Ubiquitous and Mobile Computing
CS 528 - Tech Talk

ML Kit - Smart Reply

Team 1

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Background

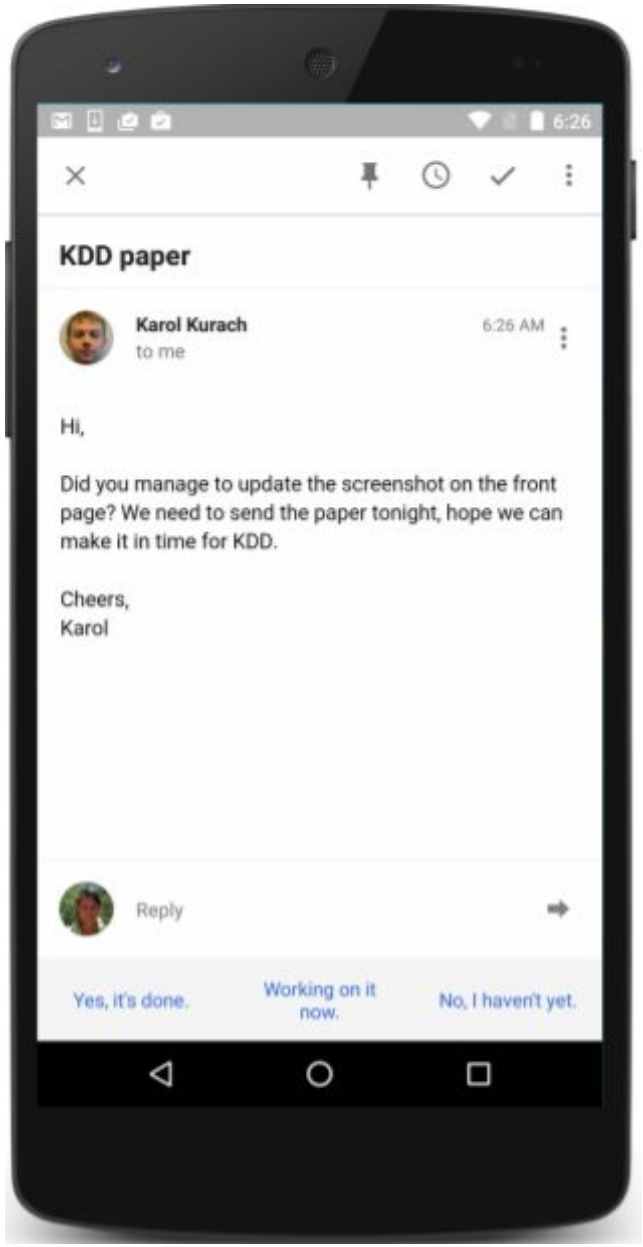
- Began as a project to automate short emails answered on mobile.
- Study showed that 25% of replies had 20 tokens or less
- Questions
  - Can we assist users with composing short messages?
  - Can we suggest brief replies that can be used with a single tap?

Problems it’s Designed to Solve

- Reduced response time.
- Ease of replying on a mobile device with just a tap.

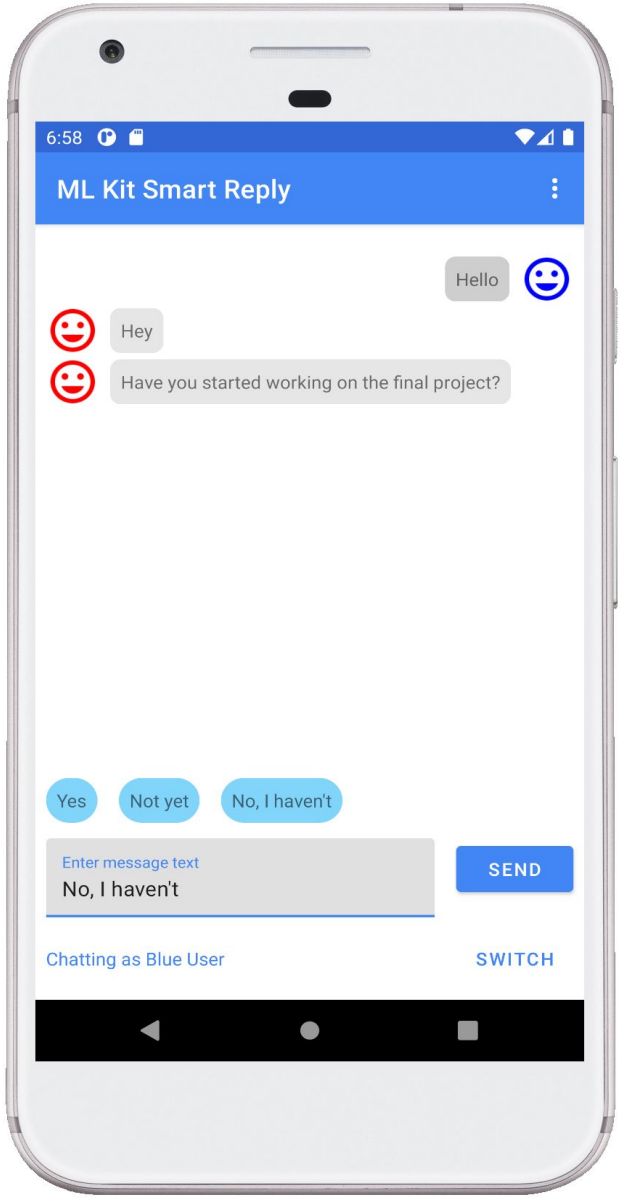
Real world examples

- Inbox by Gmail.
- Google Allo, an instant messaging mobile app(shutdown).
- Pretty much available for all messaging apps(built into Android 10 and onwards)
- Responsible for assisting with 10% of all mobile responses.



Example Use Cases

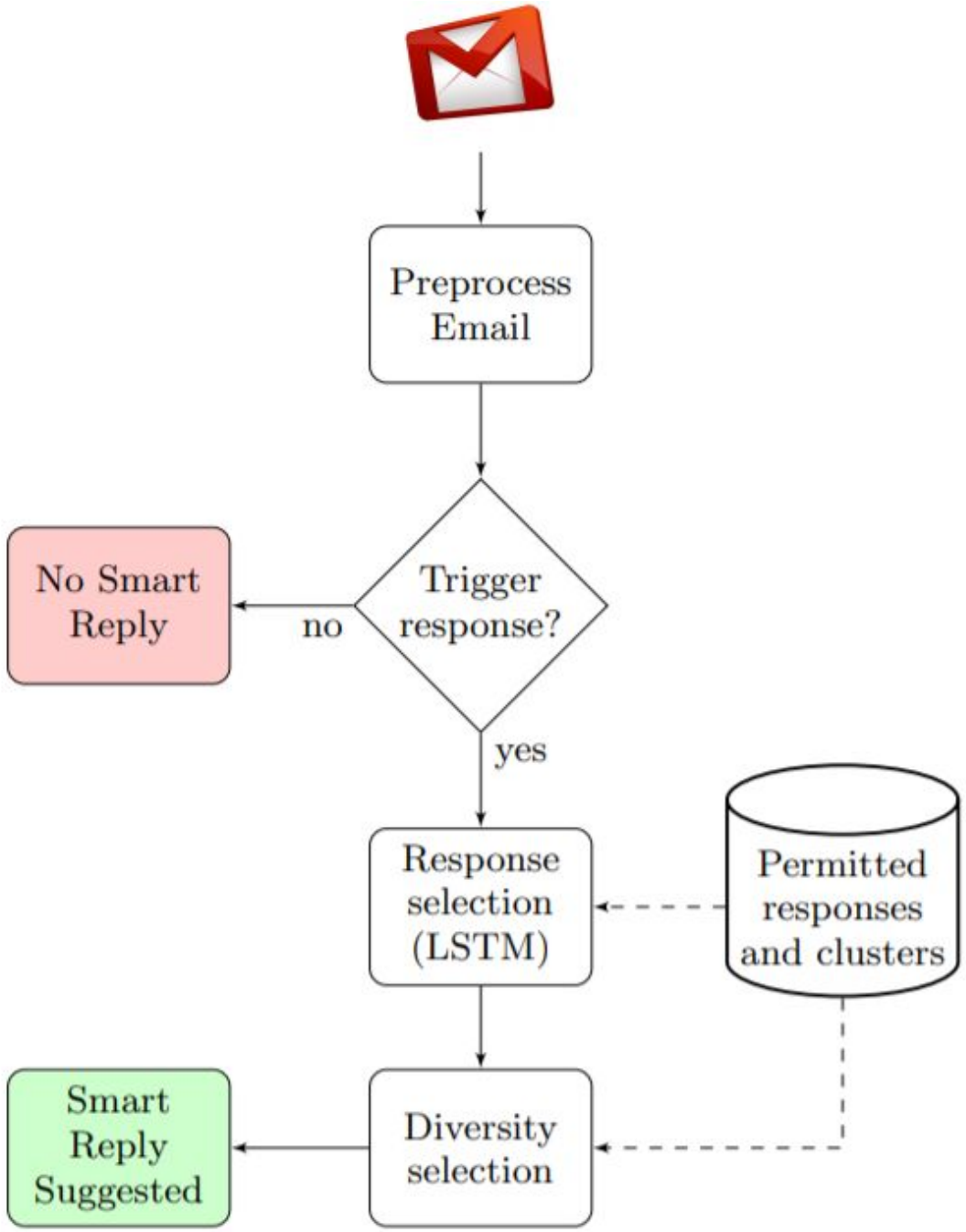
- Email Apps - Replies to emails
- Messaging Apps - Replies to messages
- Chat Bots - Replies to tech queries.



How it works: An Overview

- Considers 10 most recent messages from conversation history.
- Suggests 3 relevant Responses.
- Provides responses for English language only.
- No responses provided when sensitive topic is detected.

The Message Flow



Kannan, A. et al. "Smart Reply: Automated Response Suggestion for Email." *Proceedings of the 22nd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining* (2016): n. pag.

Code snippet: Walk through simple example

1. Create conversation history object (incoming and outgoing)

```
conversation.add(TextMessage.createForLocalUser(
        "heading out now", System.currentTimeMillis()));
```

```
conversation.add(TextMessage.createForRemoteUser(
        "Are you coming back soon?", System.currentTimeMillis(), userId));
```

Code snippet walkthrough (continued)

2. Generate smart replies

```
SmartReplyGenerator smartReply = SmartReply.getClient();
smartReply.suggestReplies(conversation)
        .addOnSuccessListener(new OnSuccessListener() {
            @Override
            public void onSuccess(SmartReplySuggestionResult result) {
                if (result.getStatus() == SmartReplySuggestionResult.STATUS_NOT_SUPPORTED_LANGUAGE) {
                    // The conversation's language isn't supported, so
                    // the result doesn't contain any suggestions.
                } else if (result.getStatus() == SmartReplySuggestionResult.STATUS_SUCCESS) {
                    // Task completed successfully
                    // ...
                }
            }
        })
        .addOnFailureListener(new OnFailureListener() {
            @Override
            public void onFailure(@NonNull Exception e) {
                // Task failed with an exception
                // ...
            }
        });
```

Code snippet walkthrough (continued)

3. On success

```
for (SmartReplySuggestion suggestion : result.getSuggestions()) {
    String replyText = suggestion.getText();
}
```

References

1. https://developers.google.com/ml-kit/language/smart-reply/android#java
2. https://github.com/googlesamples/mlkit/tree/master/android/smartreply
3. https://www.kdd.org/kdd2016/papers/files/Paper_1069.pdf

Thank You