

Introduction to Natural Language Interfaces

Agenda

1. Definition
2. Motivation
3. History

1. Definition

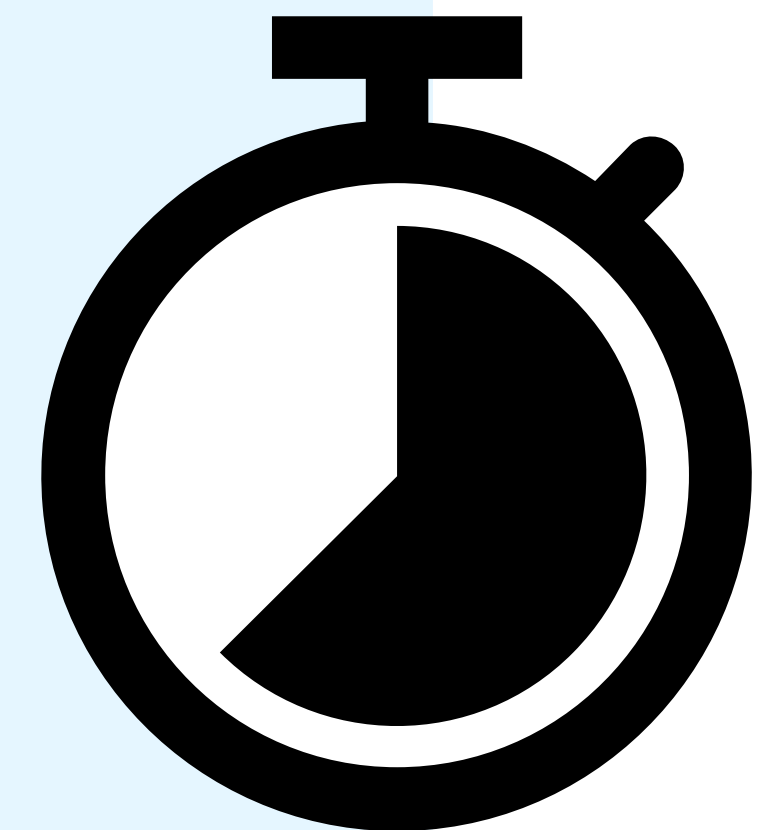
What is a natural language interface?

Activity

Take **3 minutes** to collect your thoughts and assumptions about what an NL interface is.

Jot down terms, use cases, key features, characteristics, etc.

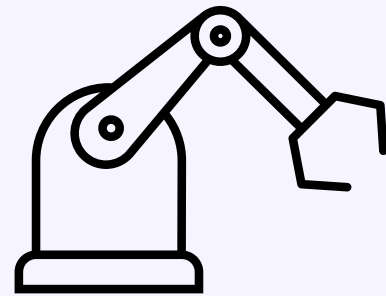
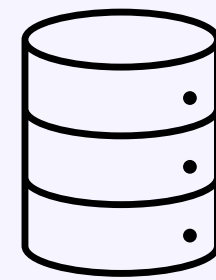
After the 3 minutes is up, we'll share ideas as a group.



Natural language interface

Interaction

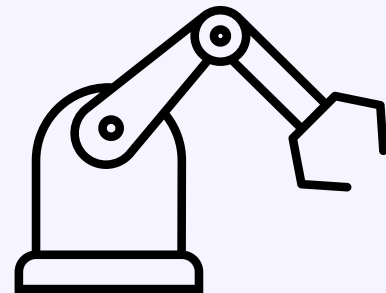
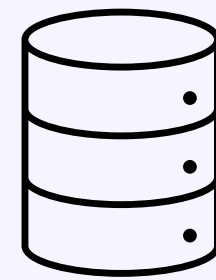
With
software or
hardware



Natural language interface

Interaction

With
software or
hardware

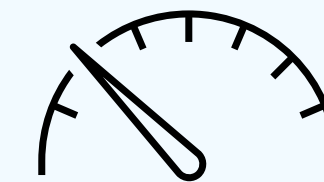


Language

Sublanguage

Controlled

Restricted



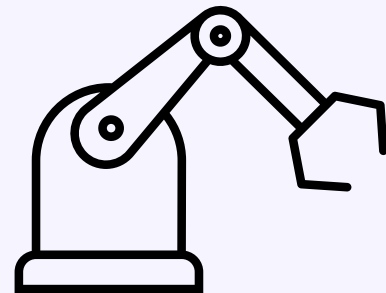
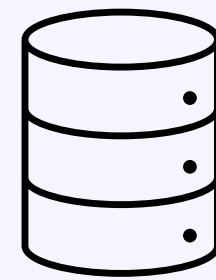
Natural
language

Structured,
commands

Natural language interface

Interaction

With
software or
hardware

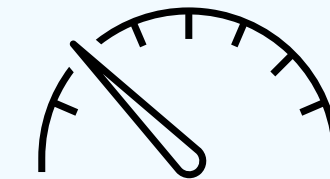


Language

Sublanguage

Controlled

Restricted

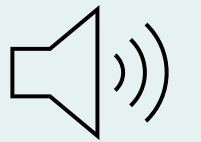
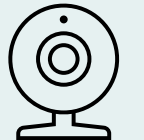
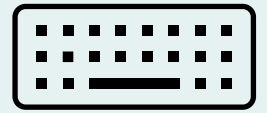


Natural
language

Structured,
commands

Format

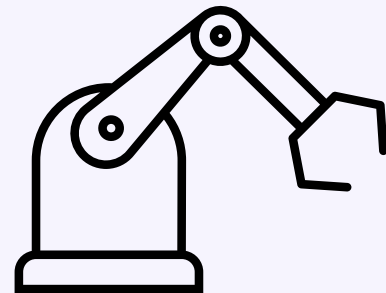
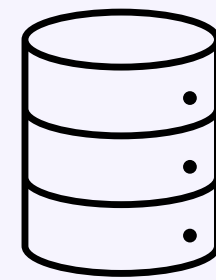
- Audio
- Text
- Tab-complete
- Menu select
- Node assembly
- Sign language
- Body language



Natural language interface

Interaction

With
software or
hardware

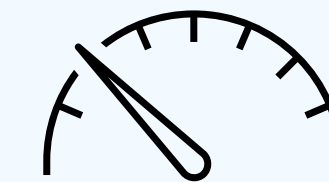


Language

Sublanguage

Controlled

Restricted

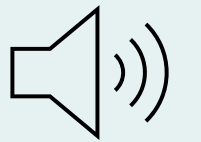
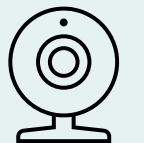
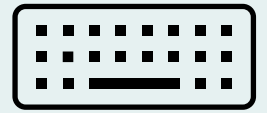


Natural
language

Structured,
commands

Format

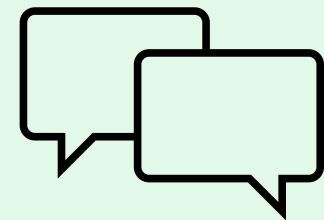
- Audio
- Text
- Tab-complete
- Menu select
- Node assembly
- Sign language
- Body language



Direction

Input
only

Output
only

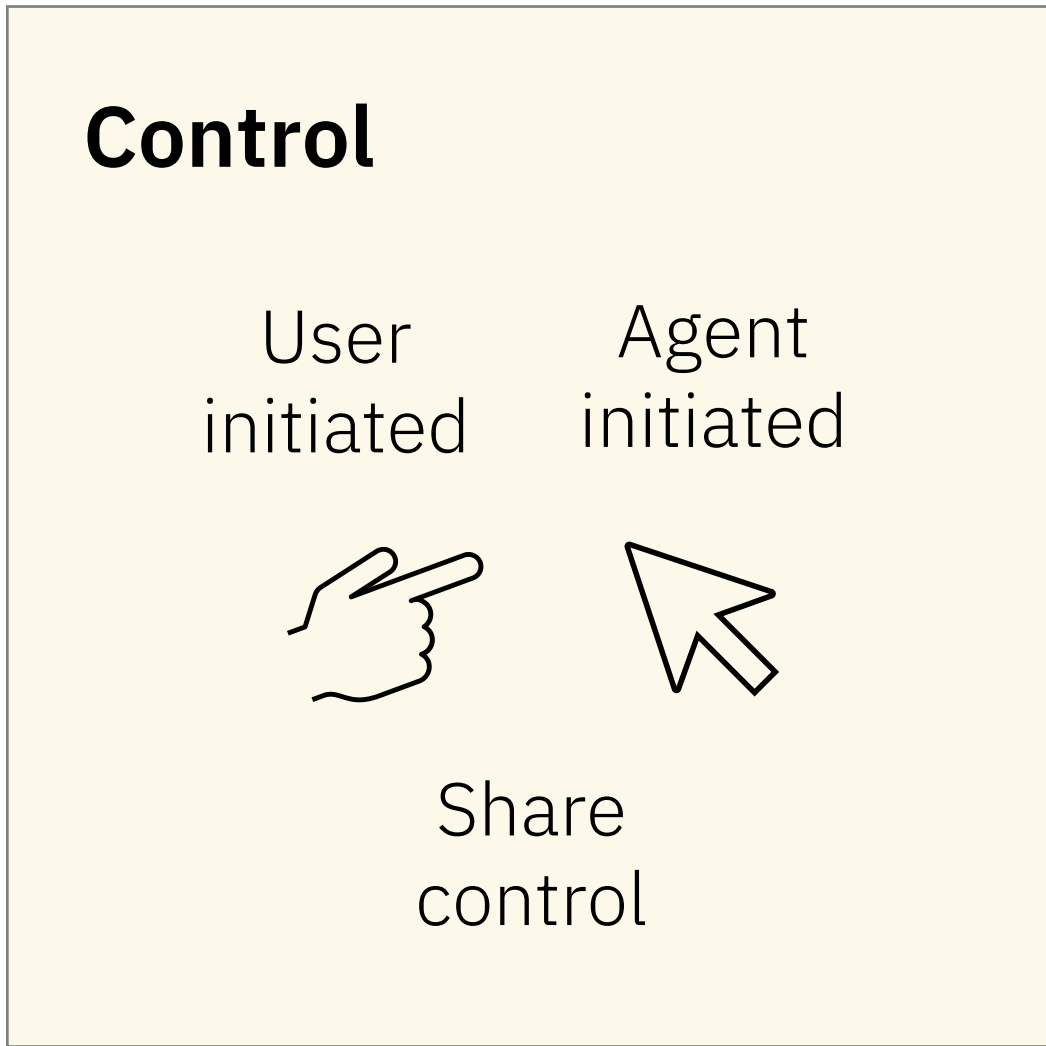
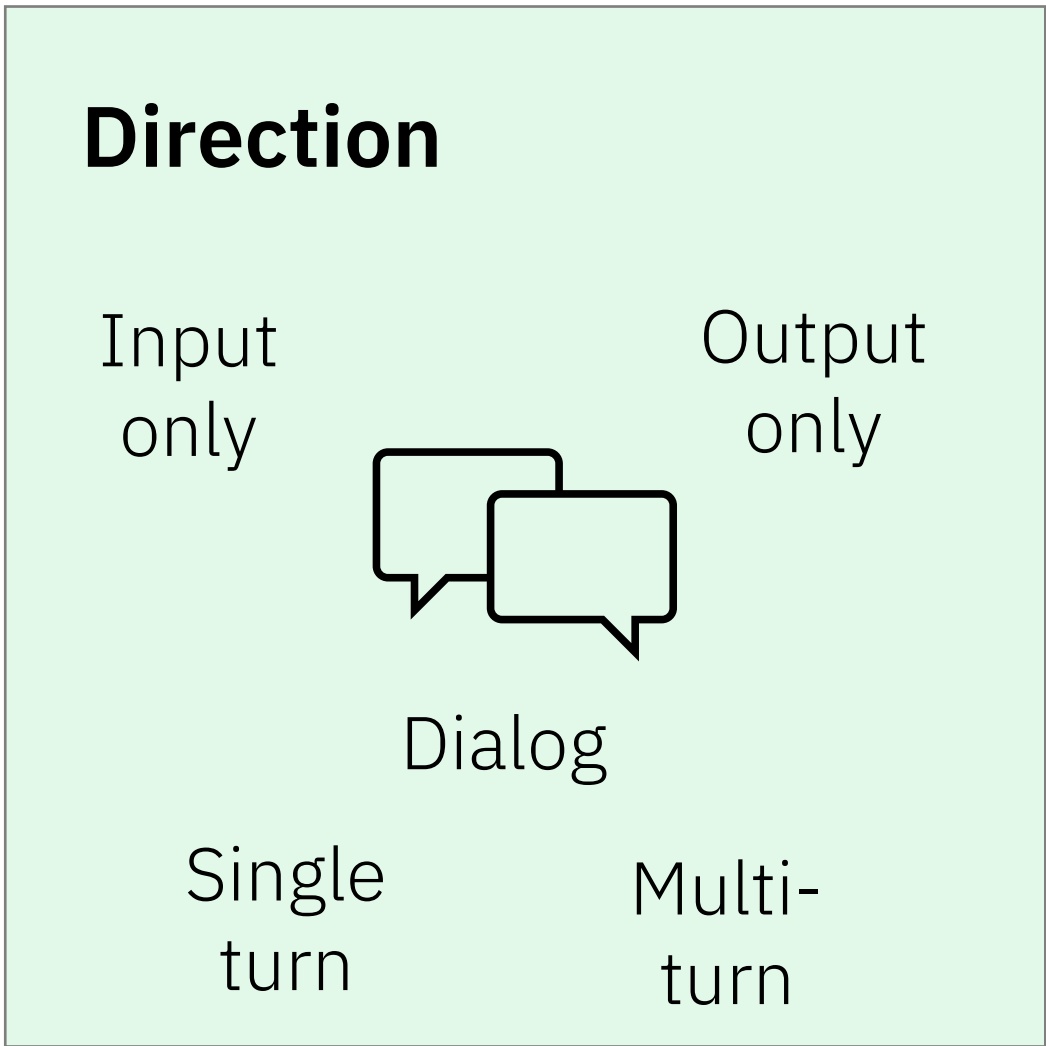
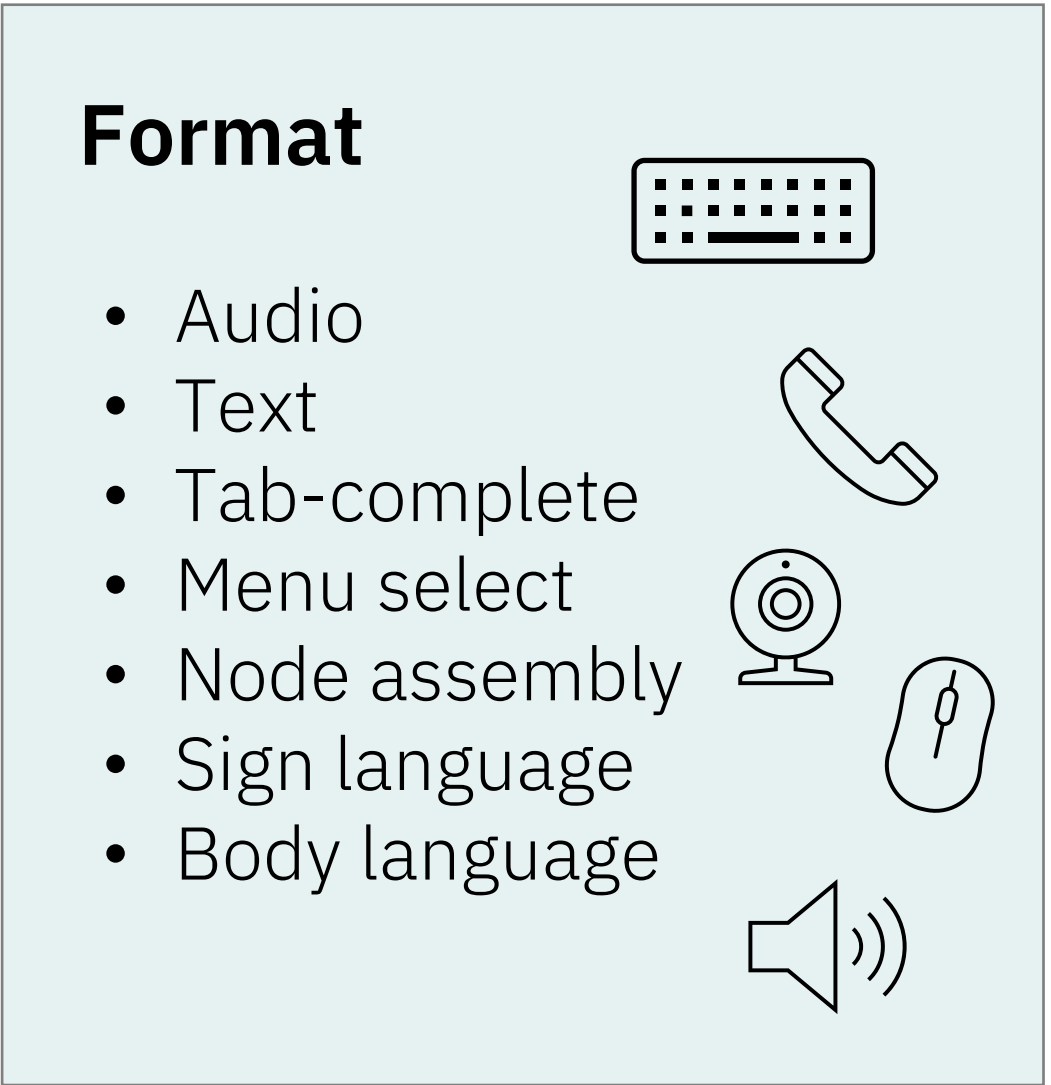
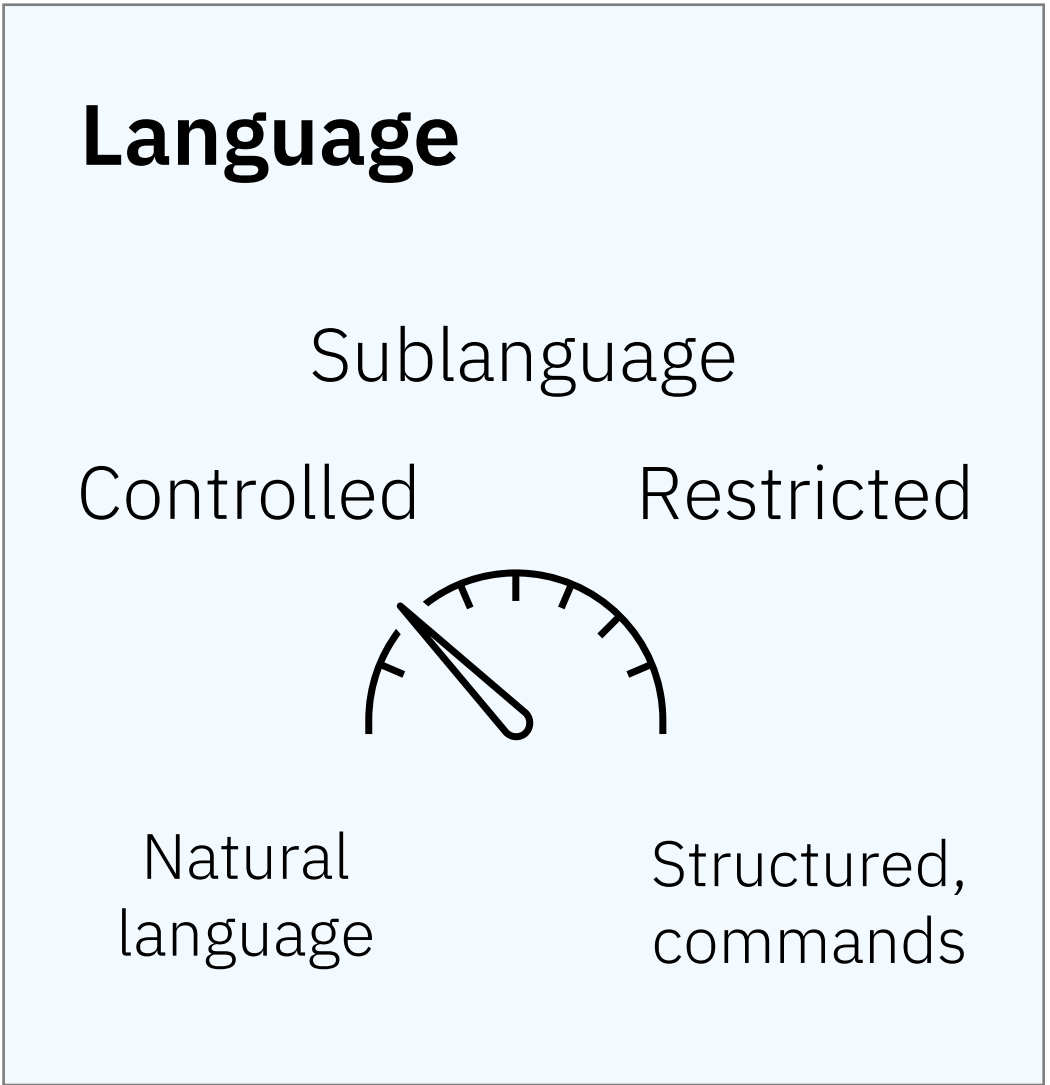
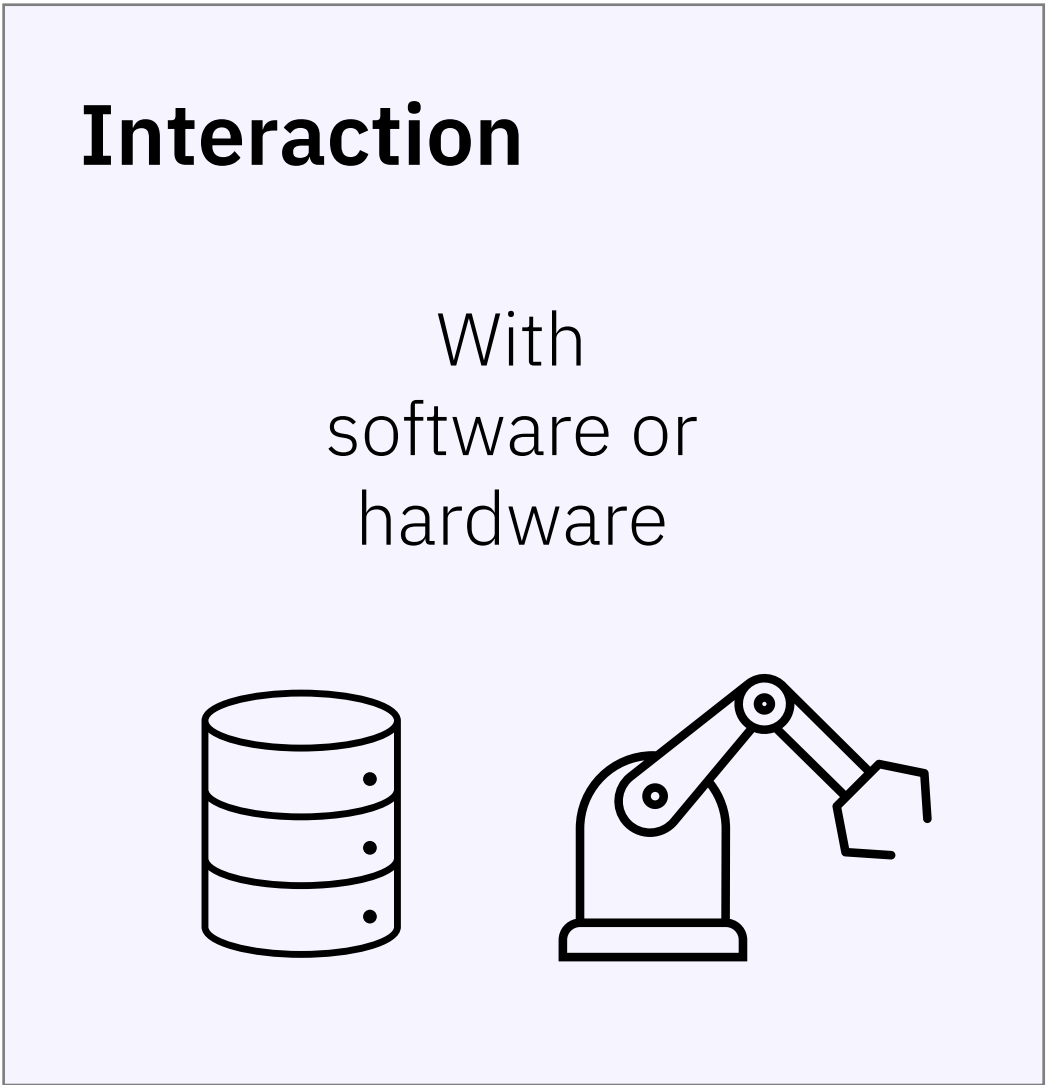


Dialog

Single
turn

Multi-
turn

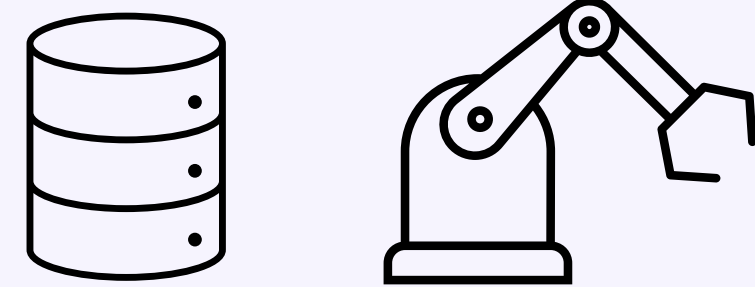
Natural language interface



Natural language interface

Interaction

With software or hardware

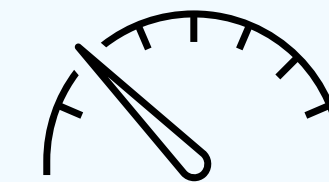


Language

Sublanguage

Controlled

Restricted

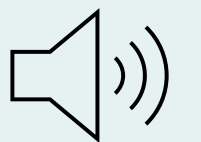
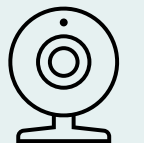
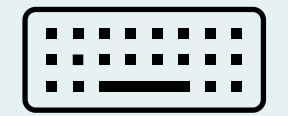


Natural language

Structured, commands

Format

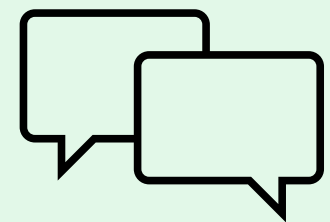
- Audio
- Text
- Tab-complete
- Menu select
- Node assembly
- Sign language
- Body language



Direction

Input only

Output only



Dialog

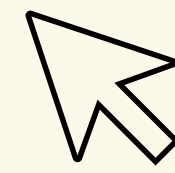
Single turn

Multi-turn

Control

User initiated

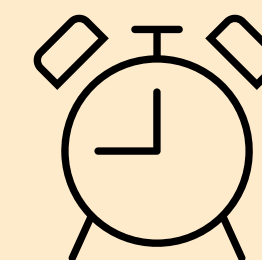
Agent initiated



Share control

Timing

Synchronous

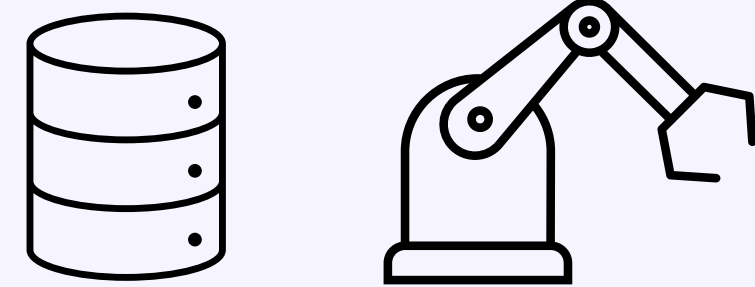


Asynchronous

Natural language interface

Interaction

With
software or
hardware

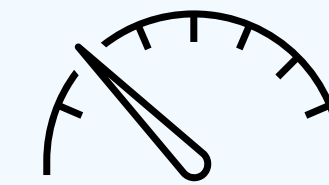


Language

Sublanguage

Controlled

Restricted

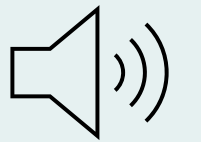
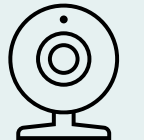
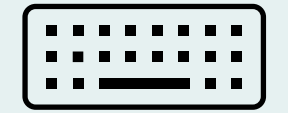


Natural
language

Structured,
commands

Format

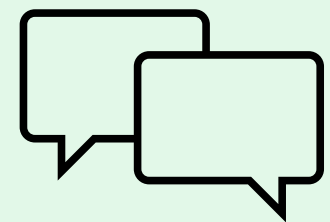
- Audio
- Text
- Tab-complete
- Menu select
- Node assembly
- Sign language
- Body language



Direction

Input
only

Output
only



Dialog

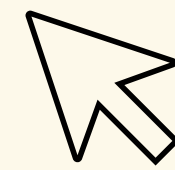
Single
turn

Multi-
turn

Control

User
initiated

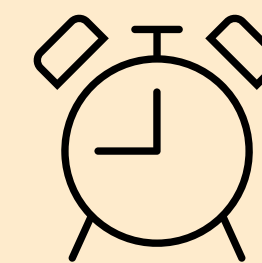
Agent
initiated



Share
control

Timing

Synchronous



Asynchronous

Purpose

- Command
- Instruct
- Direct
- Guide
- Explain
- Explore
- Answer questions
- Entertain

1. Definition

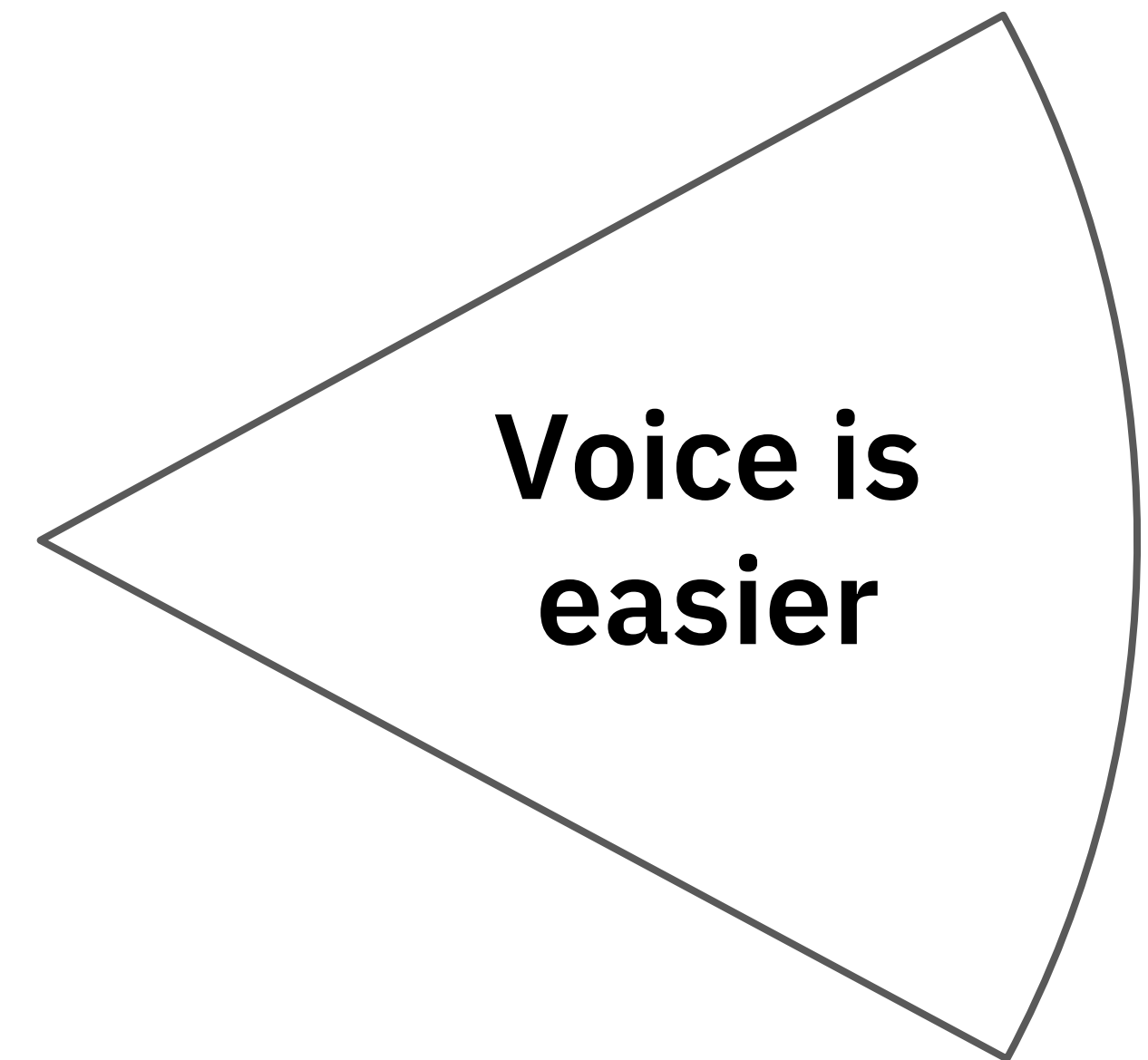
A natural language (NL) interface enables a user to achieve a goal by interacting with systems - using natural language, in a variety of formats.

An NL interaction might be initiated by the user or the system; and the interaction can flow like a conversation or be simple input or output, in real time or delayed.

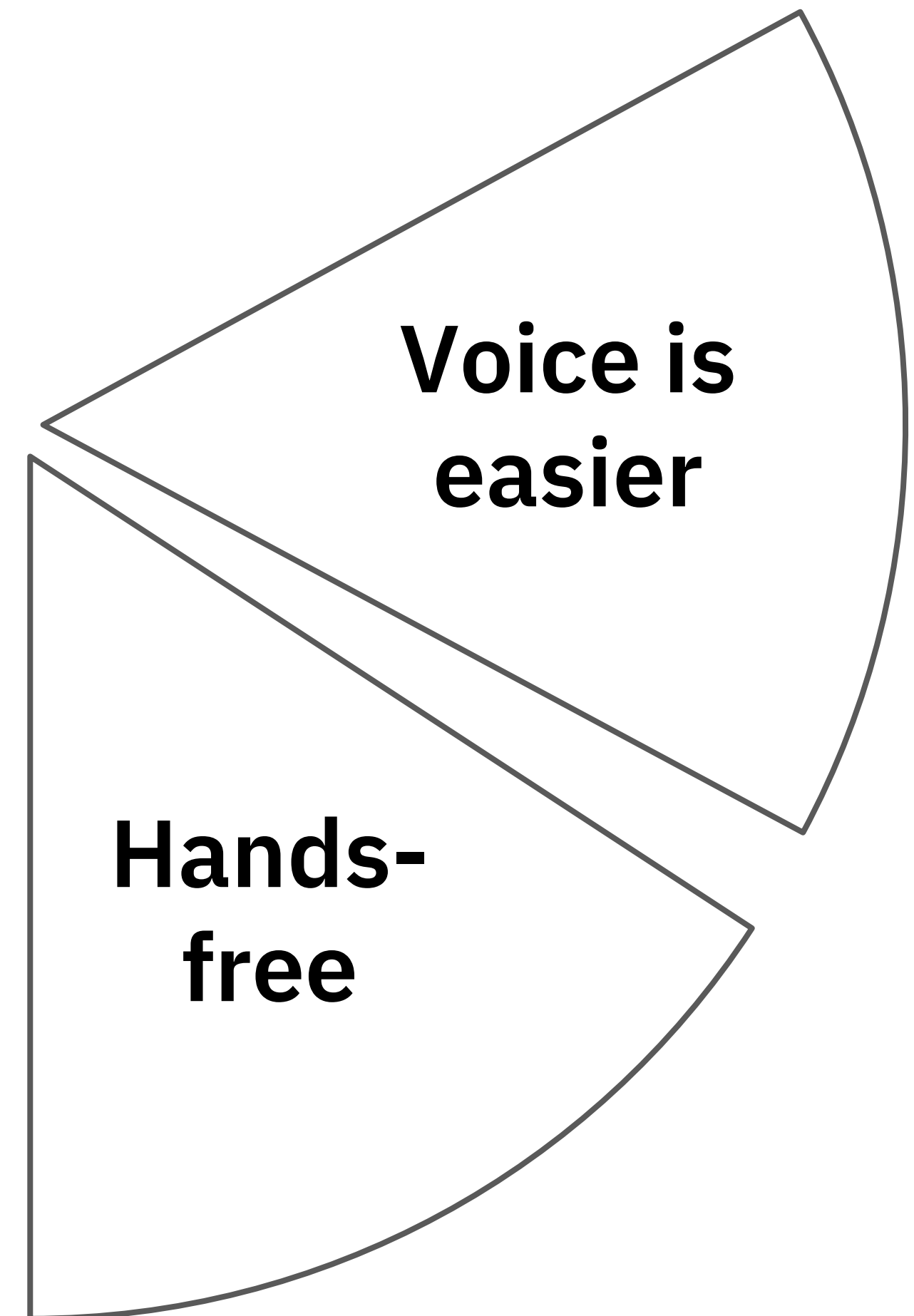
2. Motivation

Why natural language
interfaces?

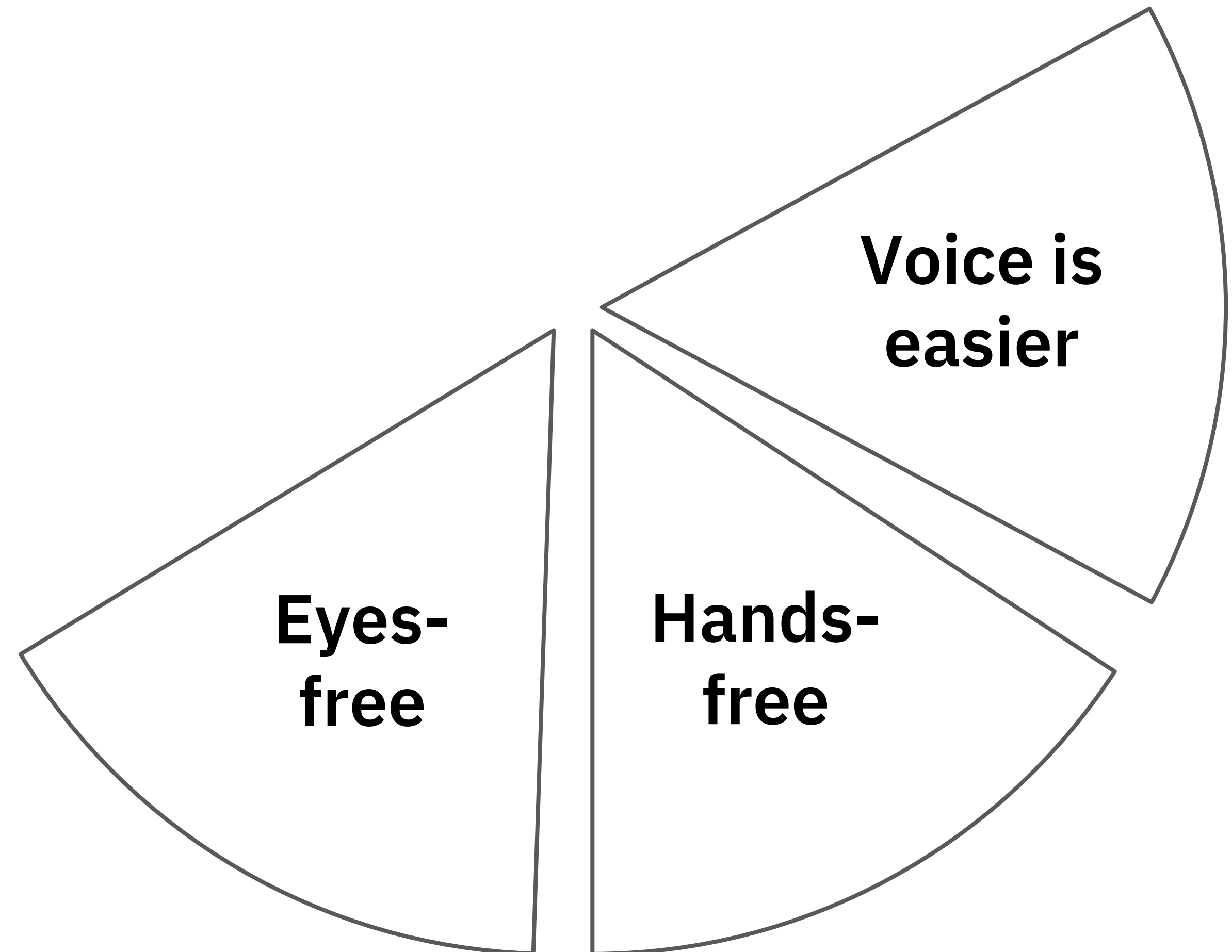
Why
Natural
language
interface?



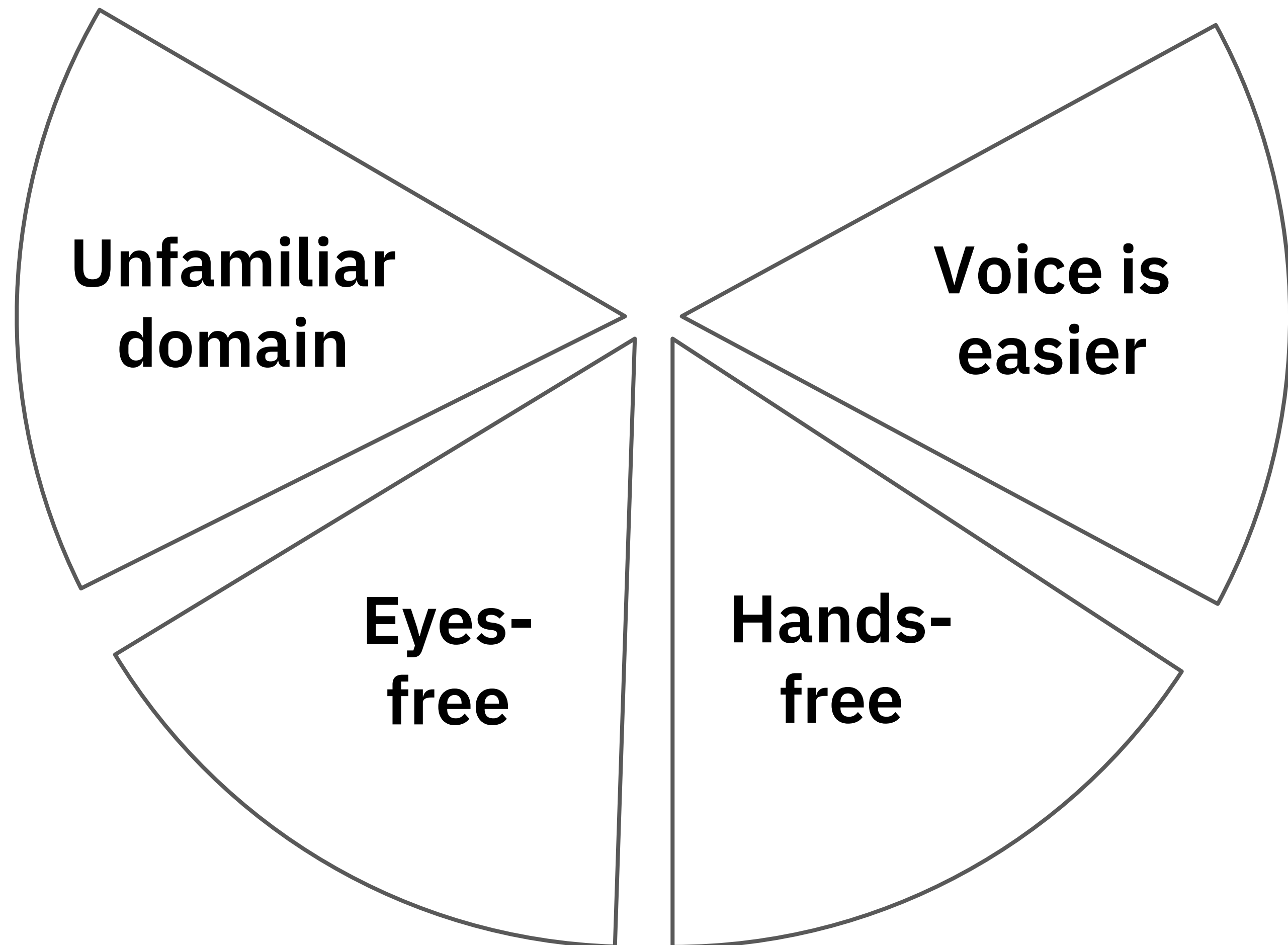
Why
Natural
language
interface?



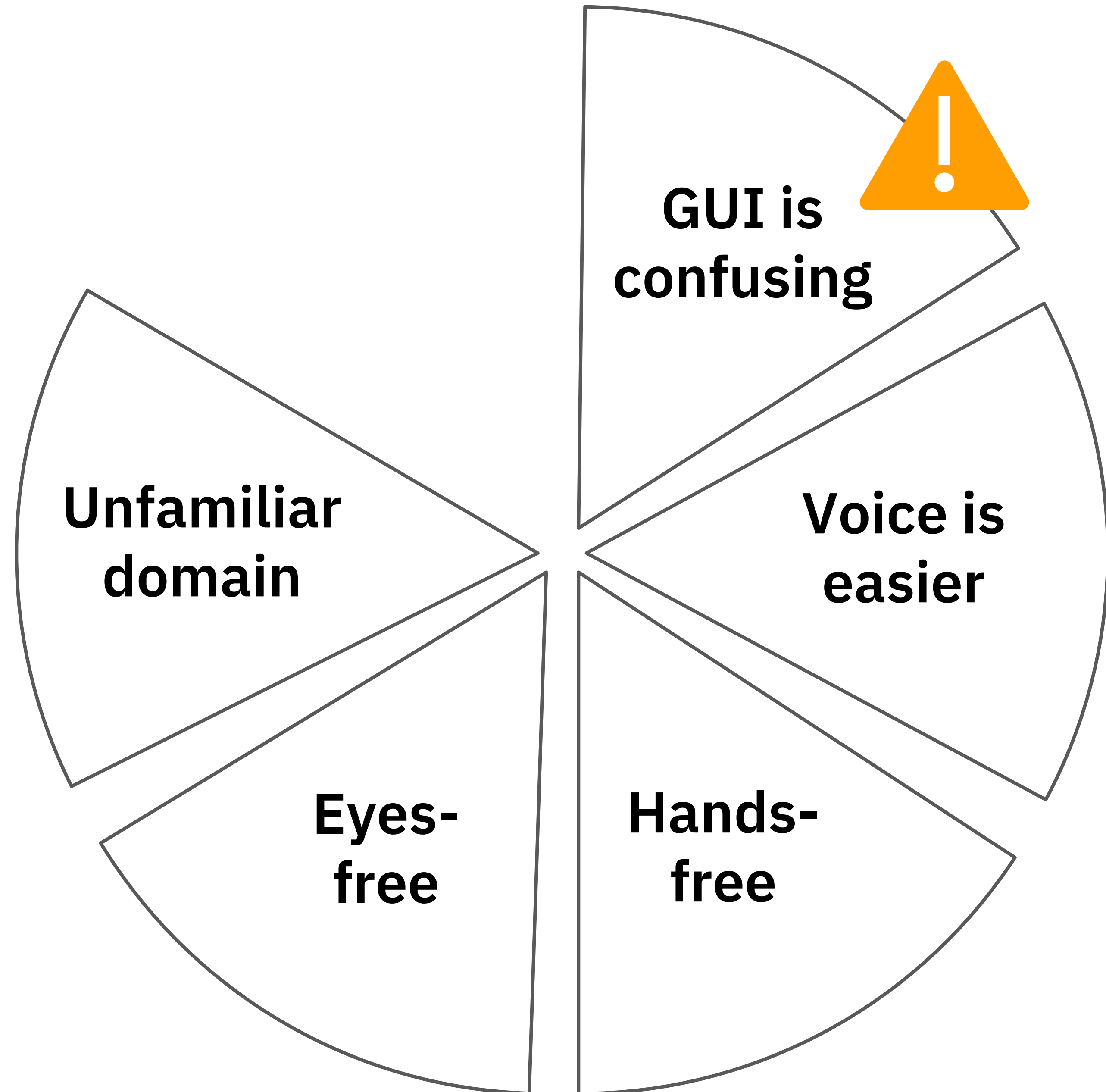
Why
Natural
language
interface?



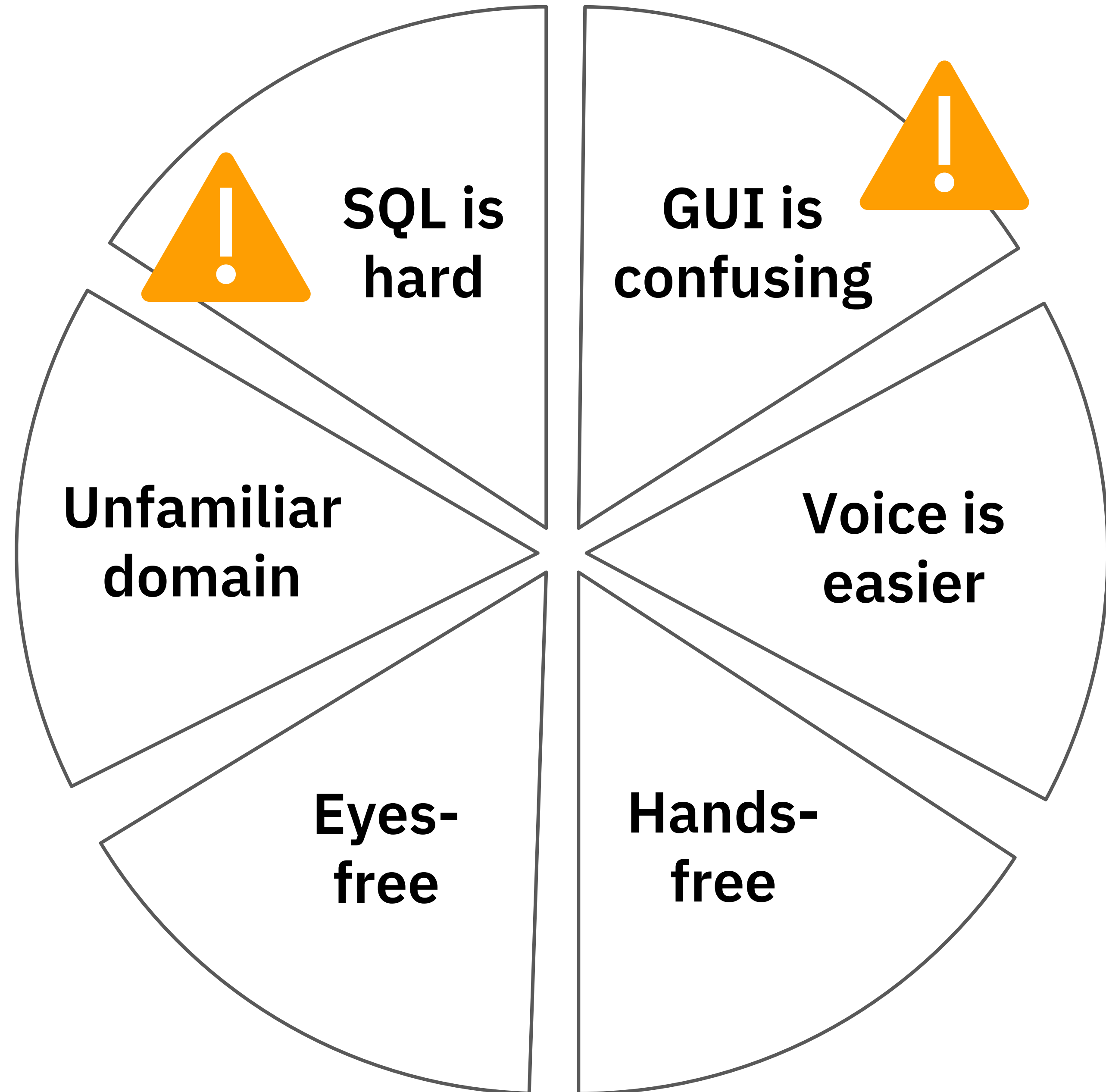
Why
Natural
language
interface?



Why
Natural
language
interface?



Why
Natural
language
interface?



3. History

What do we already know?

How did we get here?

Over the last decade, several computer systems have been developed that support natural-language interaction ...

Advantages of NL interfaces

- NL is flexible
- Users need less training with NL vs commands or SQL
- NL can be faster than using menus or GUIs
- NL enables clarifying and follow-up questions

Disadvantages of NL interfaces

- Flexibility at the cost of verbosity
- Lack of cues about capability
- People overestimate capability (eg. expect common sense)

Over the last decade, several computer systems have been developed that support natural-language interaction ...

Advantages of NL interfaces

- NL is flexible
- Users need less training with NL vs commands or SQL
- NL can be faster than using menus or GUIs
- NL enables clarifying and follow-up questions

Disadvantages of NL interfaces

- Flexibility at the cost of verbosity
- Lack of cues about capability
- People overestimate capability (eg. expect common sense)

Natural-language interface

Panel discussion, 1982

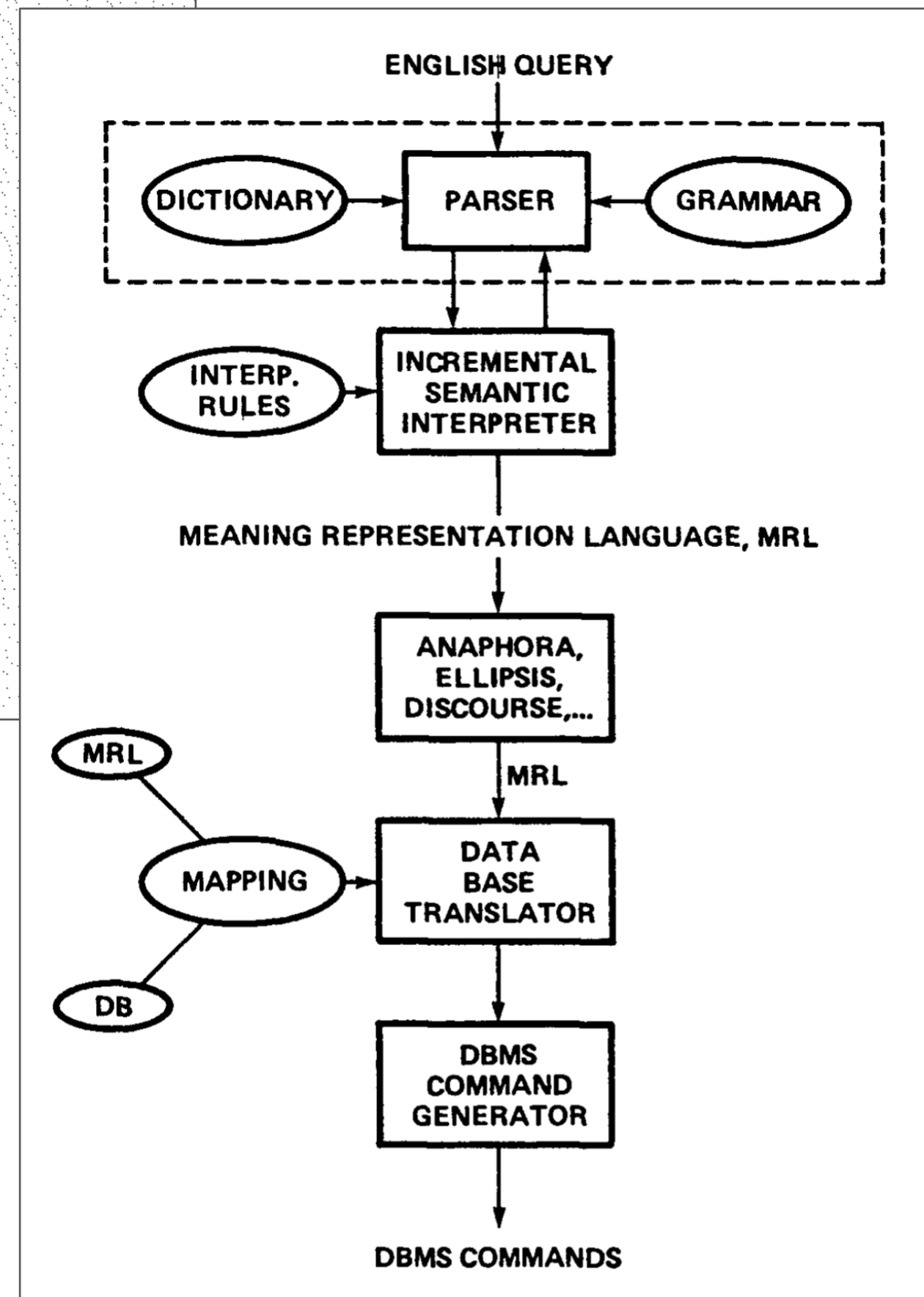
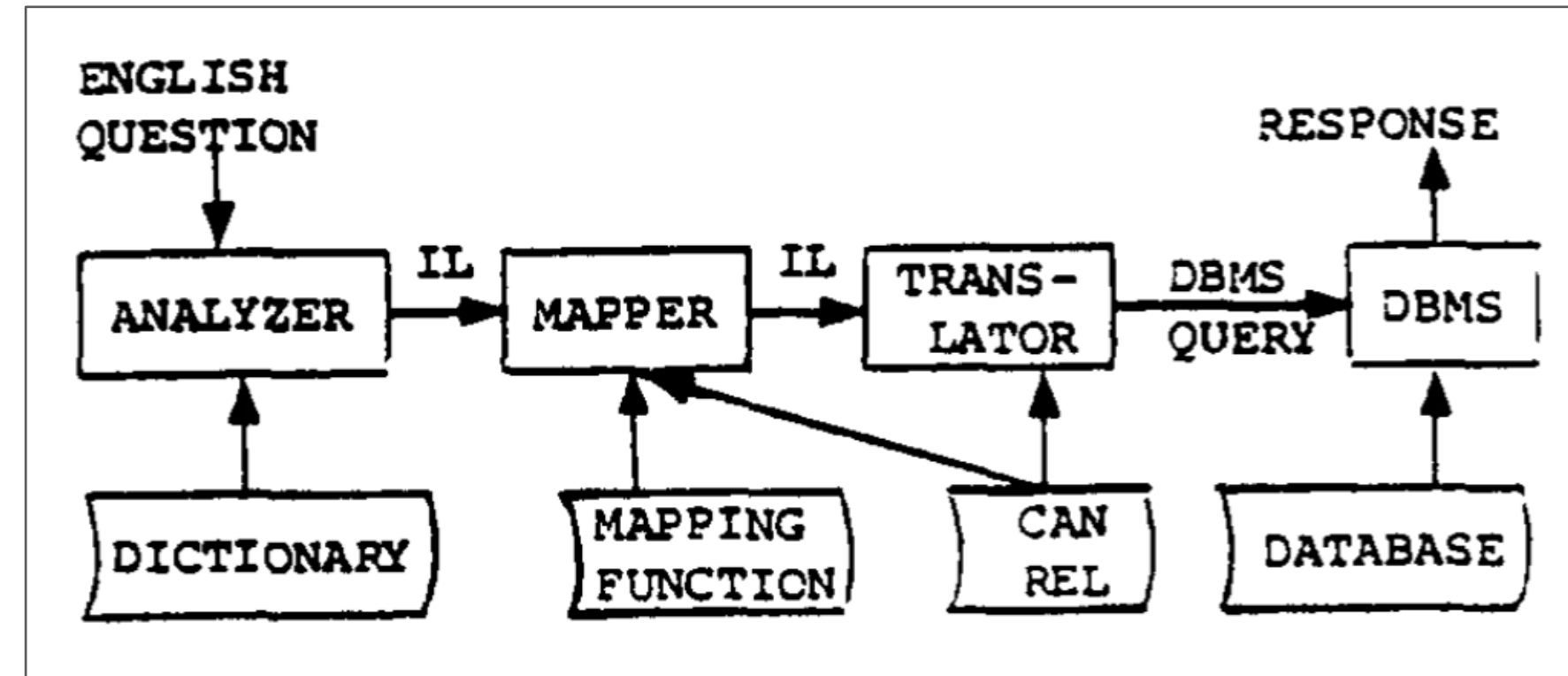
1977 - 1999

THE REPRESENTATION AND USE OF FOCUS IN DIALOGUE UNDERSTANDING

Technical Note 151

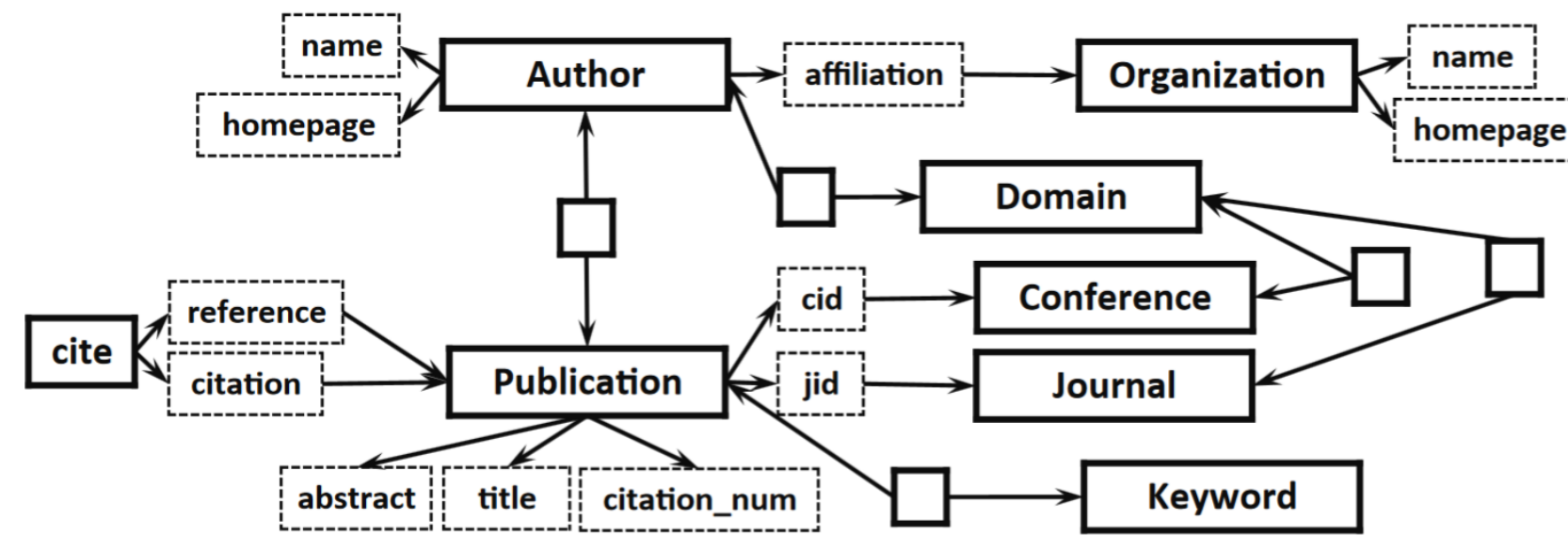
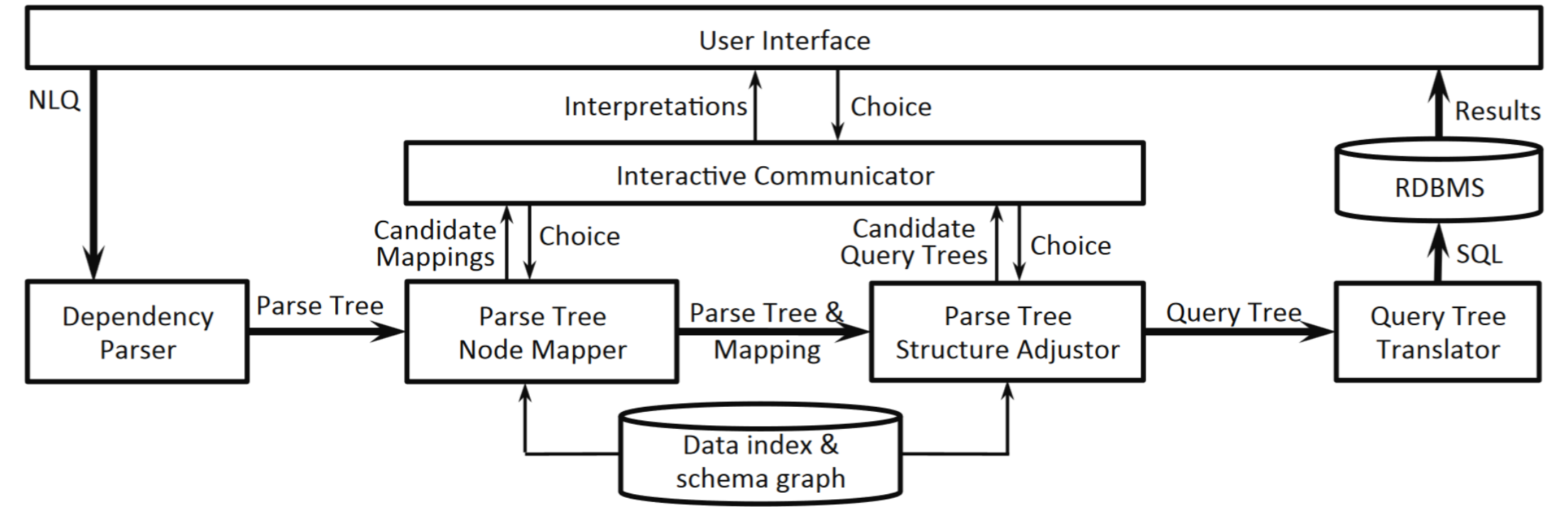
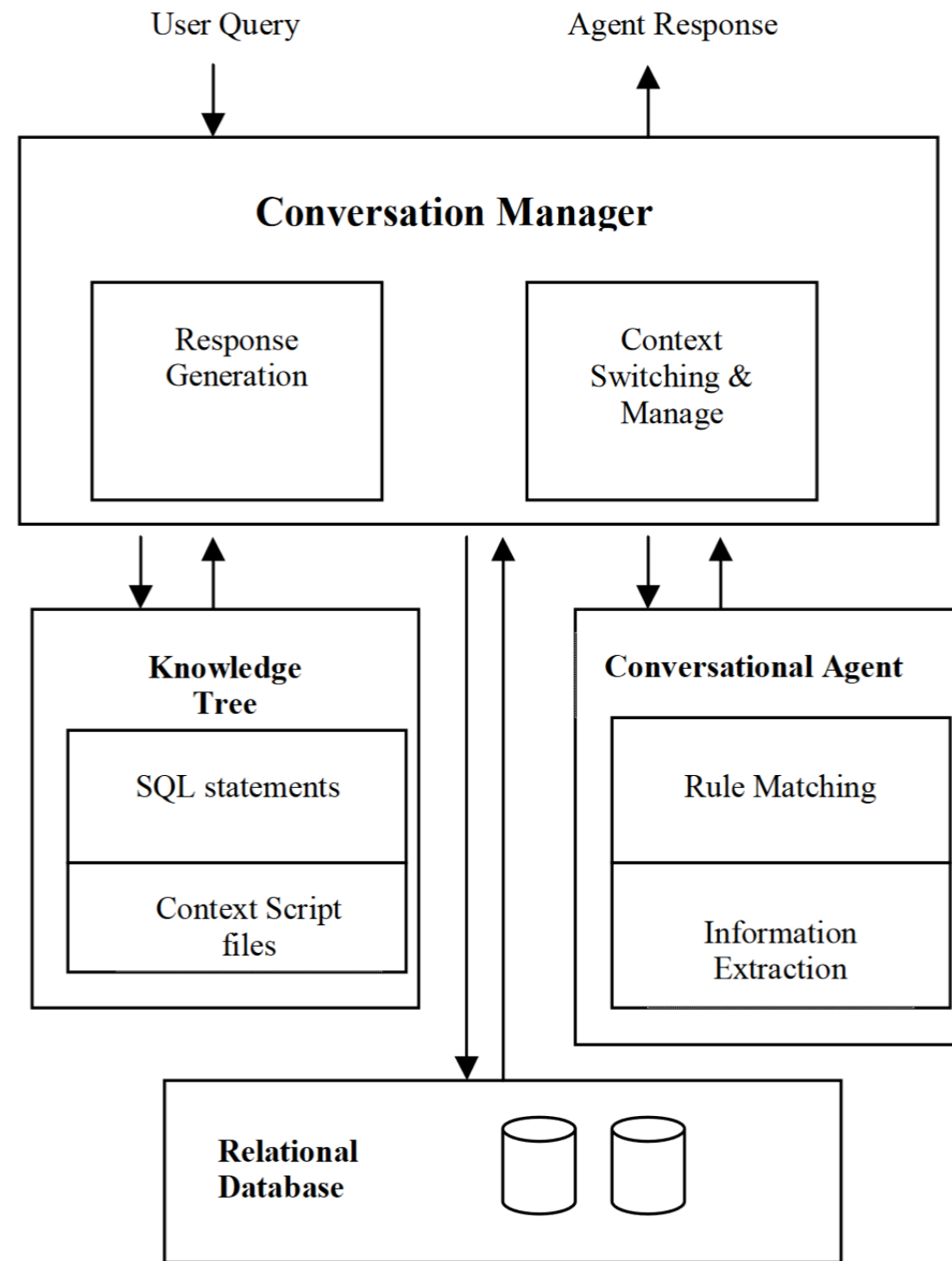
July 1977

By: Barbara J. Grosz
Artificial Intelligence Center



NLMENU Interface Austin Restaurants			
Commands Find Draw Delete Insert	Nouns restaurants <a new restaurant> a bar chart a line graph a pie chart a histogram a scatter plot a surface graph	Experts <specific map locations> <specific restaurant names> <specific addressses> <specific telephone numbers> <specific kinds of food> <specific reviews> <specific qualities of foods> <specific prices> <specific credit cards> <specific number>	Modifiers whose map location is whose name is whose address is whose telephone is whose kind of food is whose review is whose quality of food is whose price is whose credit cards are whose distance from ut in miles is with a minimum slice size of with grid on with horizontal grid with vertical grid with <n> divisions
Attributes distance from ut in name address telephone kind of food review quality of food price credit cards	Comparisons between greater than less than greater than or equal to less than or equal to equal to	Connectors and draw a map of them and or	
System Commands			
Restart Save Input Show Input	Refresh Retrieve Input Show Parse Tree	Rubout Delete Inputs Execute	Exit System Play Input Save Output

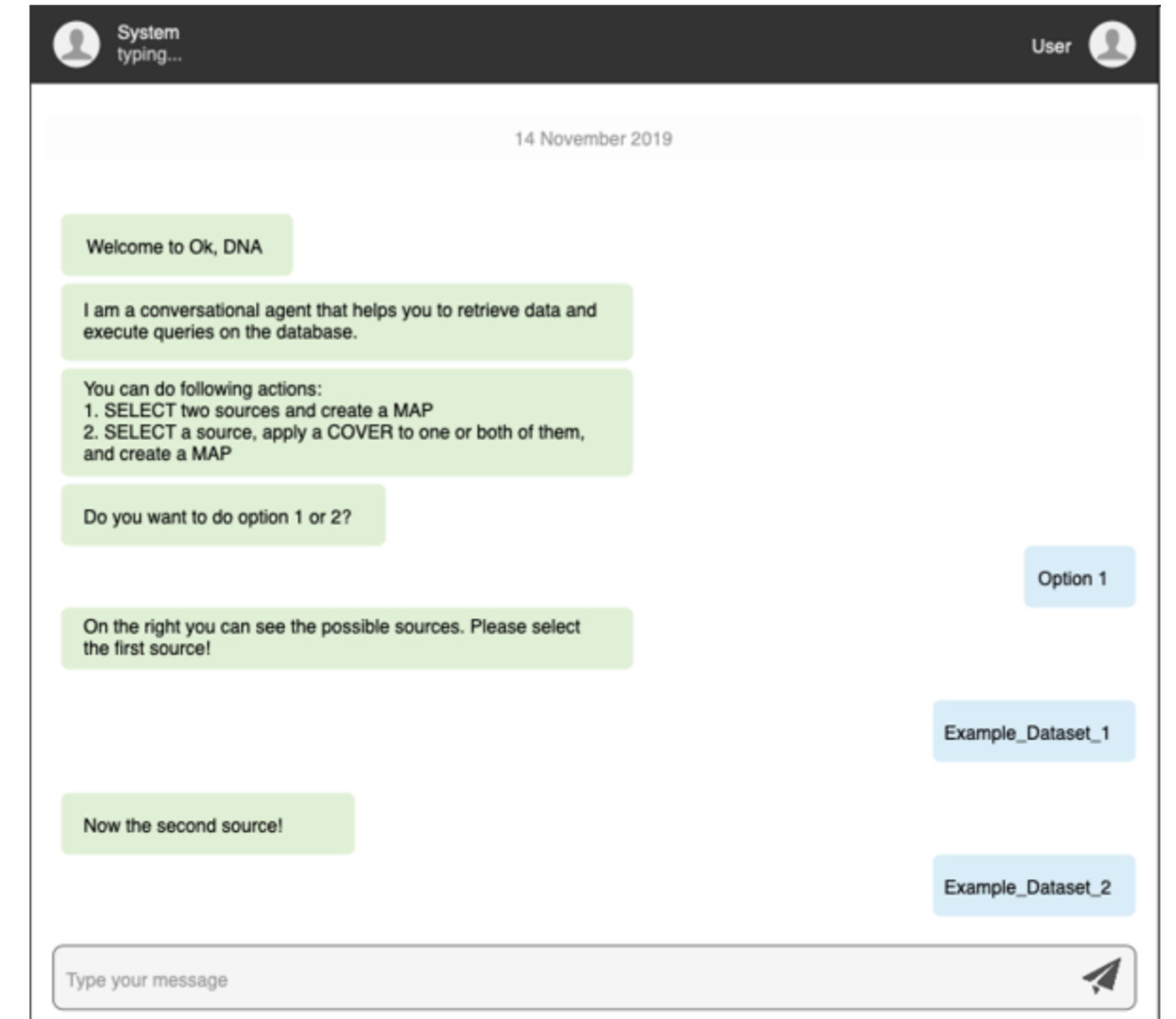
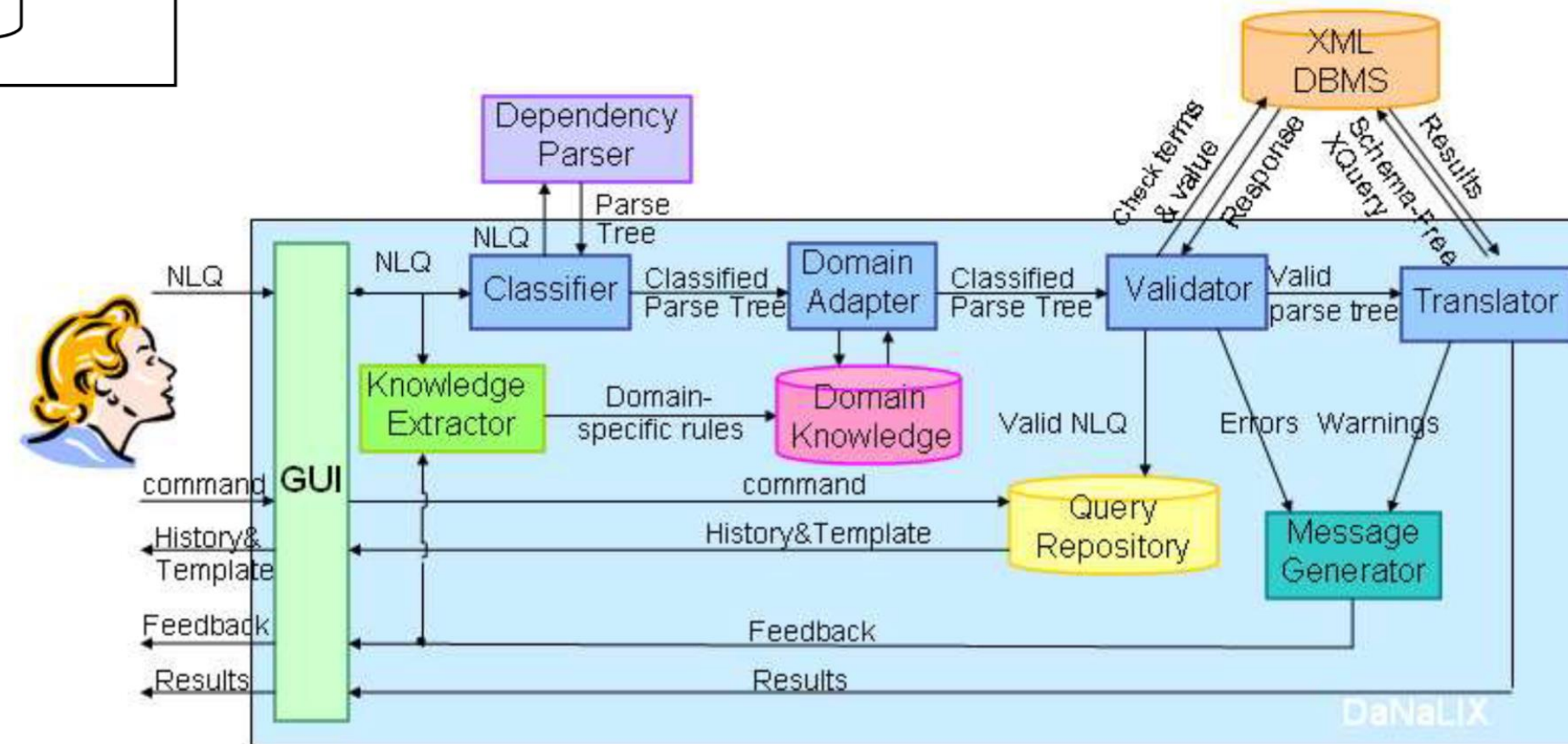
2000 – 2020



Query 1: Return the average number of publications by Bob in each year.

Query 2: Return authors who have more papers than Bob in VLDB after 2000.

Query 3: Return the conference in each area whose papers have the most total citations.



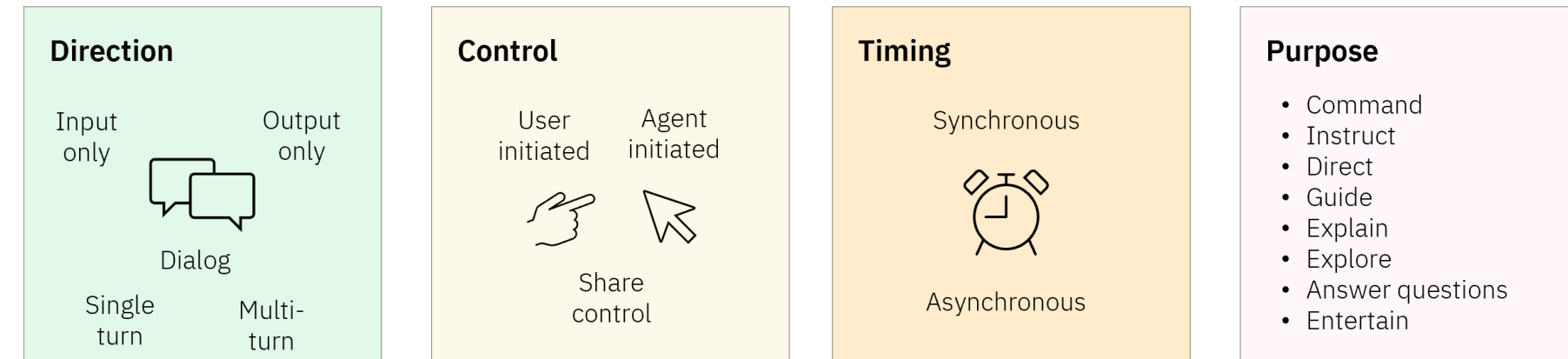
Review

1. Definition
2. Motivation
3. History

Review

1. Definition
2. Motivation
3. History

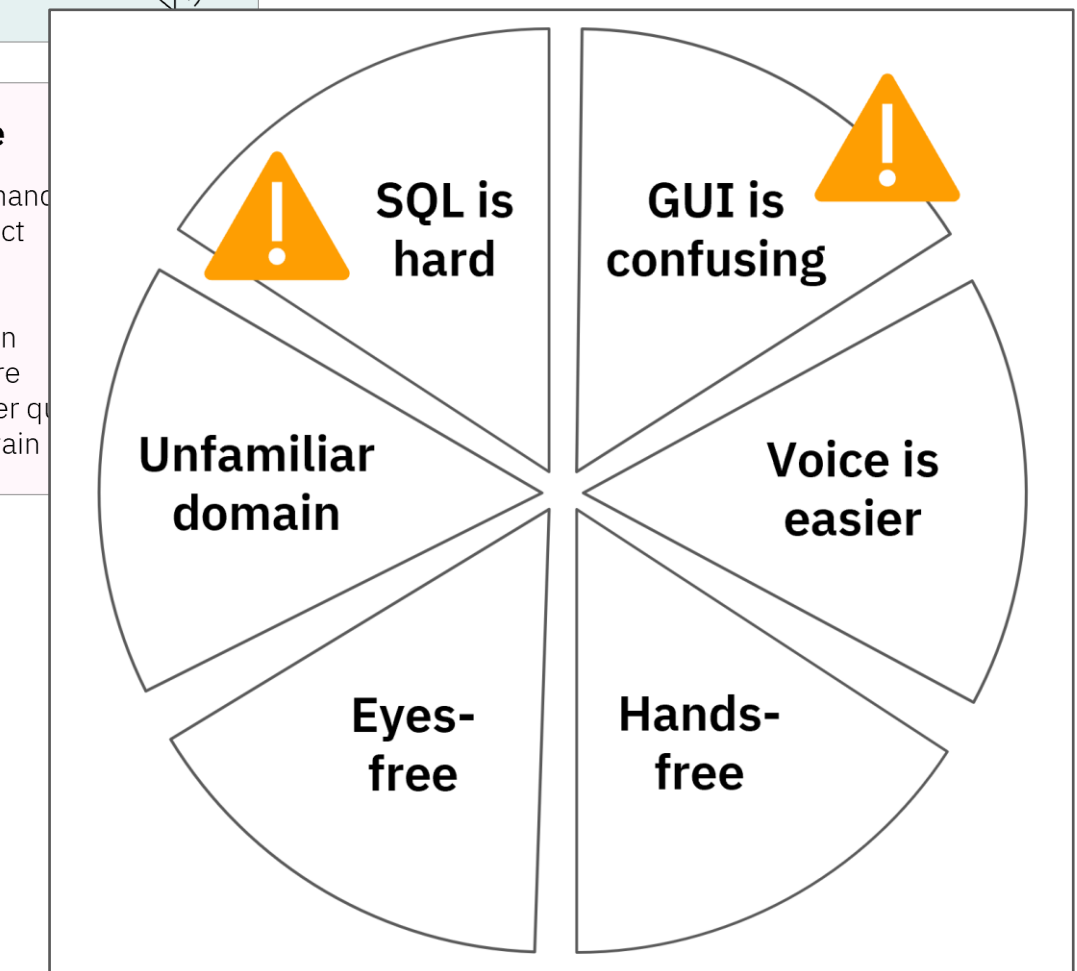
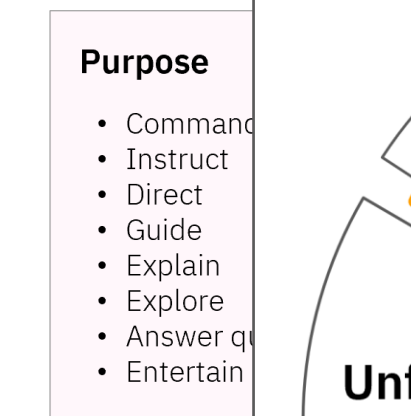
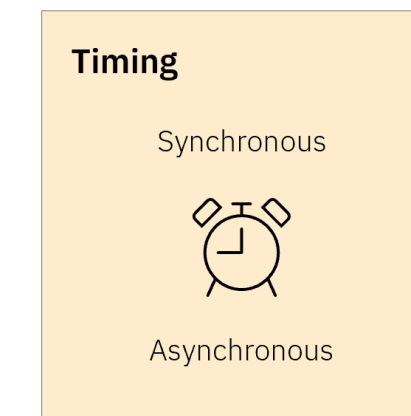
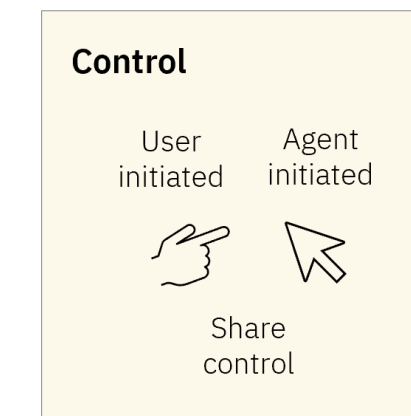
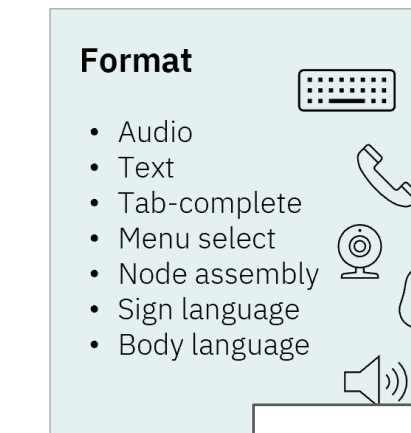
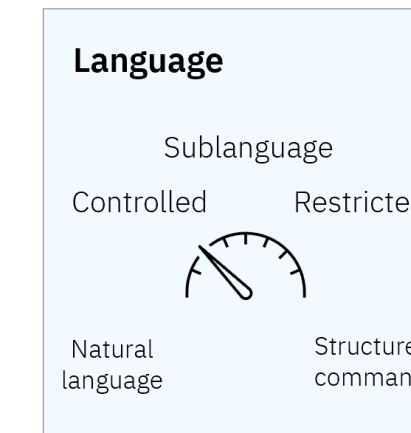
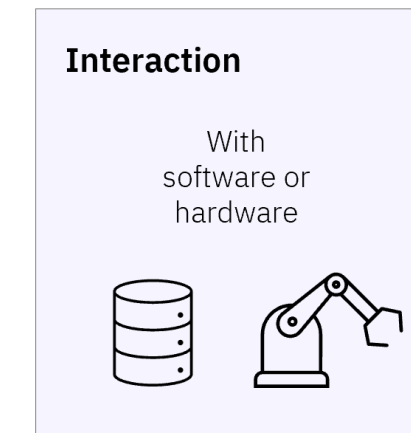
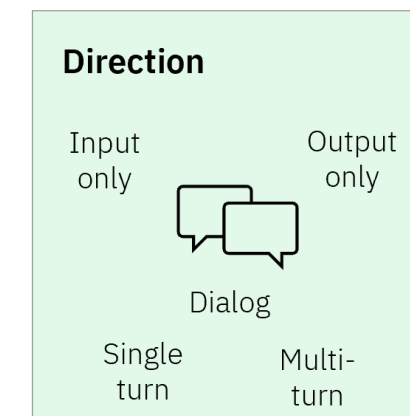
Natural
language
interface



Review

1. Definition
2. Motivation
3. History

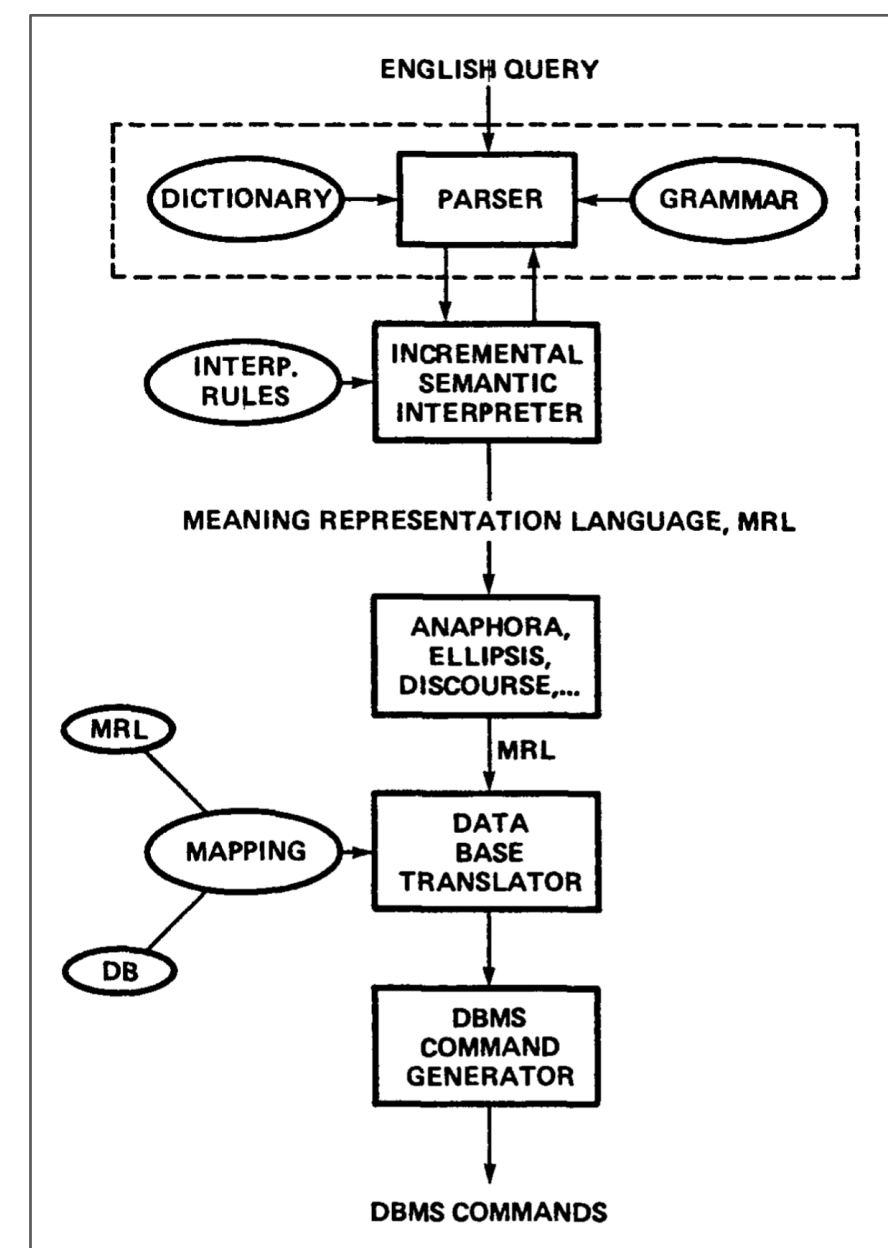
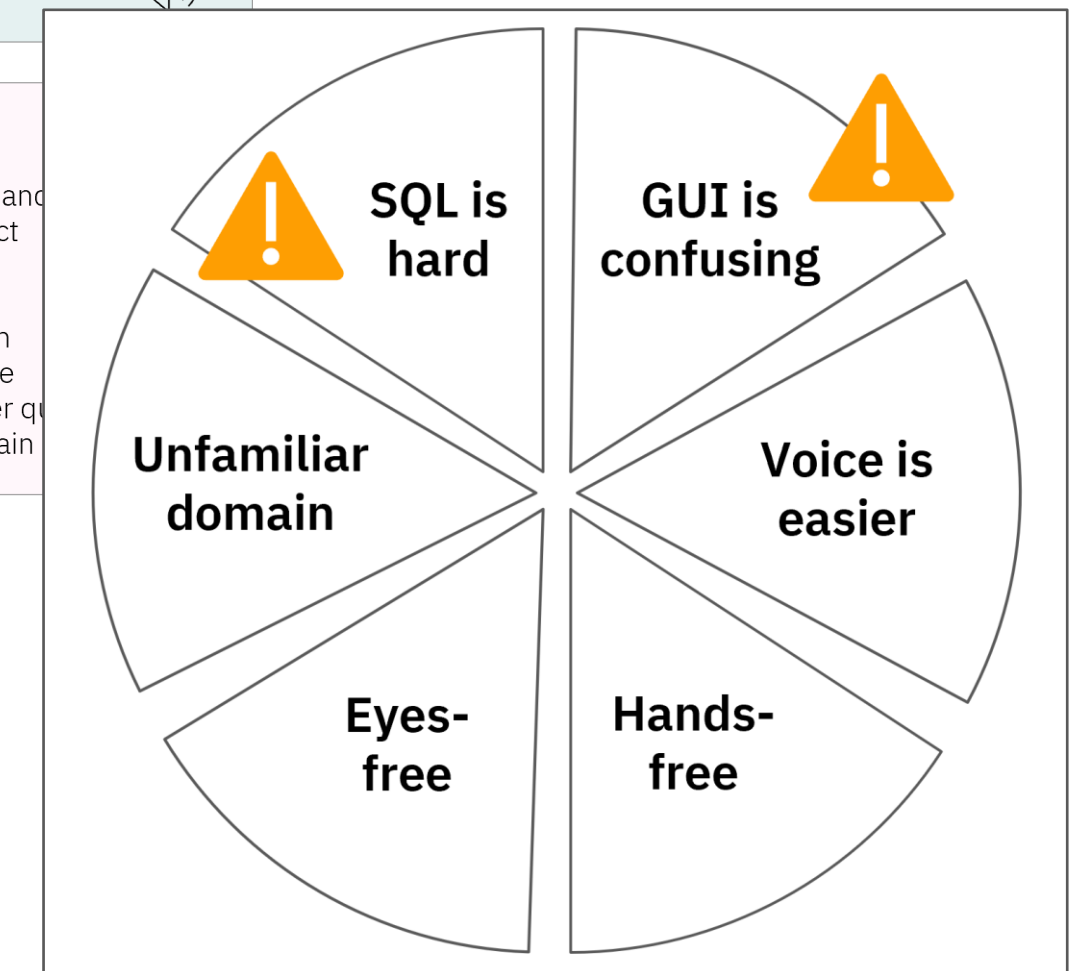
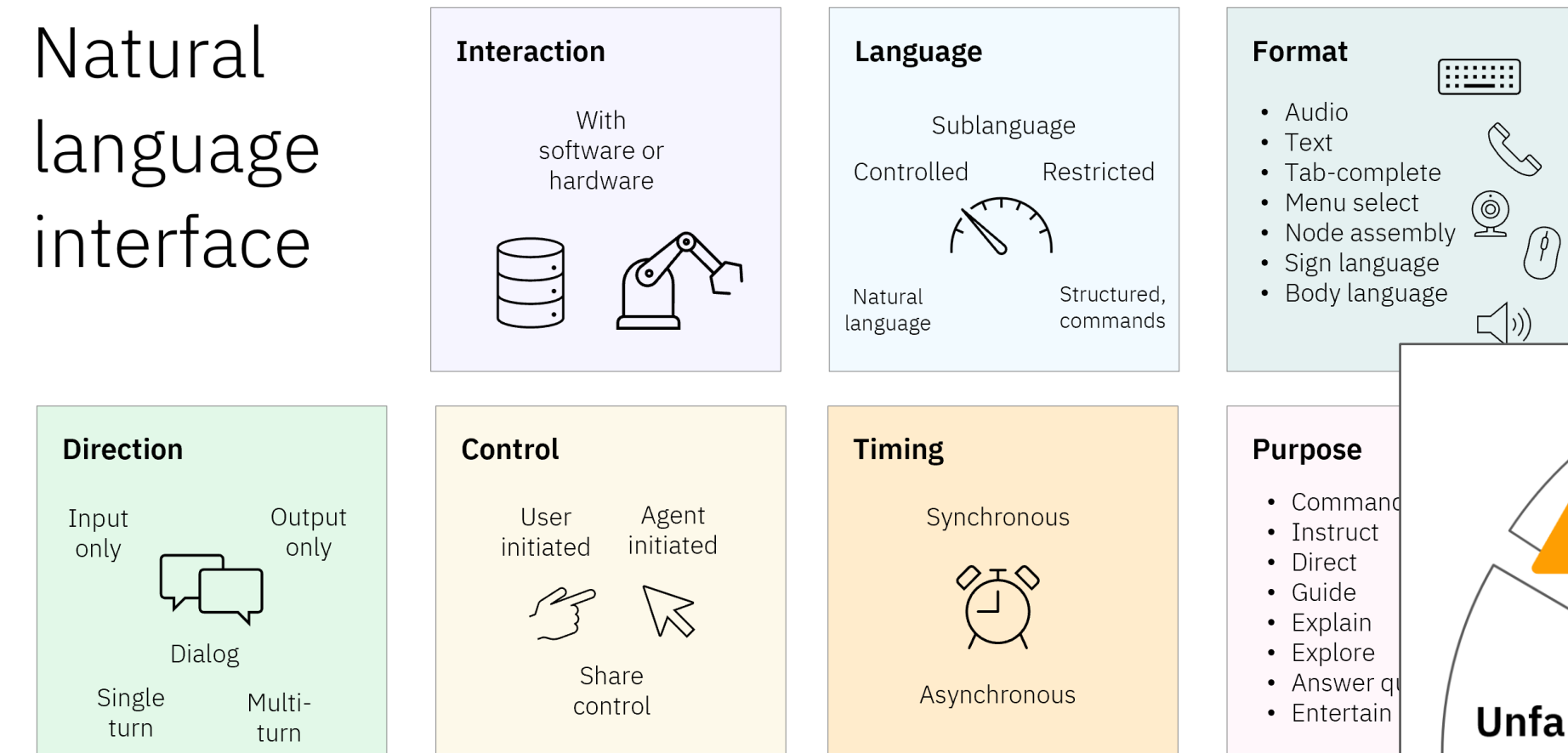
Natural
language
interface



Review

1. Definition
2. Motivation
3. History

Natural language interface



Review

- 1. Definition
- 2. Motivation
- 3. History

