

Introduction



A business line for business owners to connect with their customers

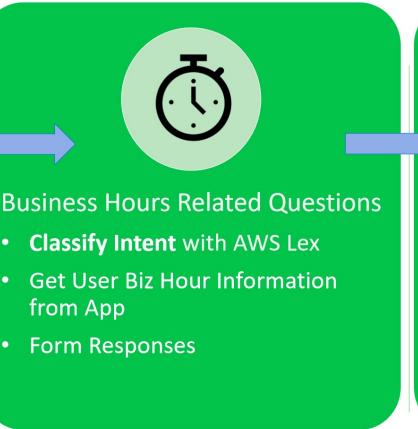
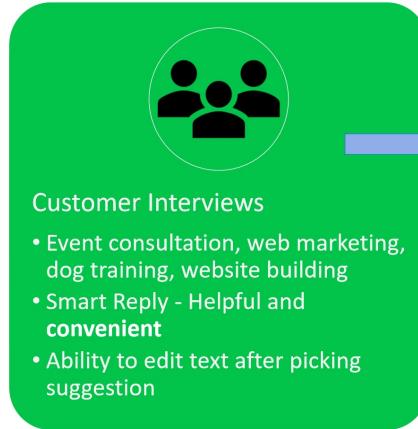
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"What's your address?"

of incoming messages are **questions**

Many questions are **repeated**

Process

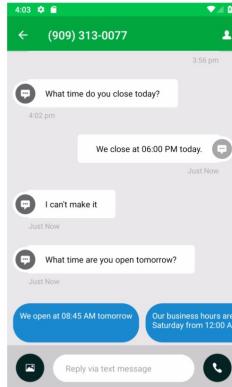
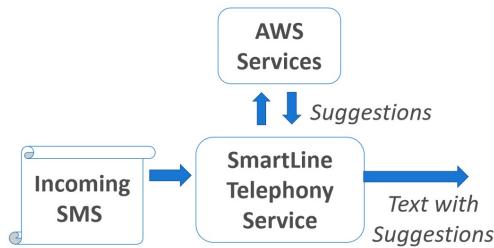


Future Work

- Integrate a **feedback mechanism** to evaluate performance of models and iteratively improve them
- For response for business hours questions, improve Lex's accuracy by periodically **updating training data**
- For personalized response retrieval, evaluate relevance of an outgoing SMS to an incoming neighbor
- Use other approaches such as **Sequence2Sequence** to suggest responses for other more generic incoming messages

SmartReply

We built a **response suggestion feature** to help Smartline users reply to their customers



Machine Learning Models

Business Hours Related Questions

Using AWS Lex

- Prebuilt system to process text, filter noise, classify intents, and extract entities
- An AWS Service – Operational synergies in the medium-long term
- Blackbox – Only way to improve results is to finetune the dataset
- Confidence of Intent prediction not outputted

Datasets

Sets of examples for each of 20 intents generated from production SmartLine data

Augmenting Responses with Stanford Language Parser

Detect **yes-no questions**, based on sentence structures

Give out "Yes", "No" as additional response options

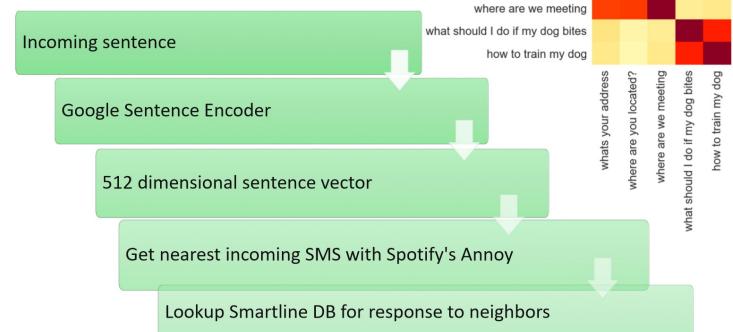
Incoming Message	Suggested Responses
Are you open Saturday?	<ul style="list-style-type: none"> "Yes, we are open on Saturday" "Our hours on Saturday are 09:00 AM – 01:00 PM" "We open at 09:00 AM on Saturday" "Sorry, we are closed Saturday"

Personalized Response Retrieval

Mining the Incoming-Outgoing Pair Dataset

- Select consequent pairs of incoming question and outgoing answers
- Labeled 4000 messages into **questions and statements**
- Trained a Recurrent Neural Network to classify with **92% accuracy**

Going from Data to Predictions



Incoming Message	Similar Past Incoming Messages	Retrieved Responses
• "Where is your business located?"	• "Where is your warehouse located?" • "Where is your store located?"	• "Off of Reno and Council Rd" • "In OKC off of Reno and Council."