (AAC)** device is a tablet or laptop that helps someone with a speech or language impairment to communicate. Making good question-answer predictions can help accelerate the communication.

**Recurrent Neural Network (RNN)** is a network that operates on a sequence and uses its own output as input for subsequent steps.

A **Sequence to Sequence network**, or seq2seq network, or Encoder Decoder network, is a model consisting of two RNNs called **the encoder and decoder**. The encoder reads an input sequence and outputs a single vector, and the decoder reads that vector to produce an output sequence.

## Question-Answer Encoder-Decoder



## Methods

- Sequence to Sequence network (seq2seq) or
- Encoder-Decoder network

### Architecture



- Long Short-Term Memory (LSTM)
- Gated Recurrent Unit (GRU)
- Recurrent Neural Network (RNN)

### Language Model



- 109 question-answer pairs
- 89 pairs train set
- 20 pairs test set

### Datasets



- Encoder vocabulary size: 210
- Decoder vocabulary size: 243

### Input Features



## Results



## Conclusion

This work provides results showing Sequence to Sequence Network, especially Attention RNN, which is trained on Small Conversational Datasets, can provide promising results on AAC device's question-answer pair predictions.

## Future Work

- Make the dataset conversation more strongly related to the user, health conditions, etc.
- Use speech data instead of text
- Try different models to continue to improve prediction accuracy
- Redefine WER to handle special cases when the prediction has no same word as the correct answer but has the same meaning