

PriBots

Conversational Privacy with Chatbots



Hamza Harkous¹, Kasseem Fawaz², Kang. G. Shin², Karl Aberer¹



¹EPFL; ²University of Michigan



Privacy Notice: Current State

When you use Google services, you trust us with your information. This Privacy Policy is meant to help you understand what data we collect, why we collect it, and what we do with it. This is important; we hope you will take time to read it carefully. And remember, you can find controls to manage your information and protect your privacy and security at [My Account](#).



Privacy Policy

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There are many different ways you can use our services – to search for and share information, to communicate with other people or to create new content. When you share information with us, for example by creating a [Google Account](#), we can make those services even better – to show you more relevant search results and ads, to help you connect with people or to make sharing with others quicker and easier. As you use our services, we want you to be clear how we're using information and the ways in which you can protect your privacy.

Our Privacy Policy explains:

- What information we collect and why we collect it.
- How we use that information.
- The choices we offer, including how to access and update information.

We've tried to keep it as simple as possible, but if you're not familiar with terms like cookies, IP addresses, pixel tags and browsers, then read about these [key terms](#) first. Your privacy matters to Google so whether you are new to Google or a long-time user, please do take the time to get to know our practices – and if you have any questions [contact us](#).

Information we collect

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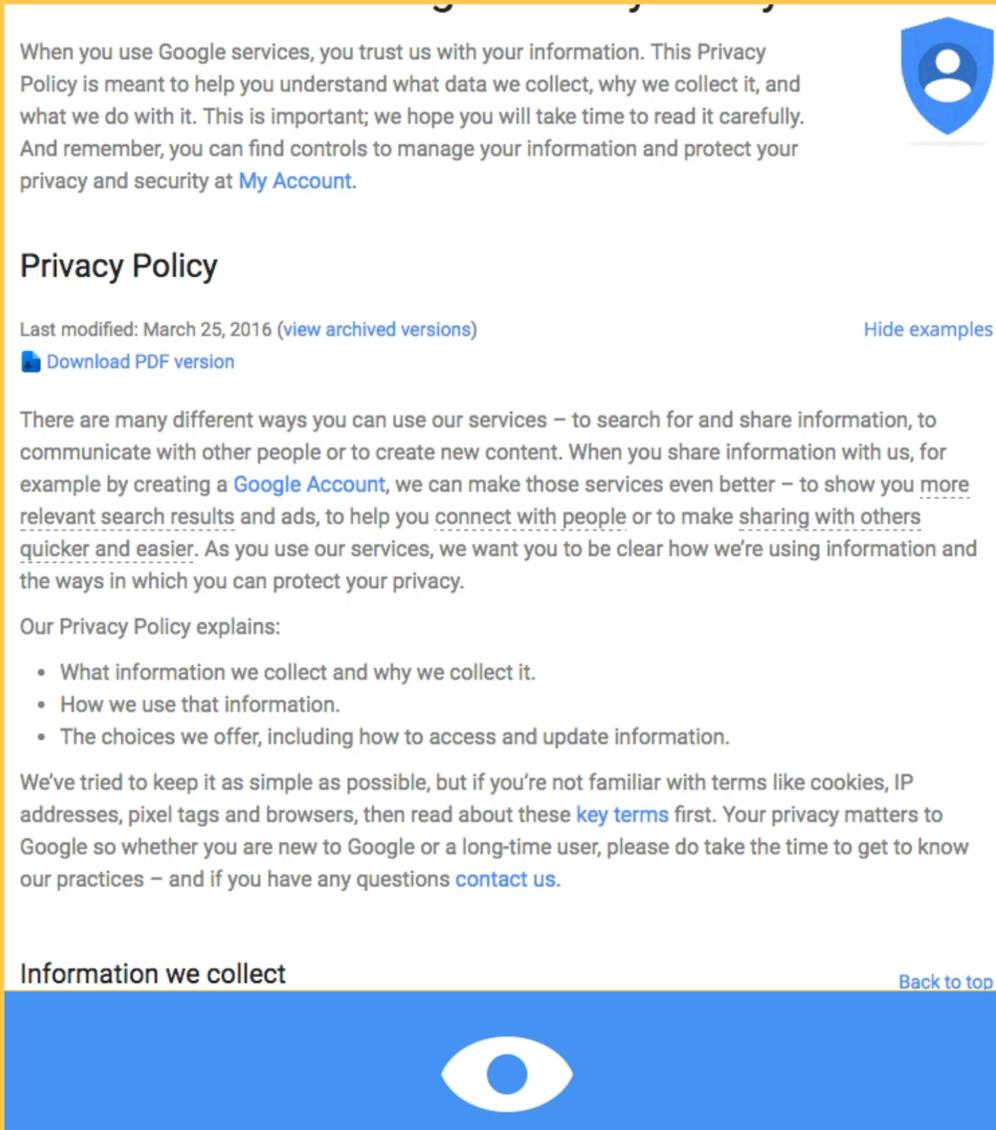


legally binding

Dual Role:

human understandable

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Information we collect [Back to top](#)



legally binding

Dual Role:

human understandable

Can we *split* these roles?

Standardization

Acme

information we collect

ways we use your information

information sharing

	ways we use your information				information sharing	
	provide service and maintain site	marketing	telemarketing	profiling	other companies	public forums
contact information		opt out	opt out			
cookies						
demographic information		opt out	opt out			
preferences		opt out	opt out			
purchasing information		opt out	opt out			
your activity on this site		opt out	opt out			

Information not collected or used by this site: social security number & government ID, financial, health, location.

Access to your information
This site gives you access to your contact data and some of its other data identified with you

acme.com
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Pittsburgh, PA 15213 United States
Phone: 800-555-5555
help@acme.com

How to resolve privacy-related disputes with this site
Please email our customer service department

 we **will** collect and use your information in this way

 we **will not** collect and use your information in this way

 **opt out** by default, we **will** collect and use your information in this way unless you tell us not to by opting out

 **opt in** by default, we **will not** collect and use your information in this way unless you allow us to by opting in

Standardization

Summarization

Acme

information we collect	ways we use your information				information sharing	
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B

-  **Collection of Personal Info (such as e-mail address)**
-  **Combination with Info from outside Companies**
-  **No Advertising Tracking (e.g., no use of Ad Cookies)**
-  **No Disclosure of Personal Info to Advertisers**
-  **Personal Info is Archived for Unlimited Time**
-  **Stored and Transmitted Info is not Encrypted**

Meaning of Grades and Symbols

- | | |
|---|--|
|  = Above Average Overall Privacy |  = Good Privacy Practice |
|  = Average Overall Privacy |  = Neutral Privacy Practice |
|  = Below Average Overall Privacy |  = Bad Privacy Practice |

Standardization

Summarization

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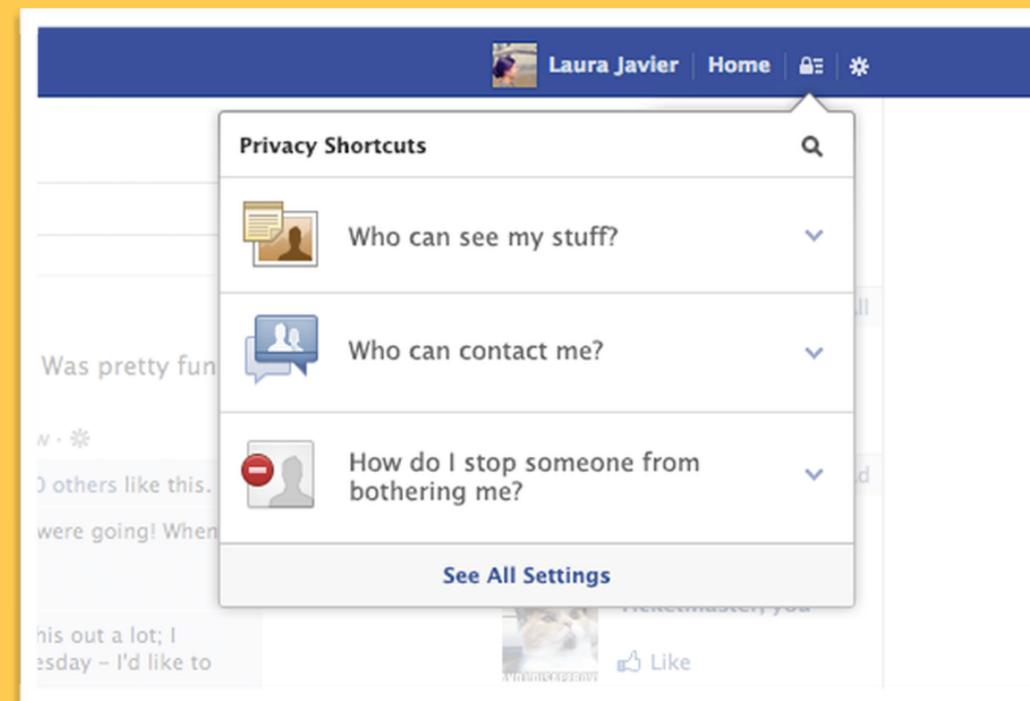
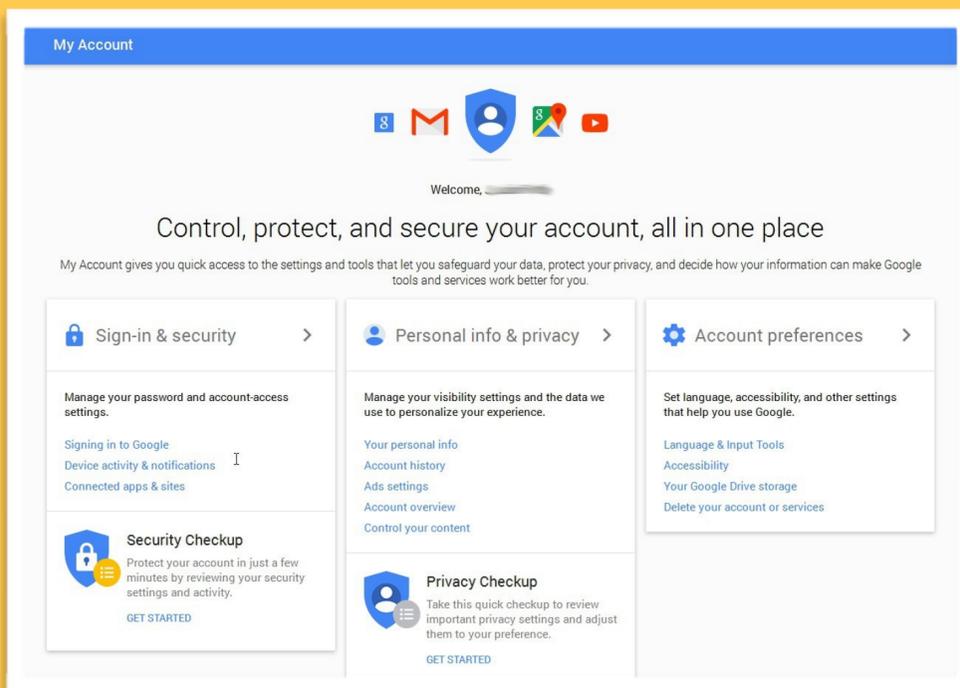
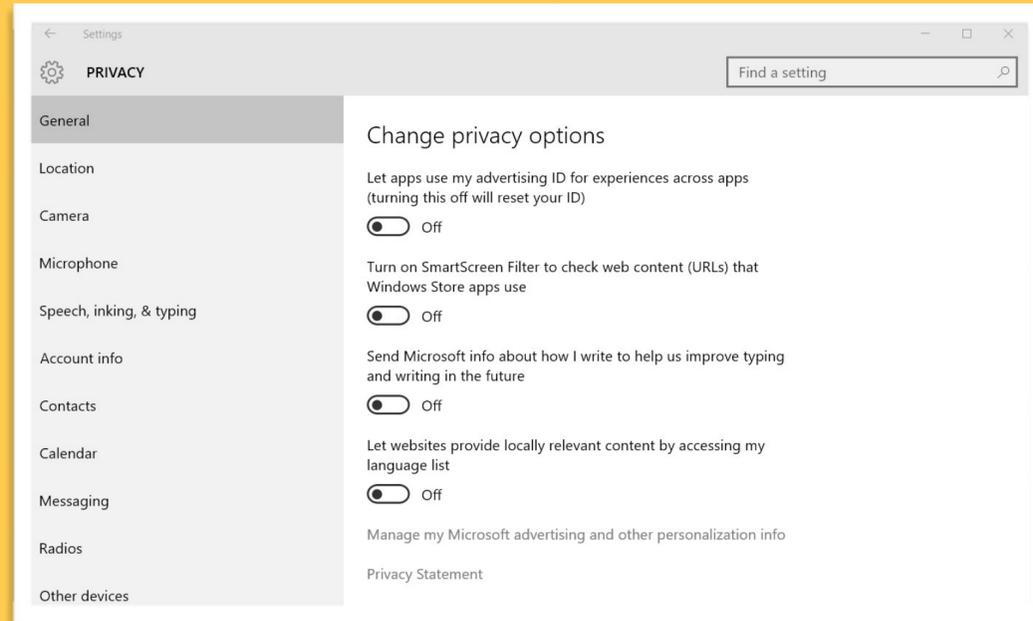
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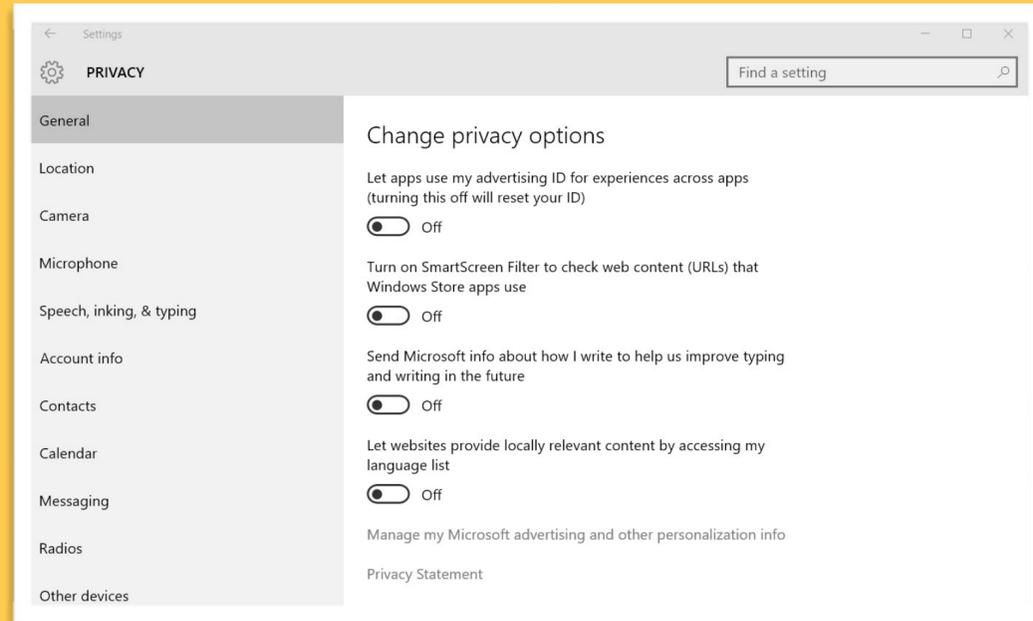
Challenges

- one size fits all
- user education

Privacy Choice: Current State

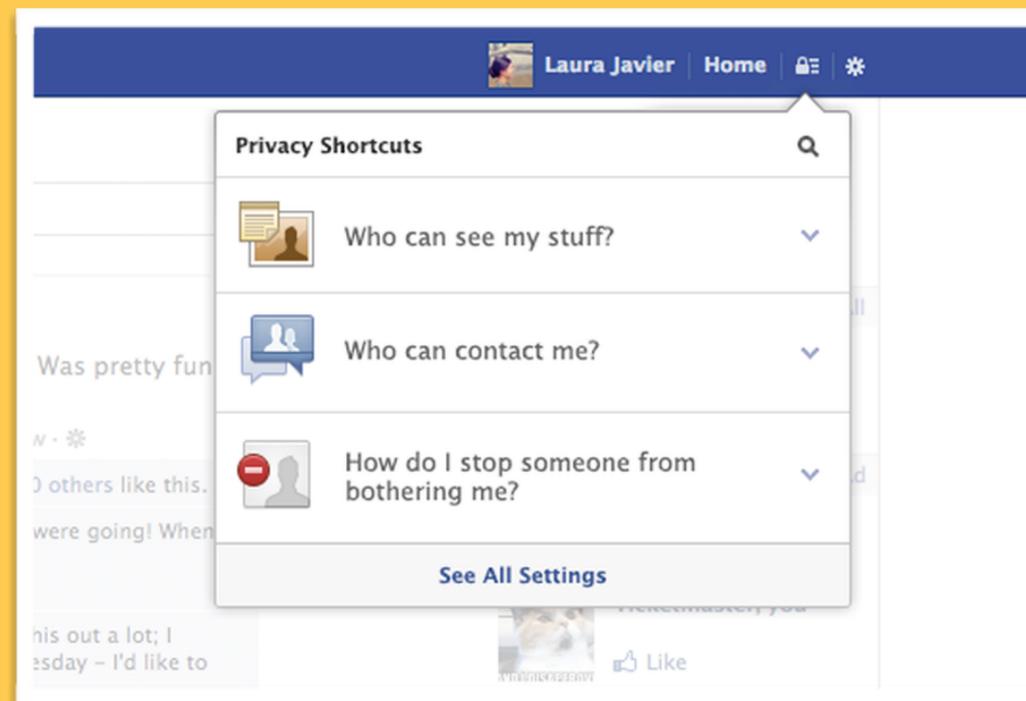
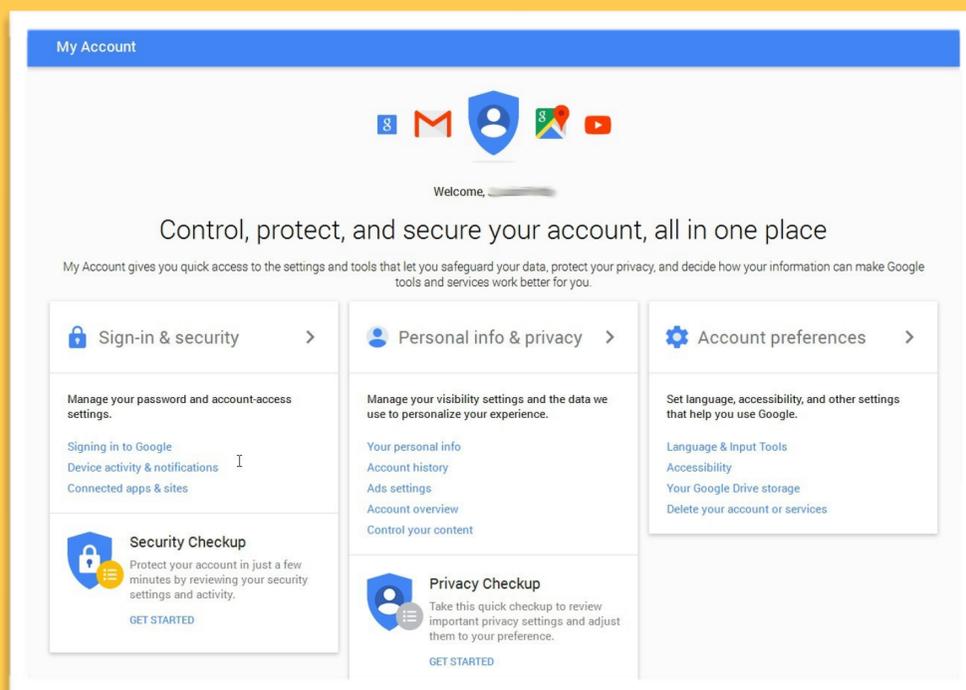


Privacy Choice: Current State



fragmented ecosystem

difficult to find





Conversation-first Interfaces



The Rise of Conversational UI

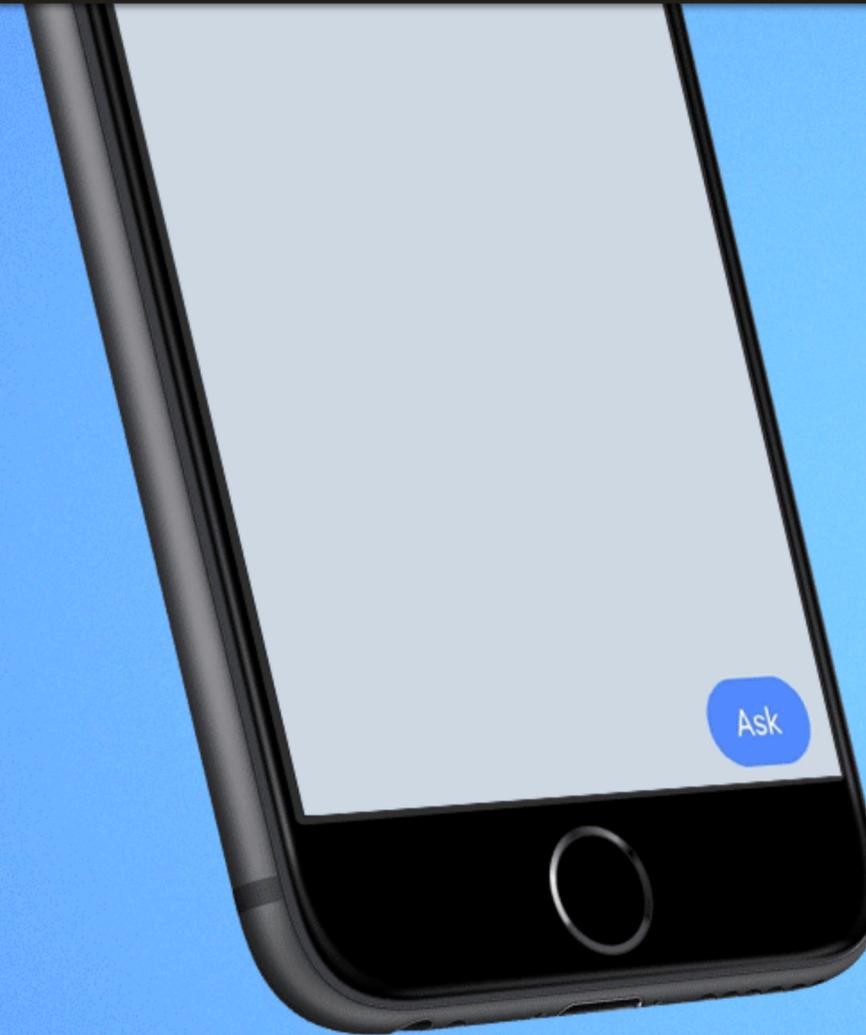


Tomaž Štolfa in The Layer

10 March · 11 min read

The Future of Conversational UI Belongs to Hybrid Interfaces

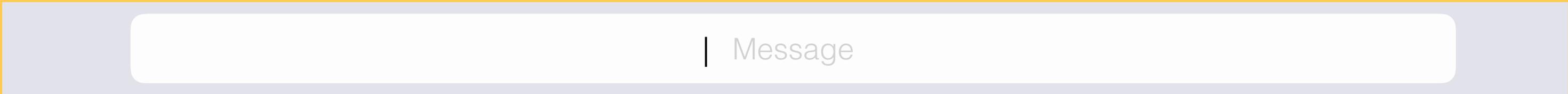
2016 is the year of everything conversational. Messaging apps are taking over the world and app store rankings with incredible retention and engagement rates. Every community, marketplace, on-demand service, dating app...



PriBots: Conversational Privacy Bots

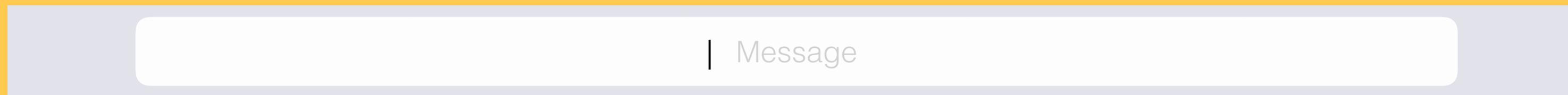
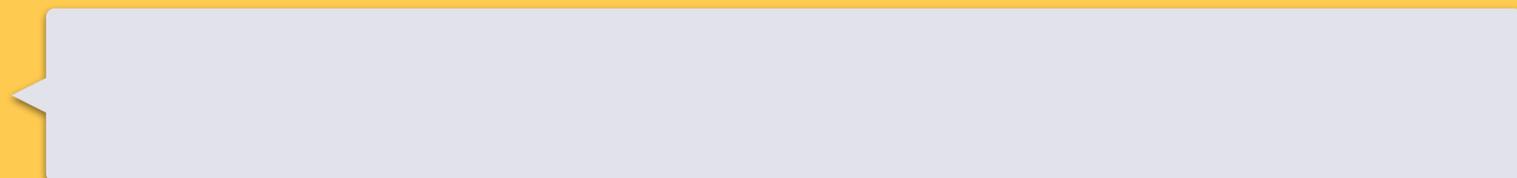
| Message

PriBots: Conversational Privacy Bots



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Appeal to new tech adopters



PriBots: Conversational Privacy Bots

Appeal to new tech adopters

Appeal to existing users

| Message

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Appeal to existing users

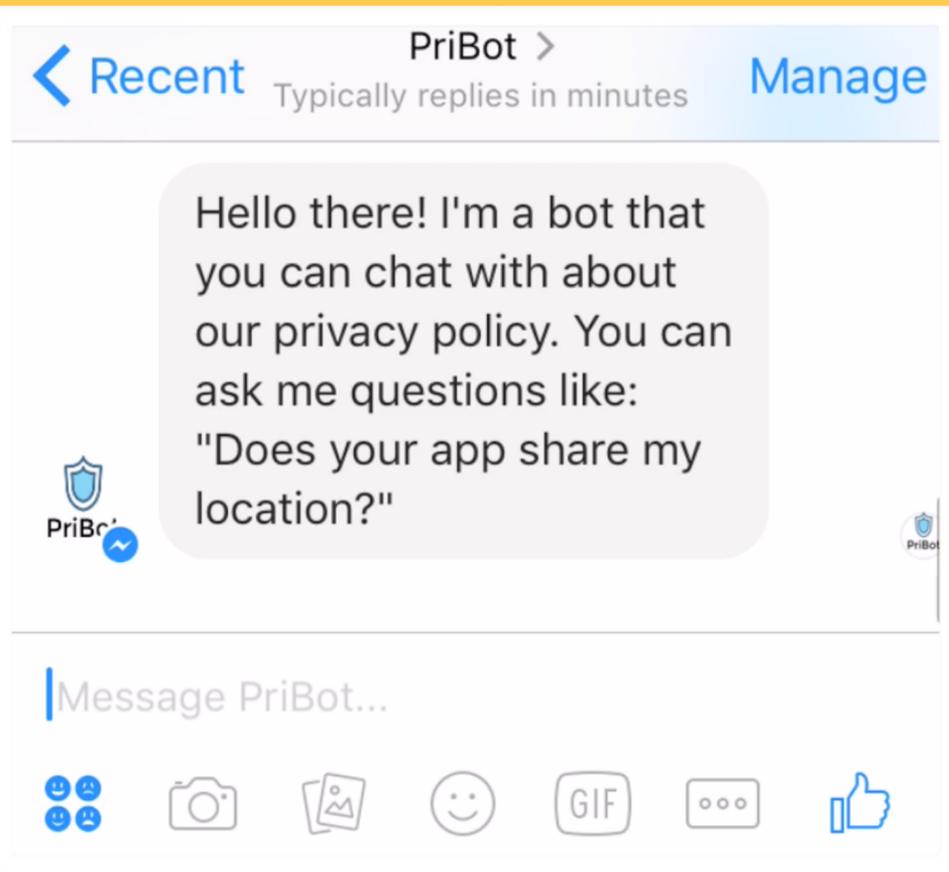
| Message

An intuitive way to

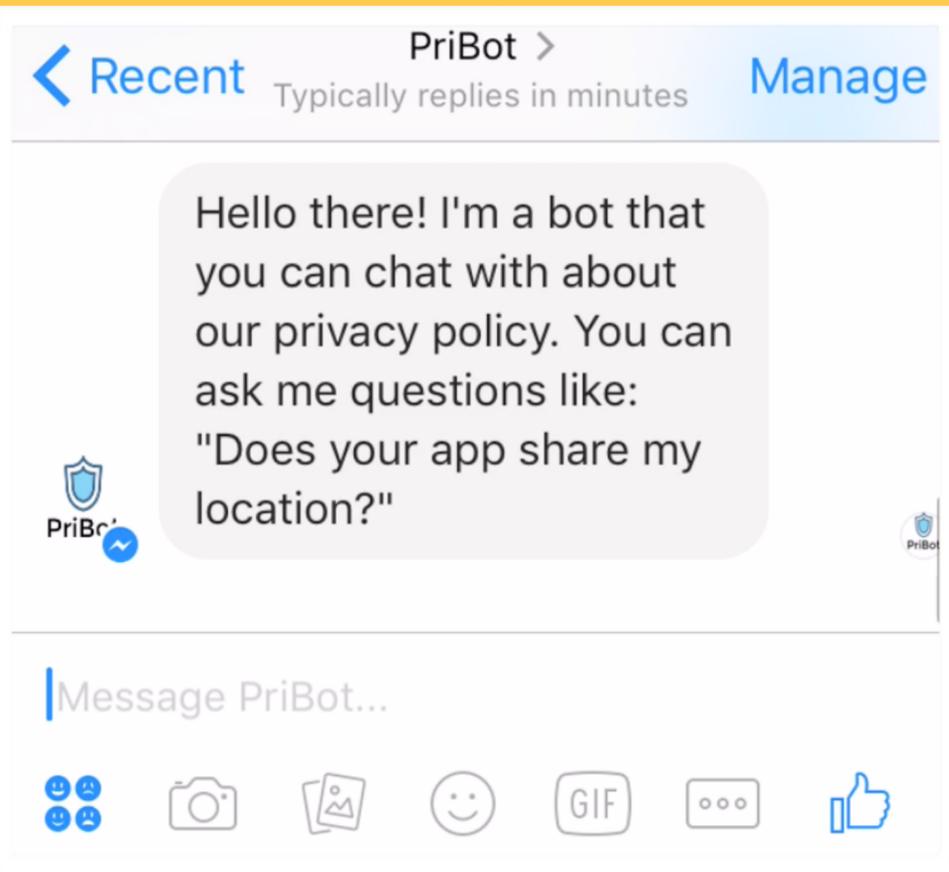
1. communicate privacy policies
2. adjust privacy preferences

1-Communicating Privacy Policies

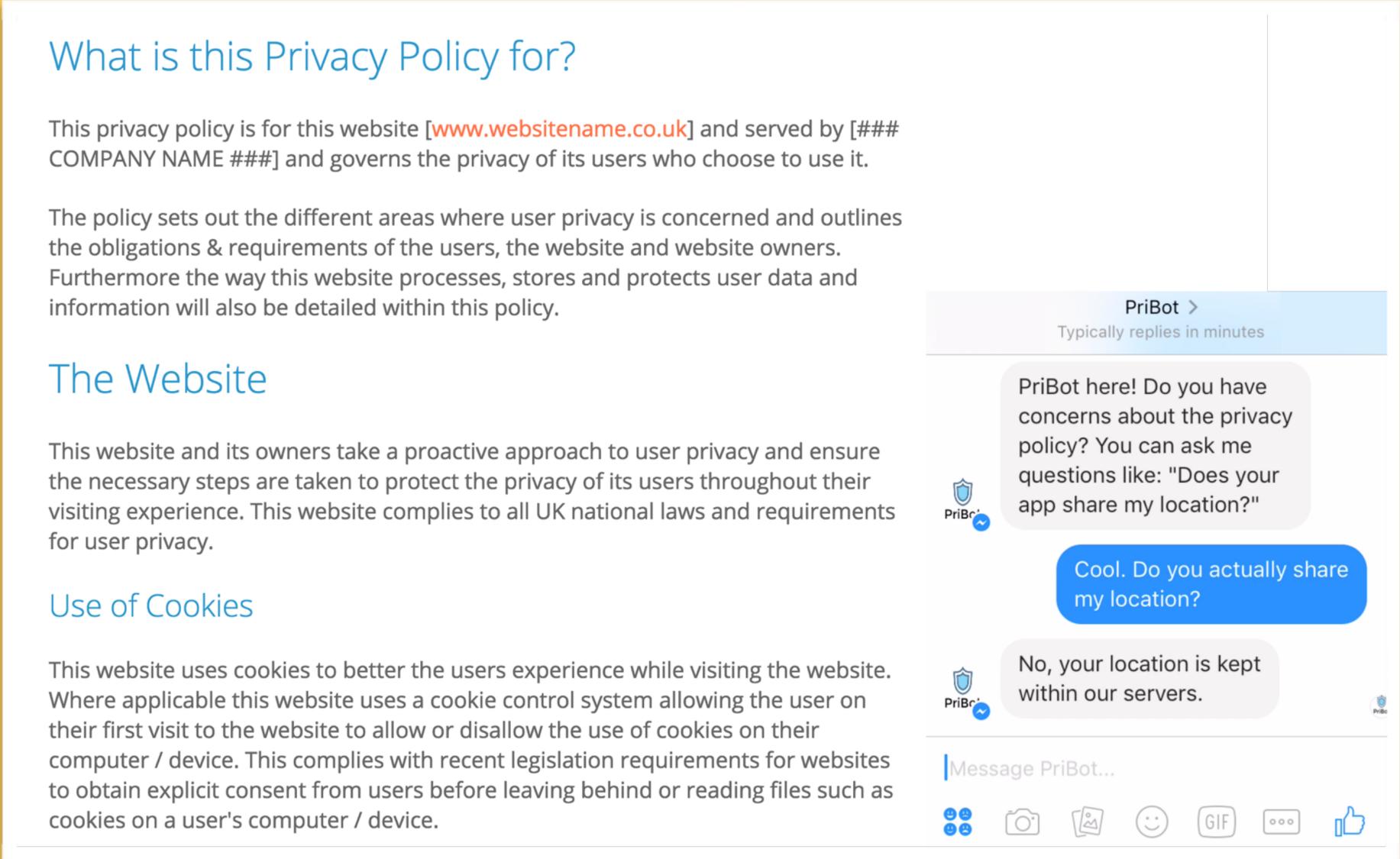
Channel



Primary



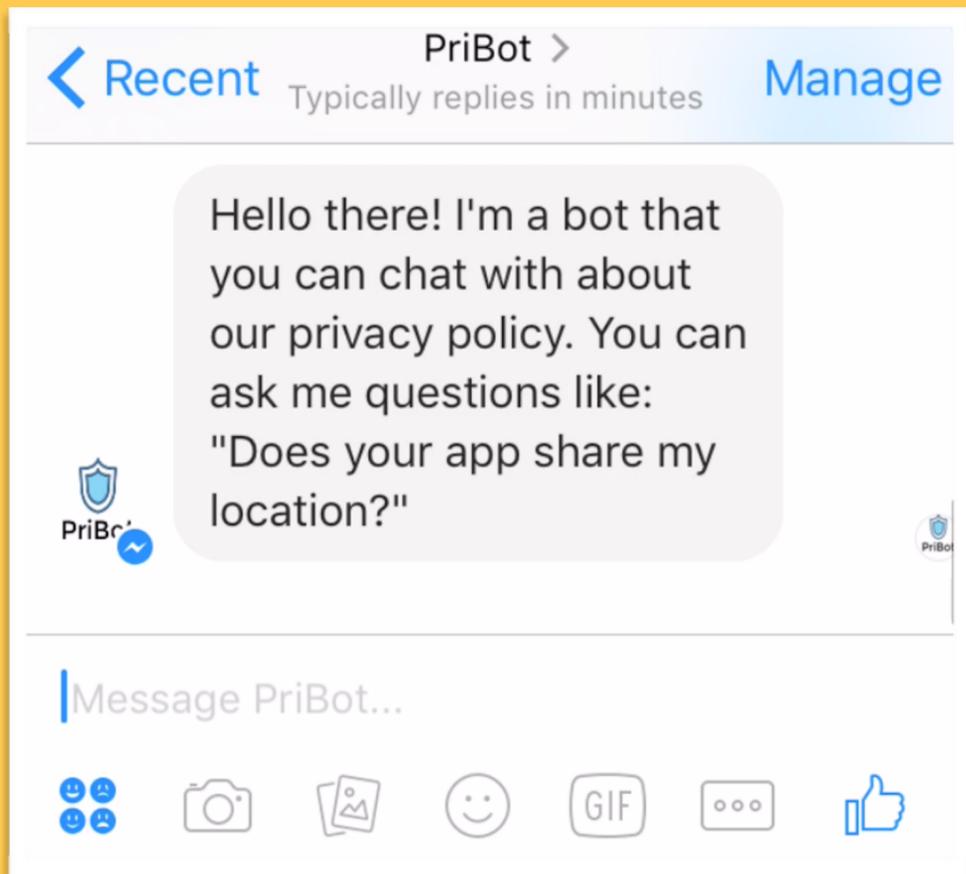
Primary



Secondary

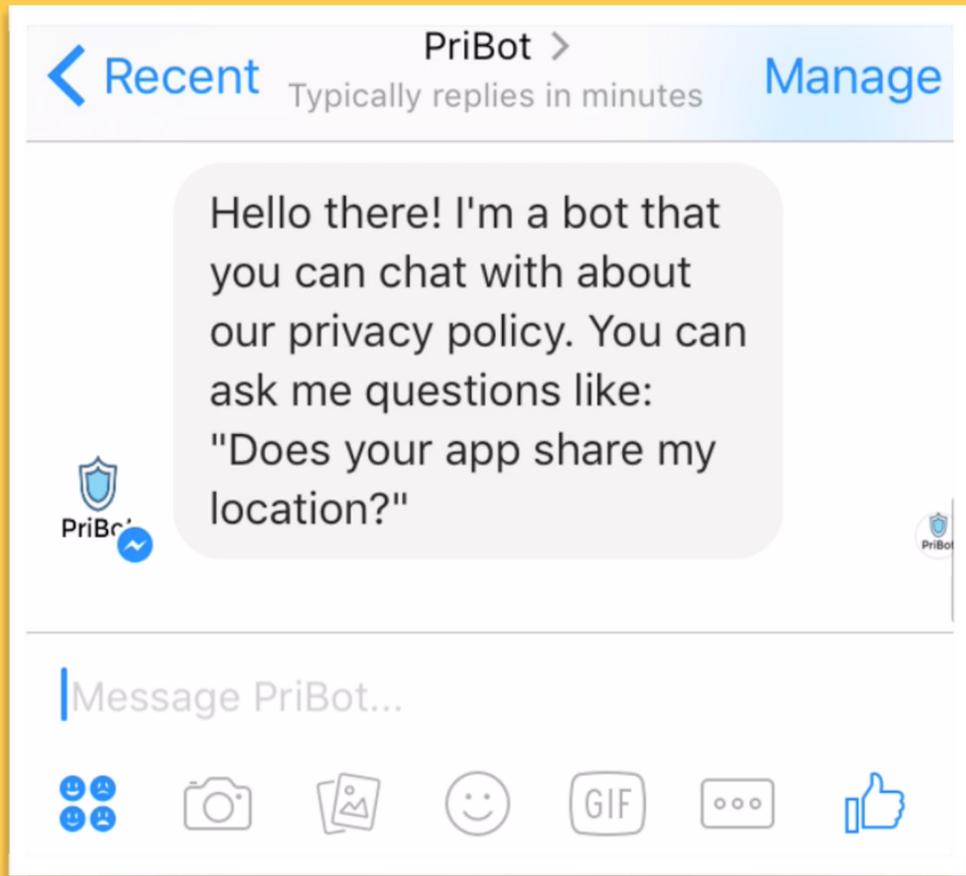
Timing

Timing



At-setup

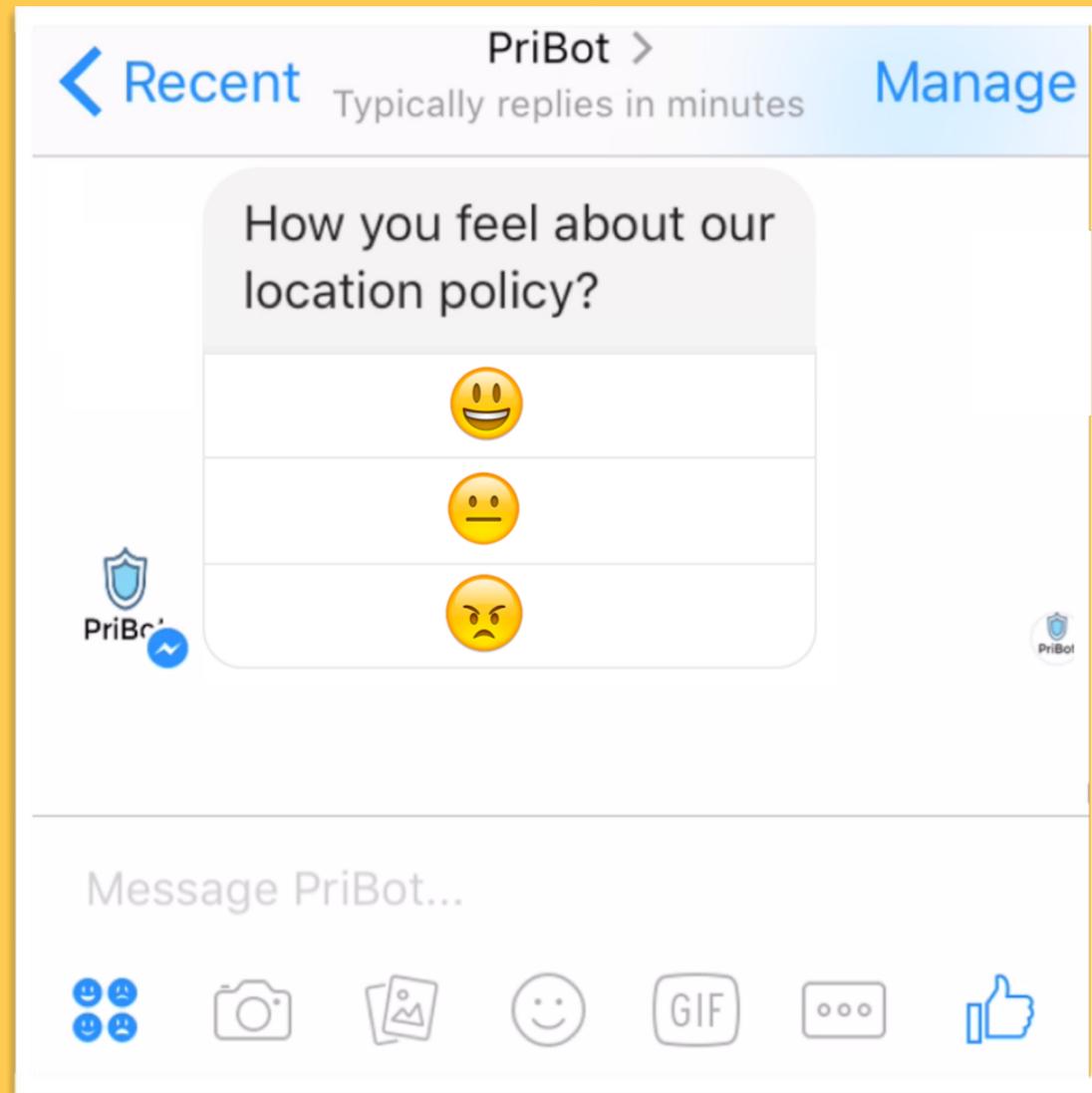
Timing



At-setup



On-demand



- **implicit:** sentiment analysis
- **explicit:** structured messages
- gathering users' concerns



Voicing User Concerns



Providers
traditionally
say what they
want



Voicing User Concerns



Providers
traditionally
say what they
want



Users' concerns
might not
be covered



Voicing User Concerns



Providers traditionally say what they want

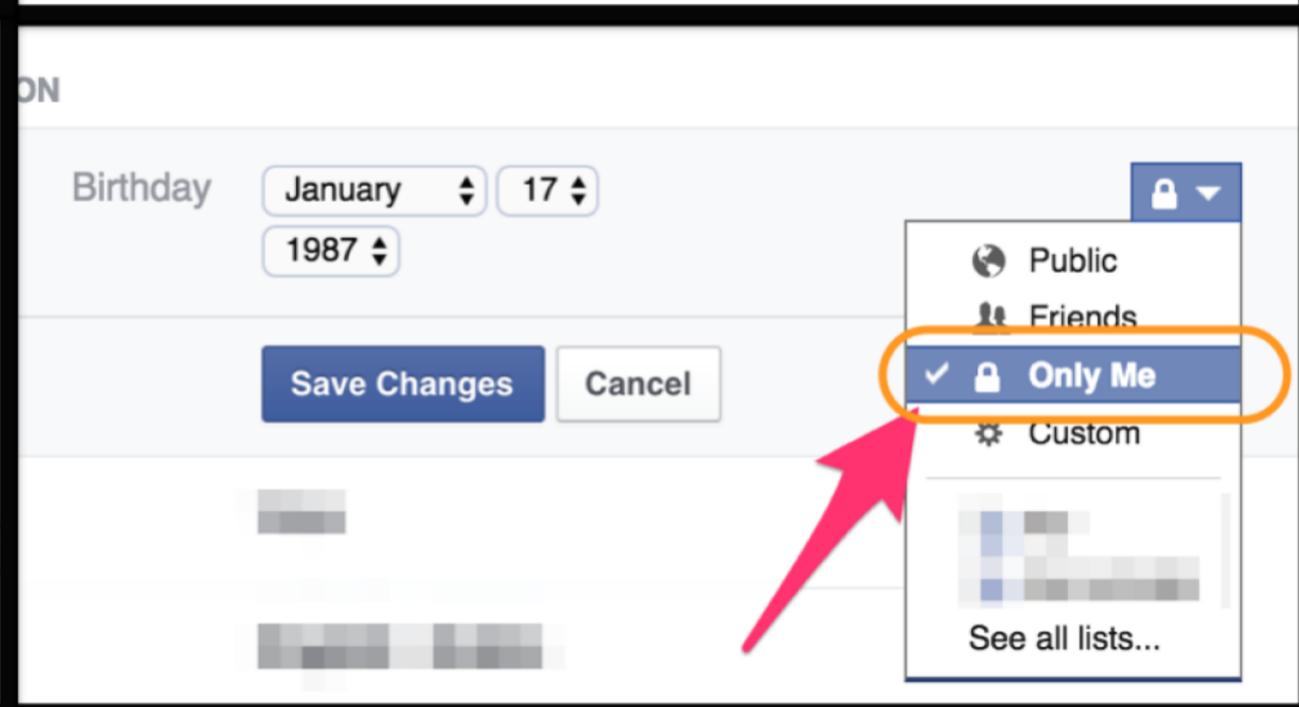
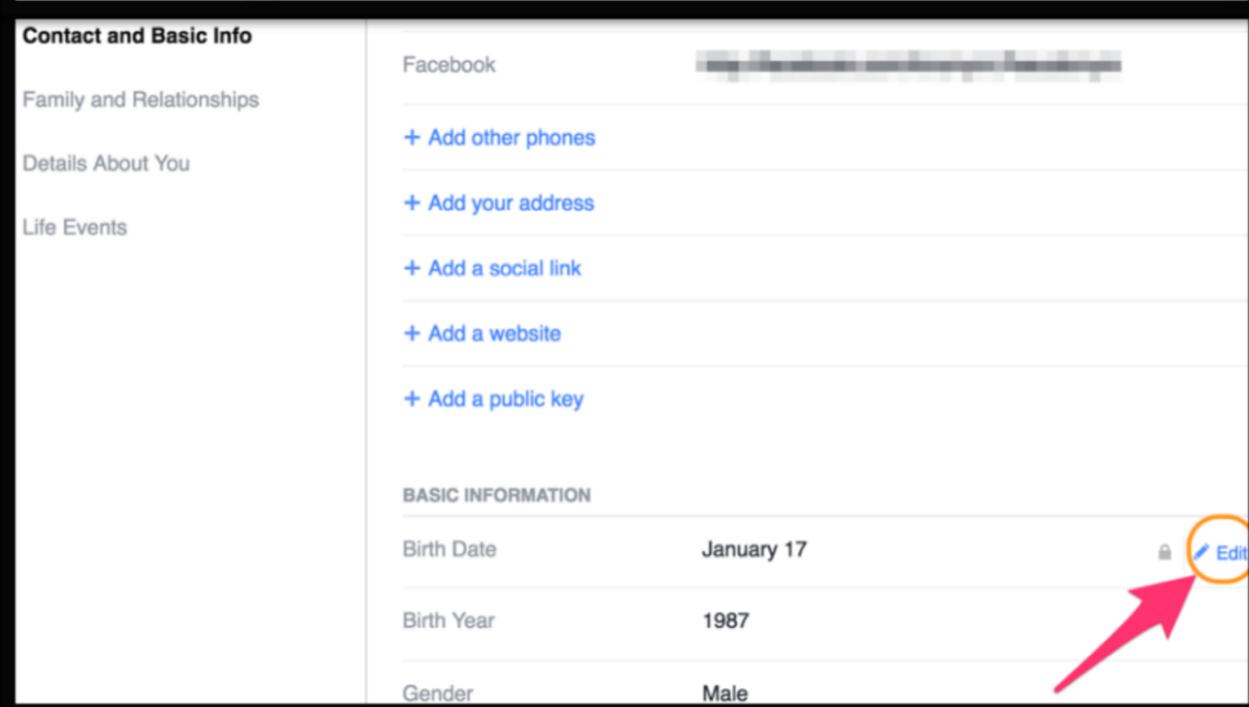
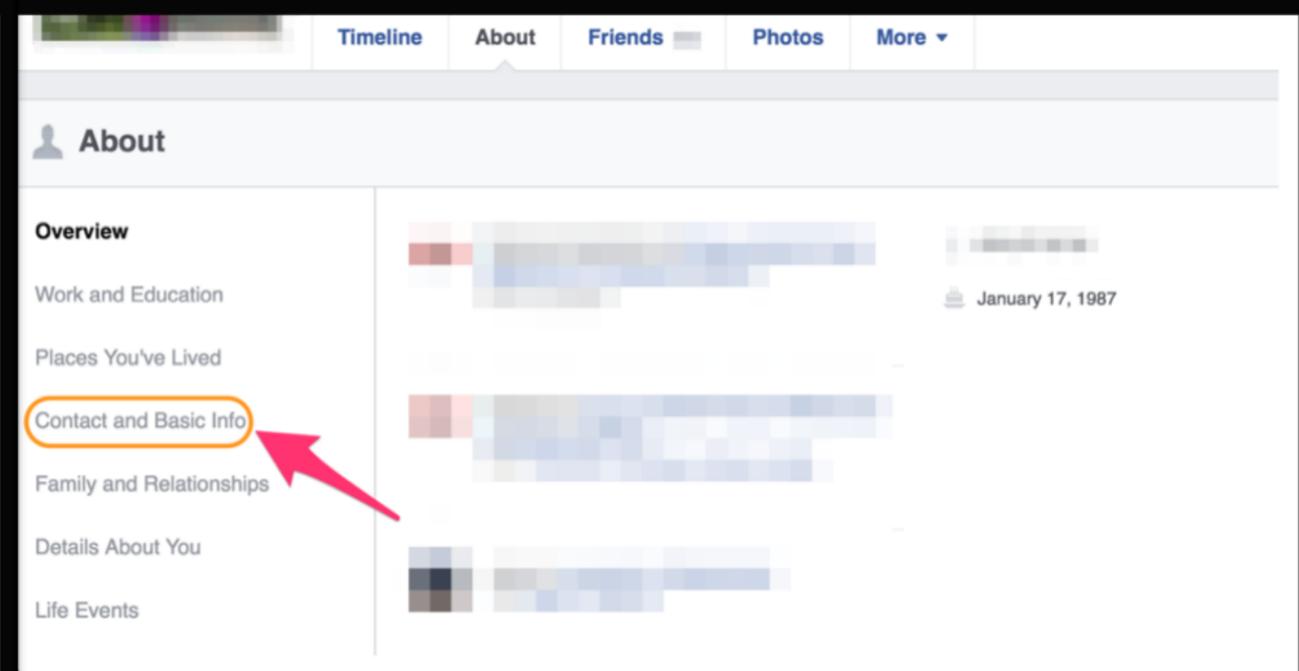
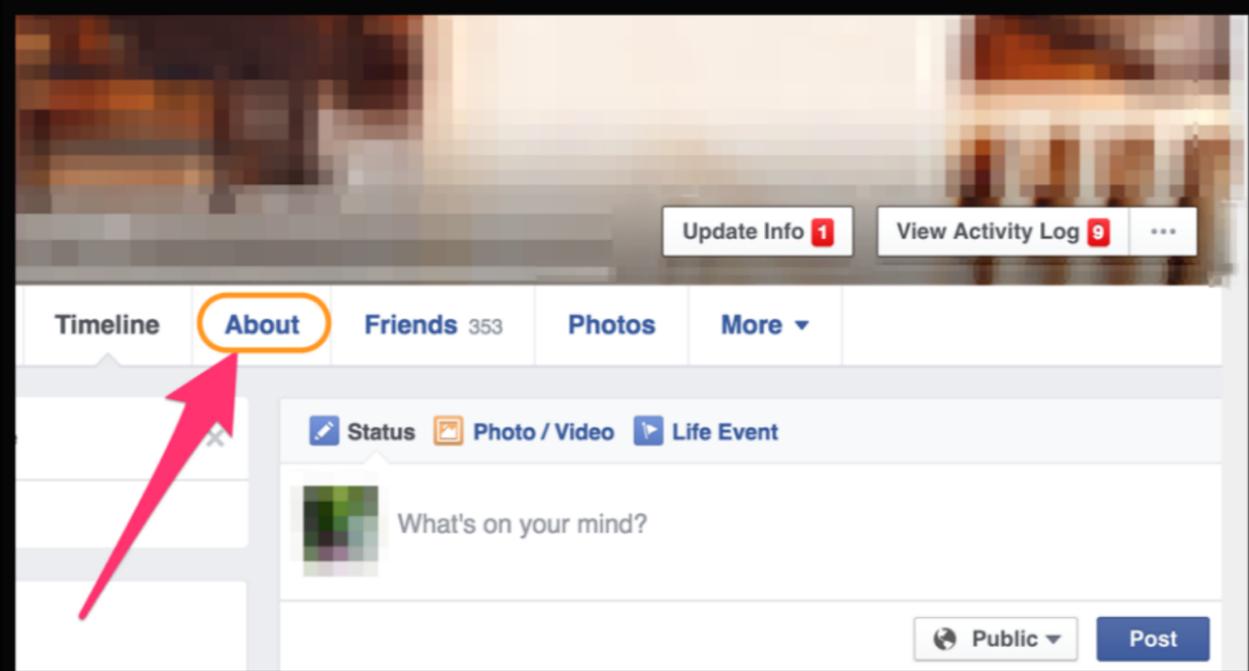


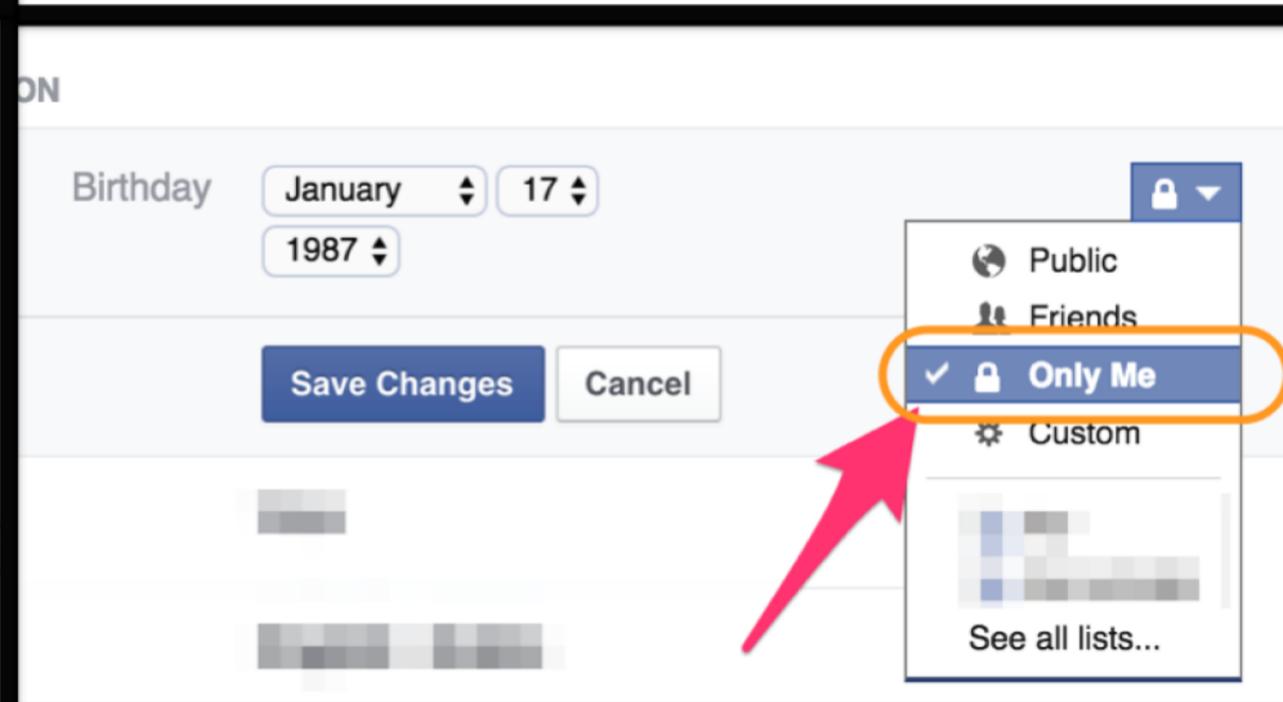
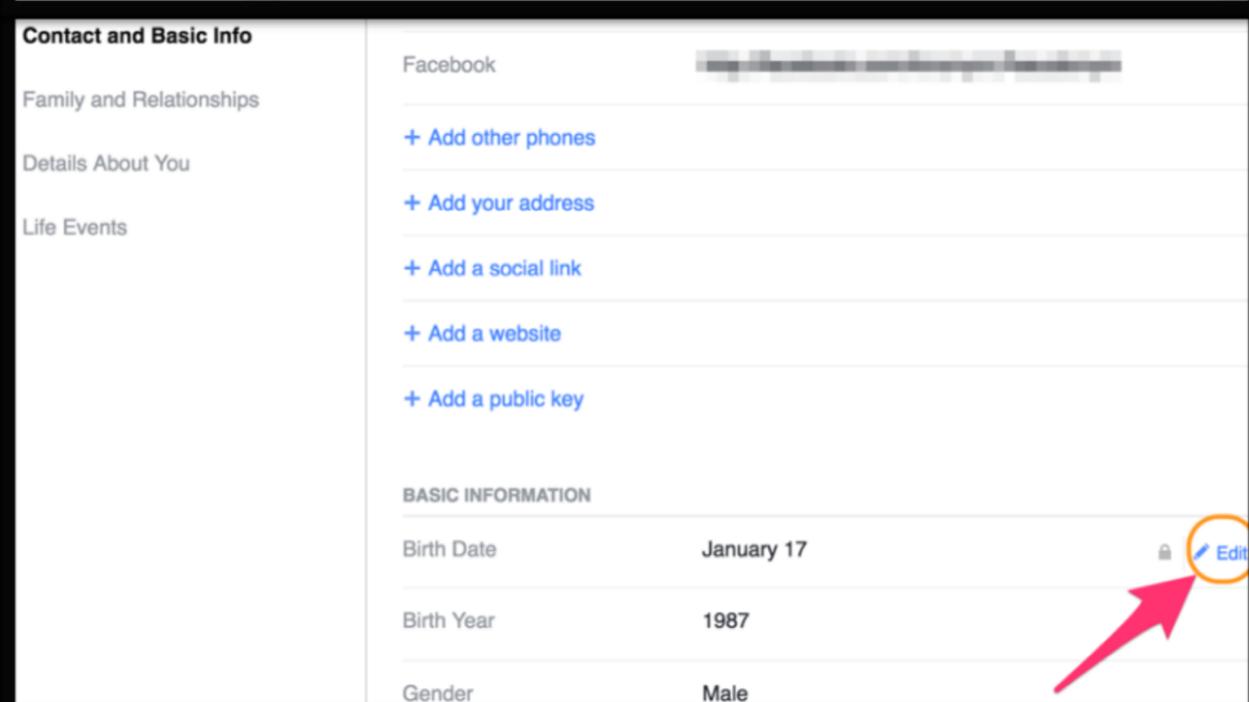
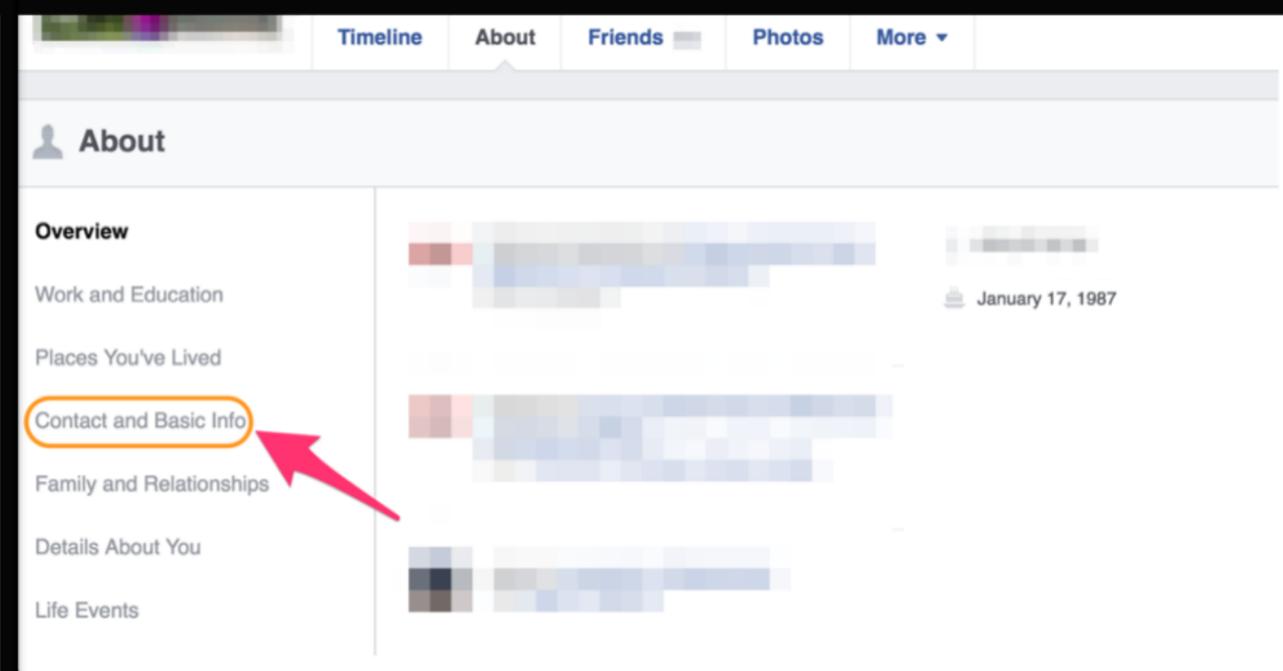
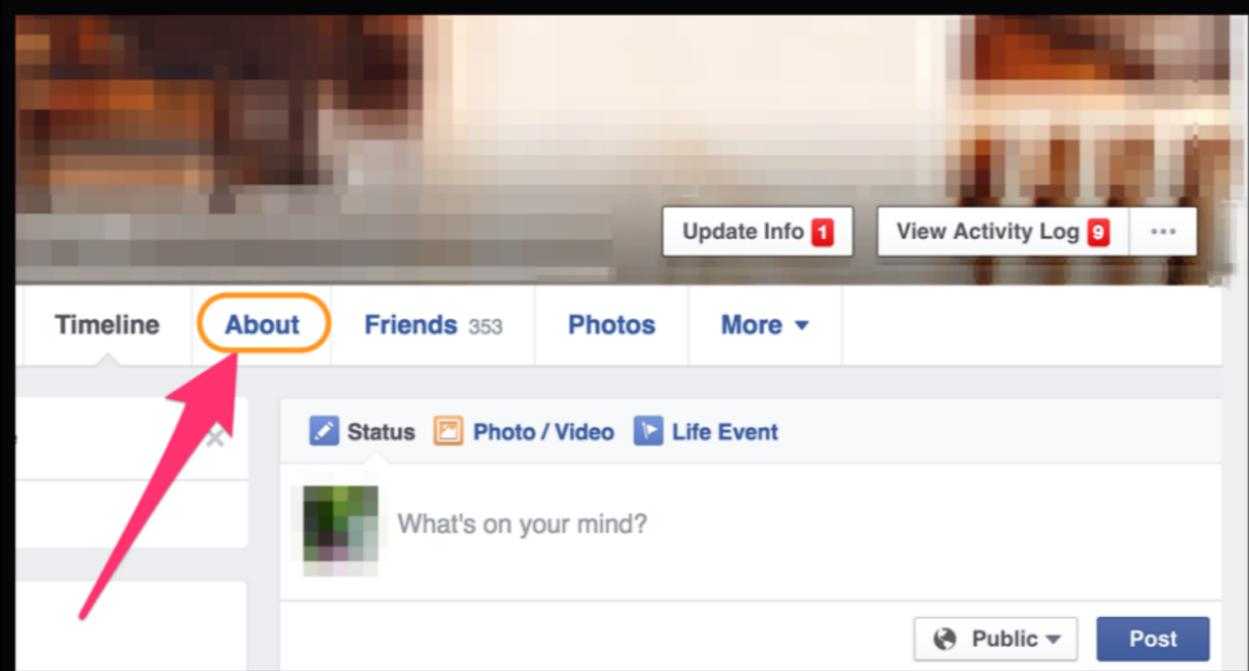
Users' concerns might not be covered



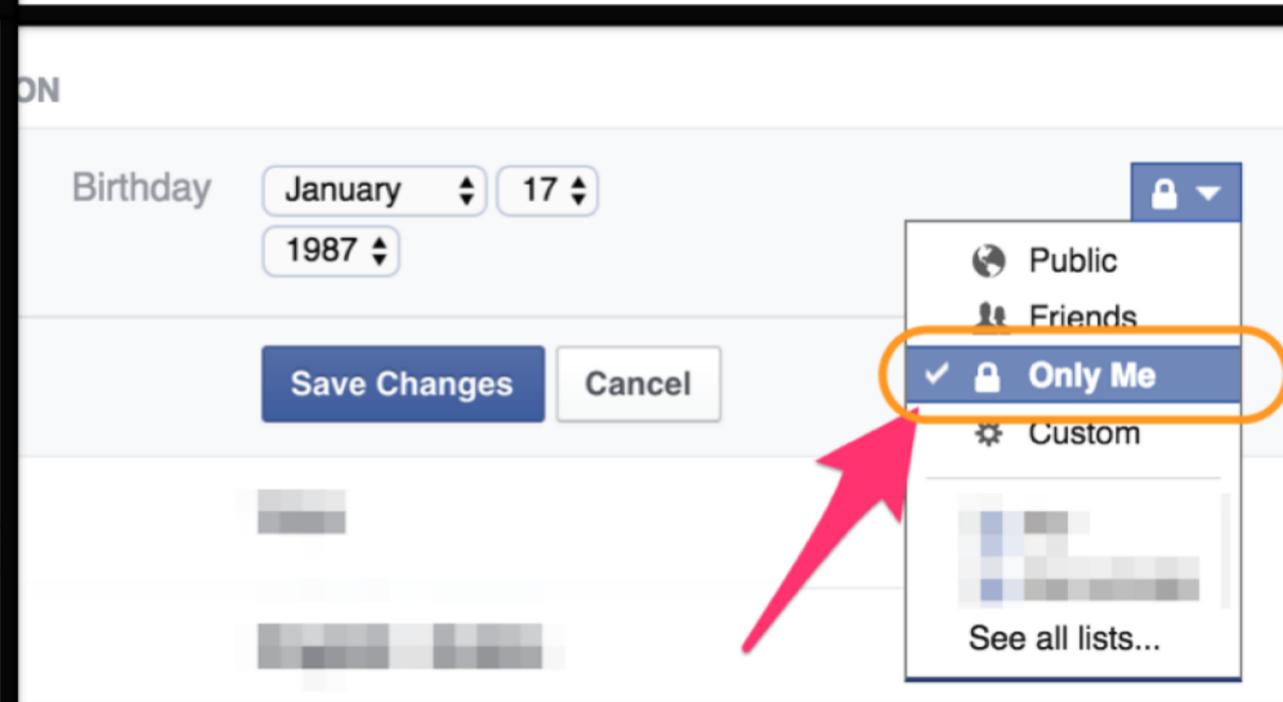
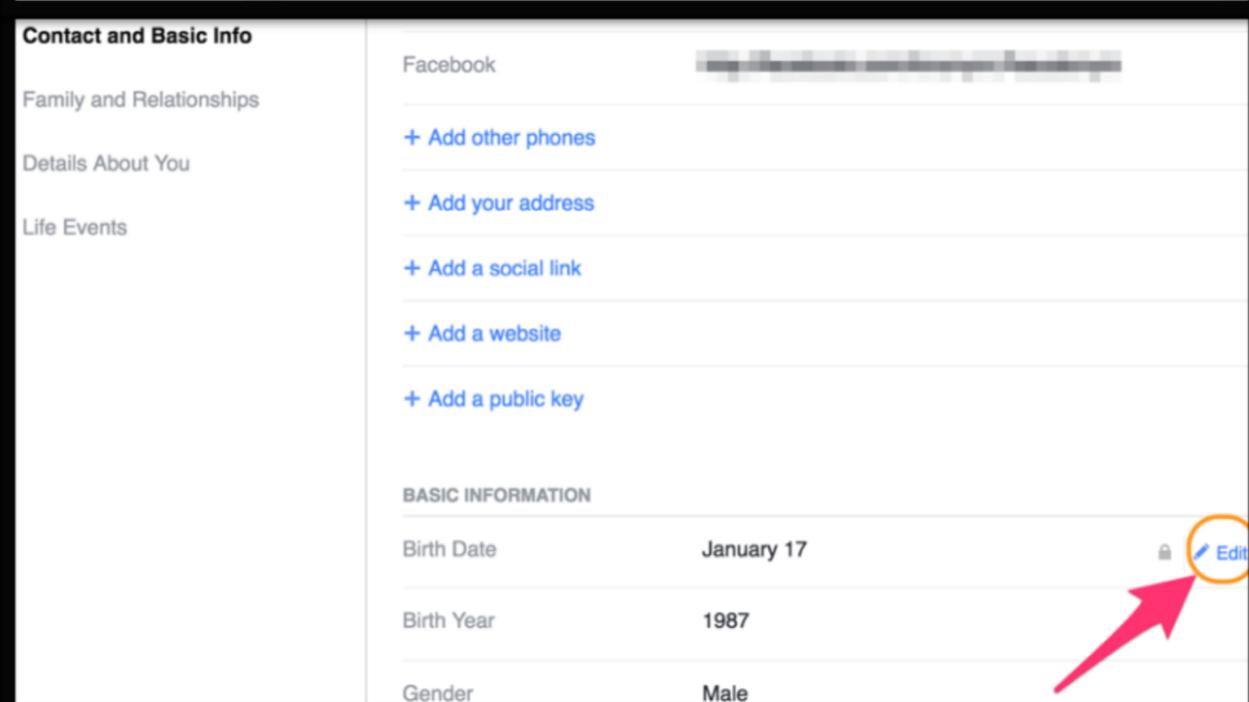
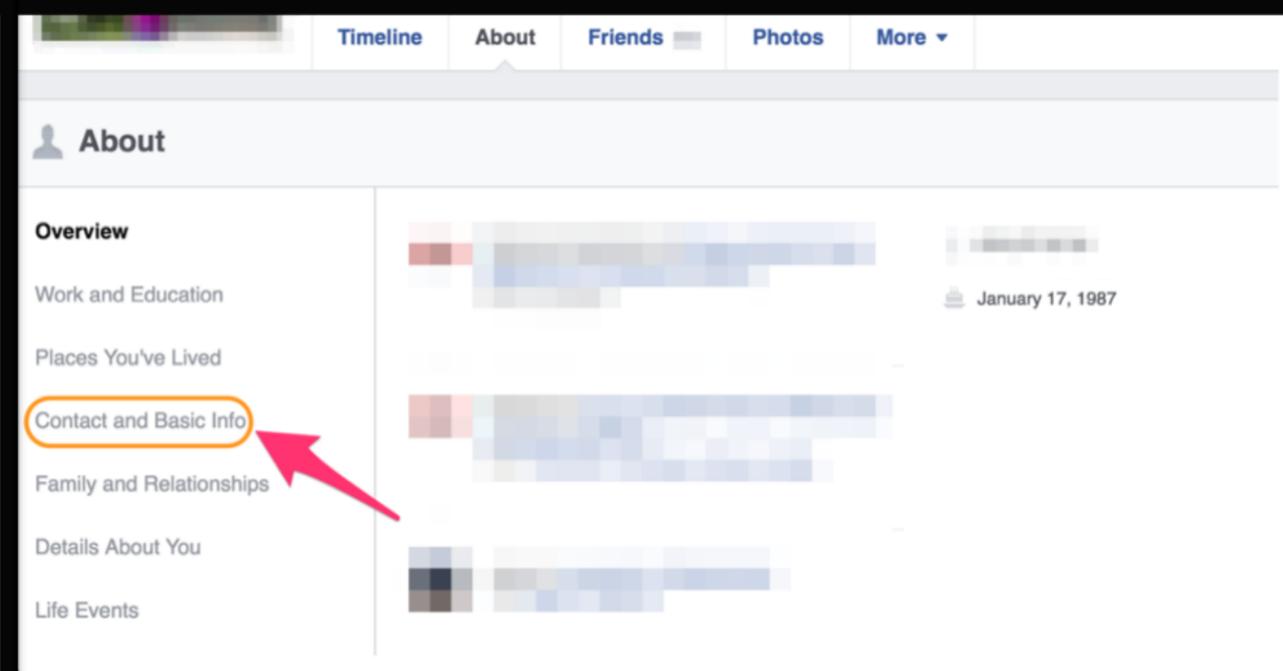
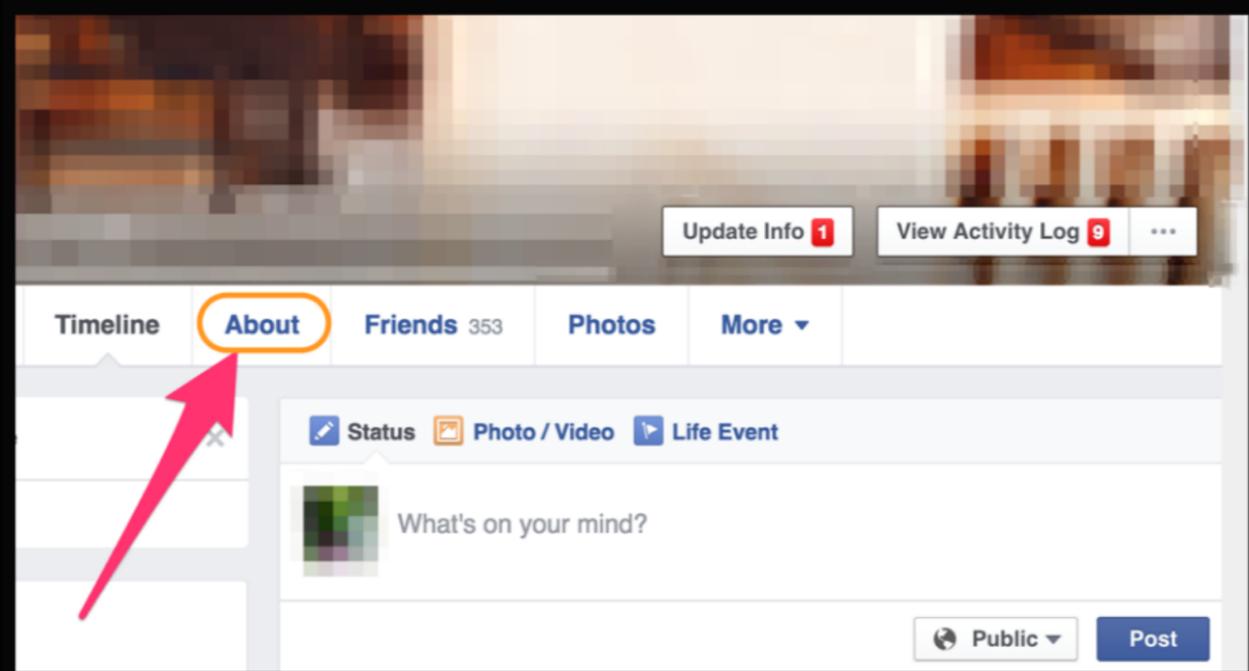
PriBots activate the two-way channel

2- Setting Privacy Preferences



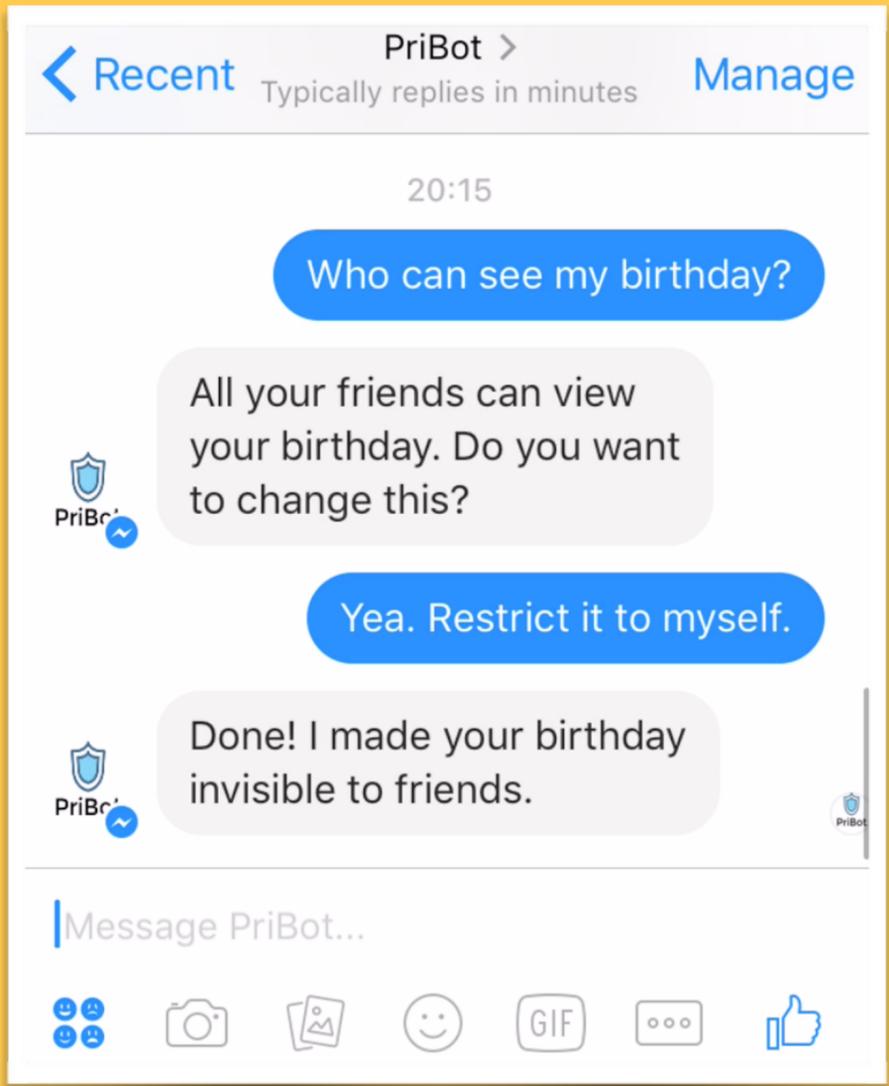


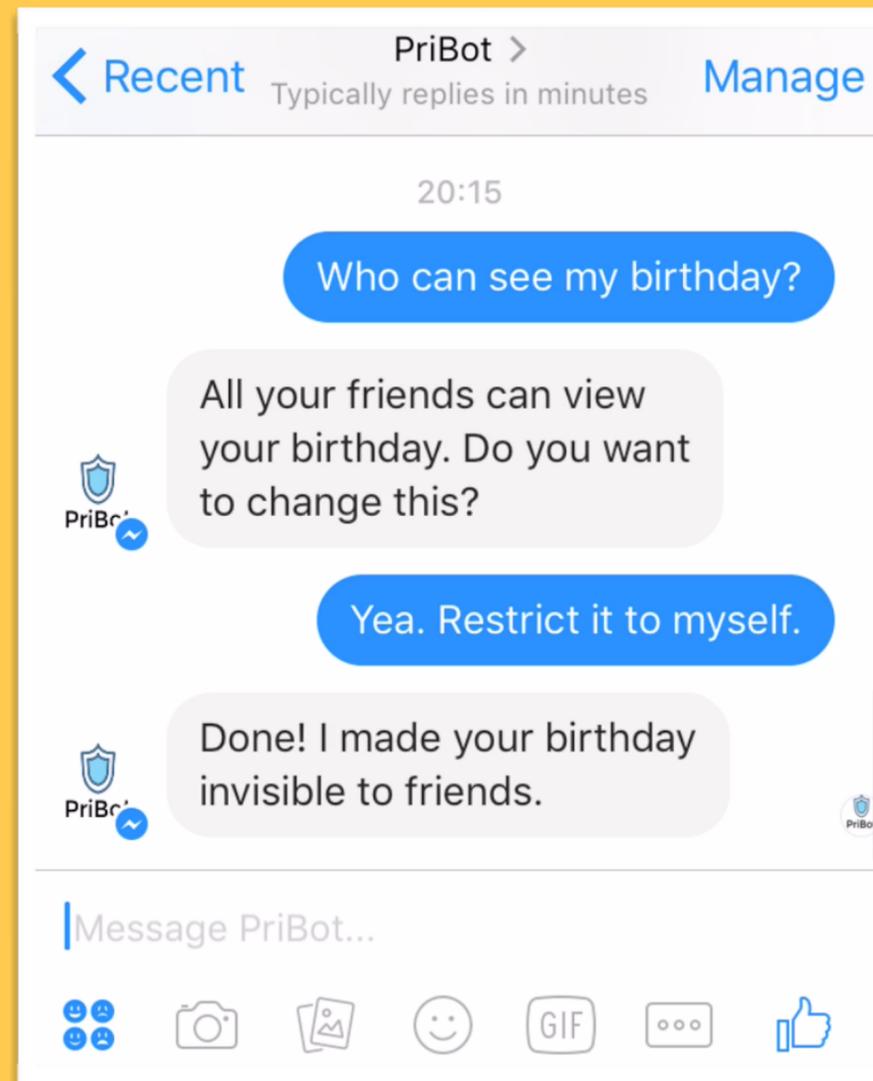
● Service and platform-dependent interface



- Service and platform-dependent interface
- Tradeoffs for simplicity: try finding this setting on Mobile Web version





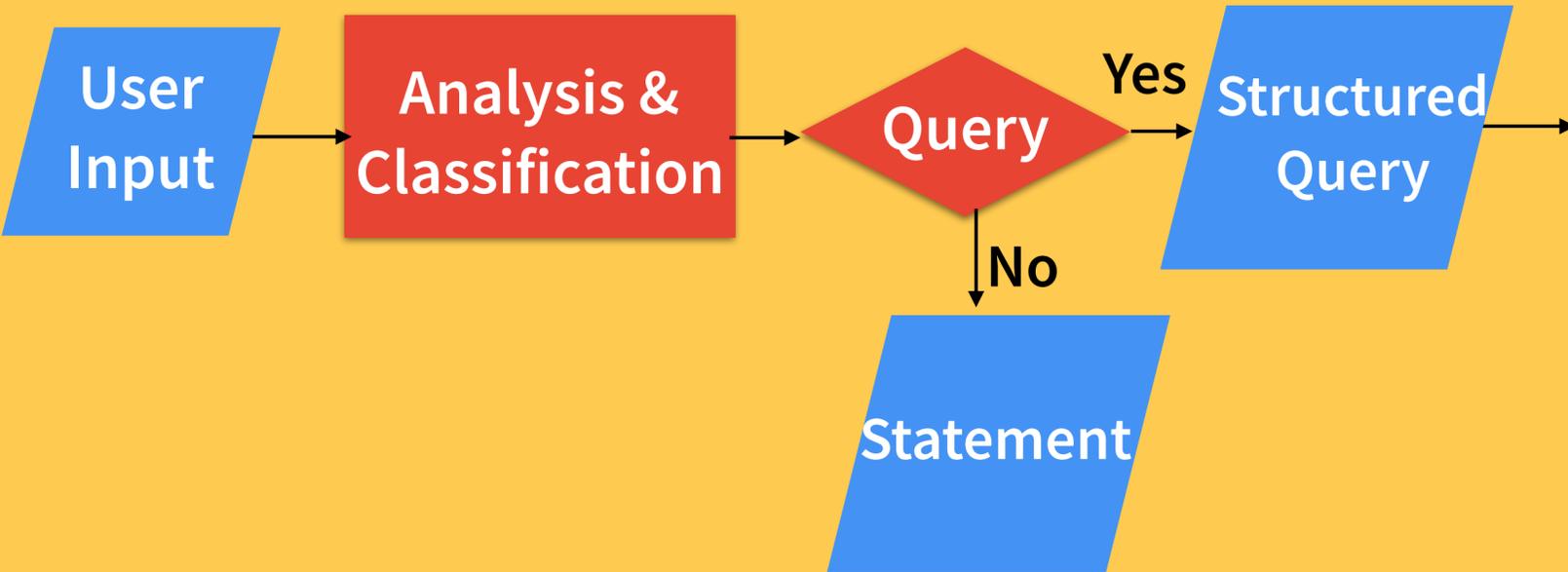


- Unique interface with all functionalities
- Ability to suggest adjustments to the user (combining notice and choice/preferences)

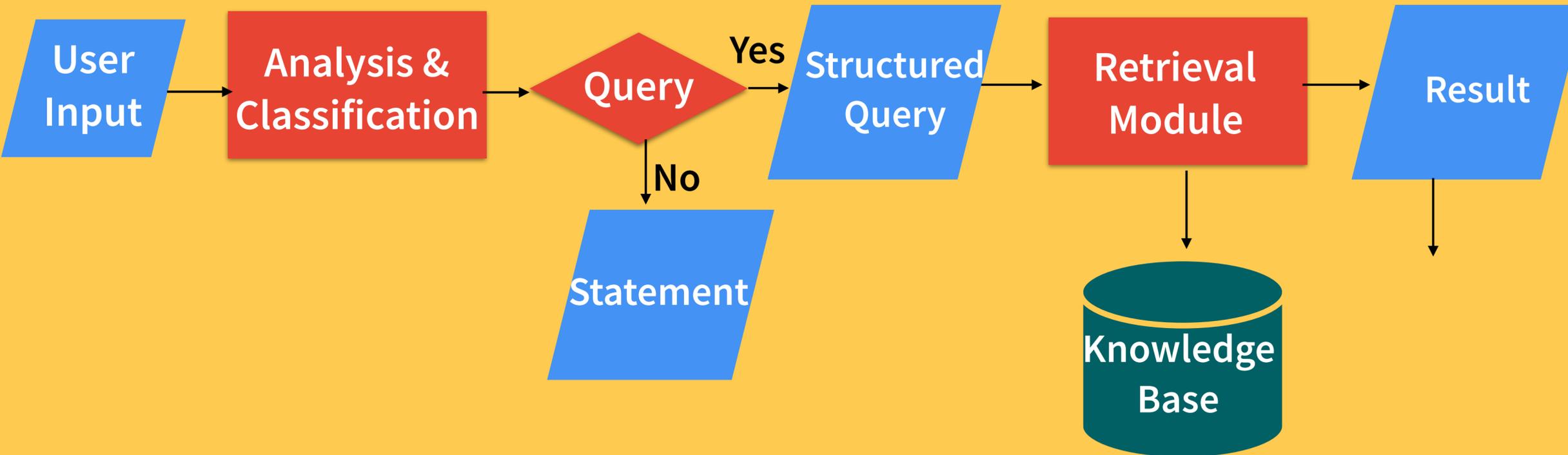
System Architecture



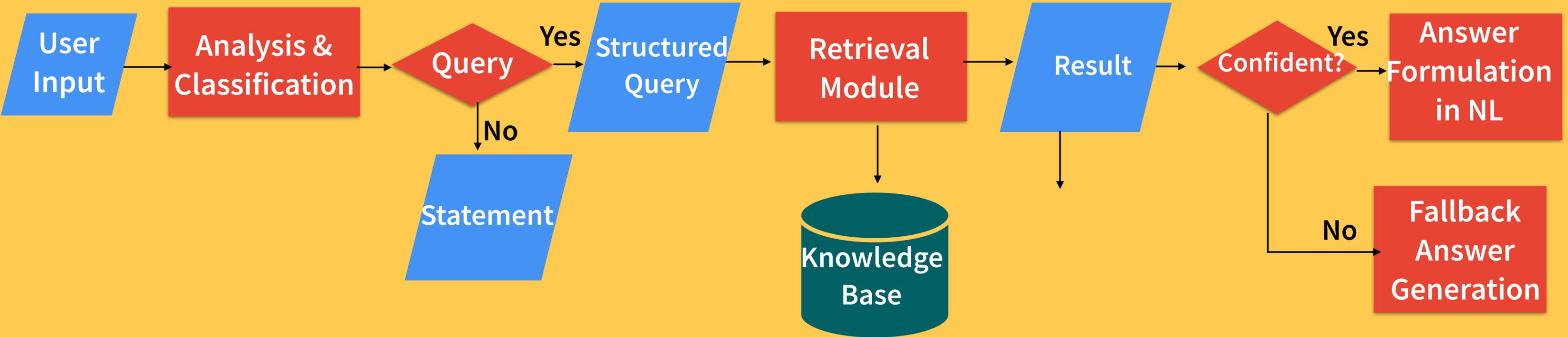
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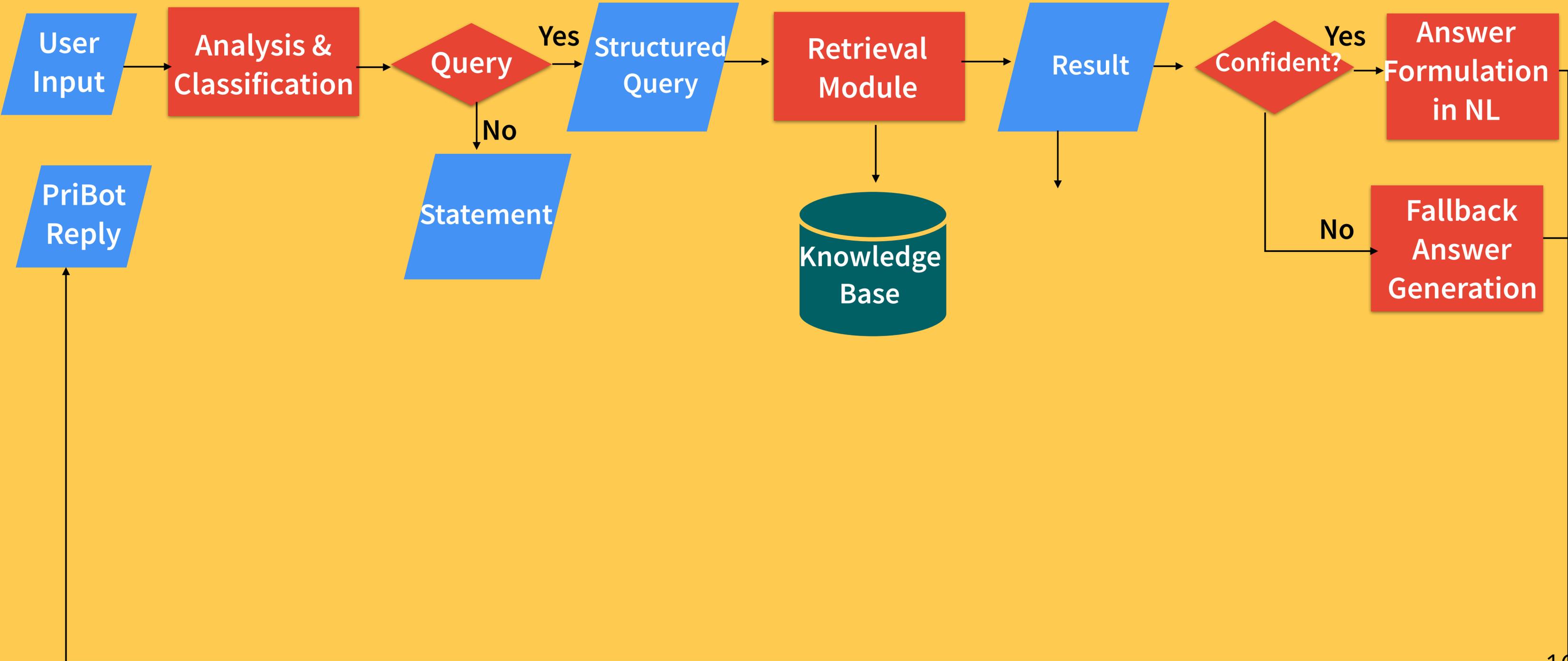
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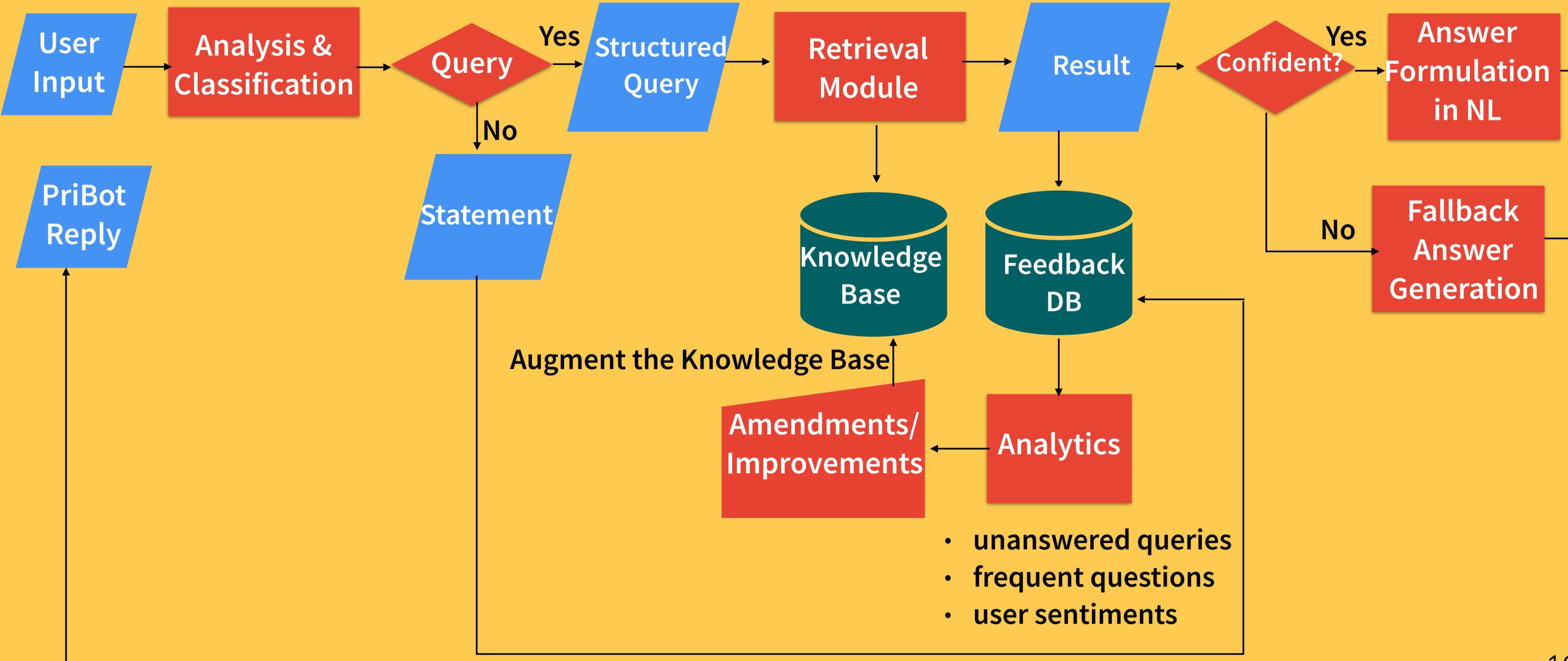
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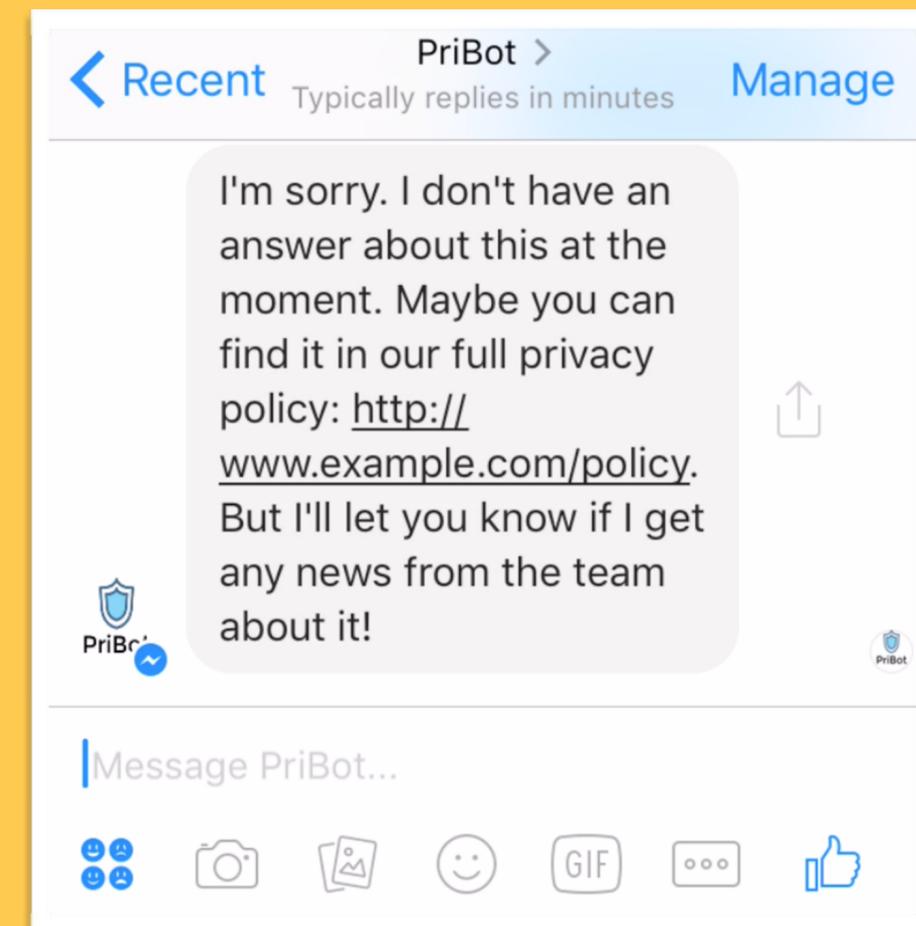
System Architecture



Challenges

Mature User Understanding

- Text processing
- Question answering
- Domain-specific datasets and ontologies
- Graceful fallback



Legal Challenges

- Inherently error prone: are they legally binding?
- Accounting for false-positives and false-negatives
- The case of 3rd party PriBots: defamation possibilities?

Trusting the Machine

- rule-based vs. AI-based
- user backlash?
- regulate the confidence level

PriBots' Personality

- positive tone → higher trust
- diversified content → reduced habituation

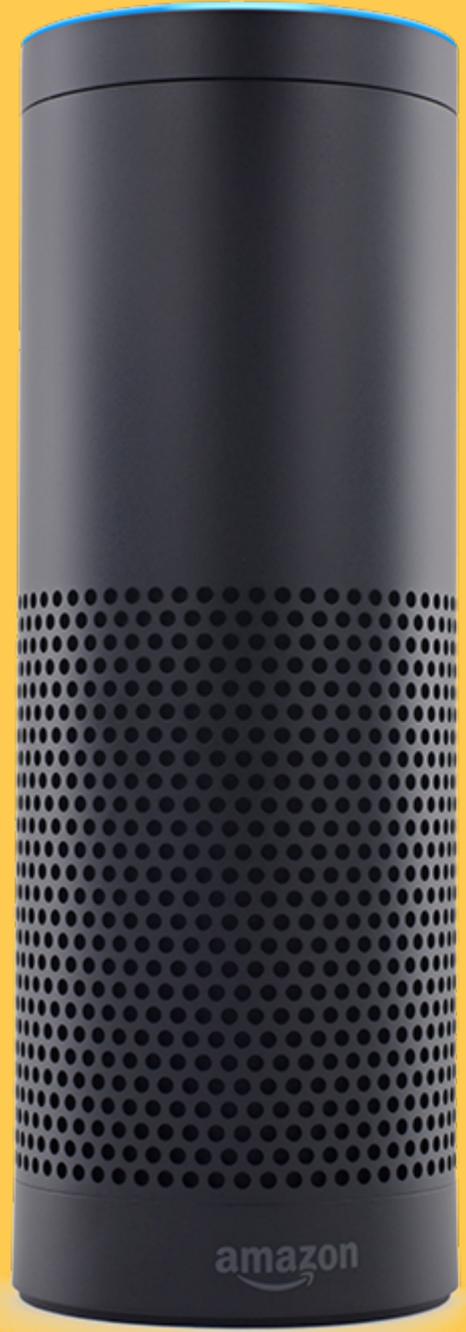
Deployment

Deployment

provider

3rd parties

Deployment



provider

3rd parties

Suitable for Voice Assistants

What's Next?

Privacy as a
Dialogue

Rule-based
Prototype

System
Implementation

User
studies



Questions/Feedback?

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