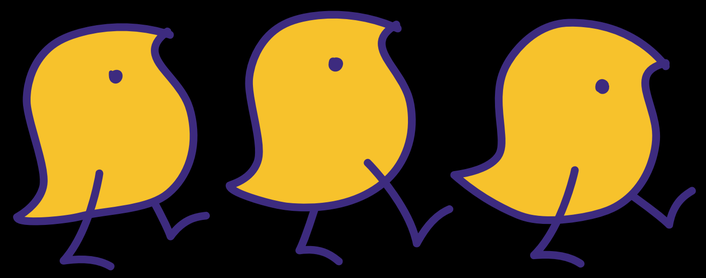
LangCon 2019

D.I.Y ourself 챗봇 v0.2

without Chatbot Builder & Deep Learning

박 혜 웅

bage79@gmail.com



without Chatbot Builder & Deep Learning

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Why?

- Chatbot Builder (=Dialogue Manager)

  엄밀히 말하면 다르지만, 우선 같다고 생각하셔도 이 발표를 이해하는데 지장이 없습니다.

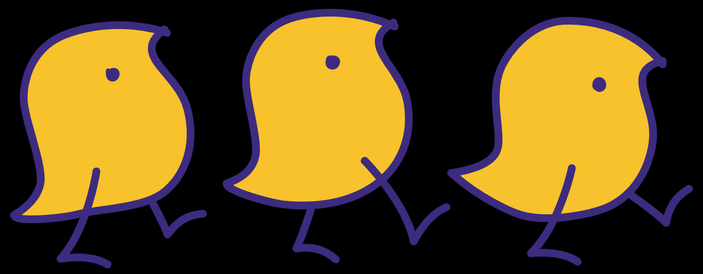
  - **We need different chatbot builders** for various chatbot services.
  - Chatbot builders **can't call some external APIs.**
- Deep Learning (=DL)
  - DL **can't perfectly control** NLU outputs(predictions).
  - I don't know DL. DL is **hard to learn**.

How?

- Messaging Platform
  - Slack, Facebook, …

이 발표에서 다루는 내용

- **Dialogue Manager (DM)**
  - **Rule based (Scenario based)**
- **Natural Language Understanding (NLU)**
  - **Intent Classification (IC)**
    - **Example based (Search-engine based)**
  - **Named Entity Recognition (NER)**
    - **Dictionary based (Regular-expression based)**
- Natural Language Generation (NLG)
  - Template based



Chatbot System

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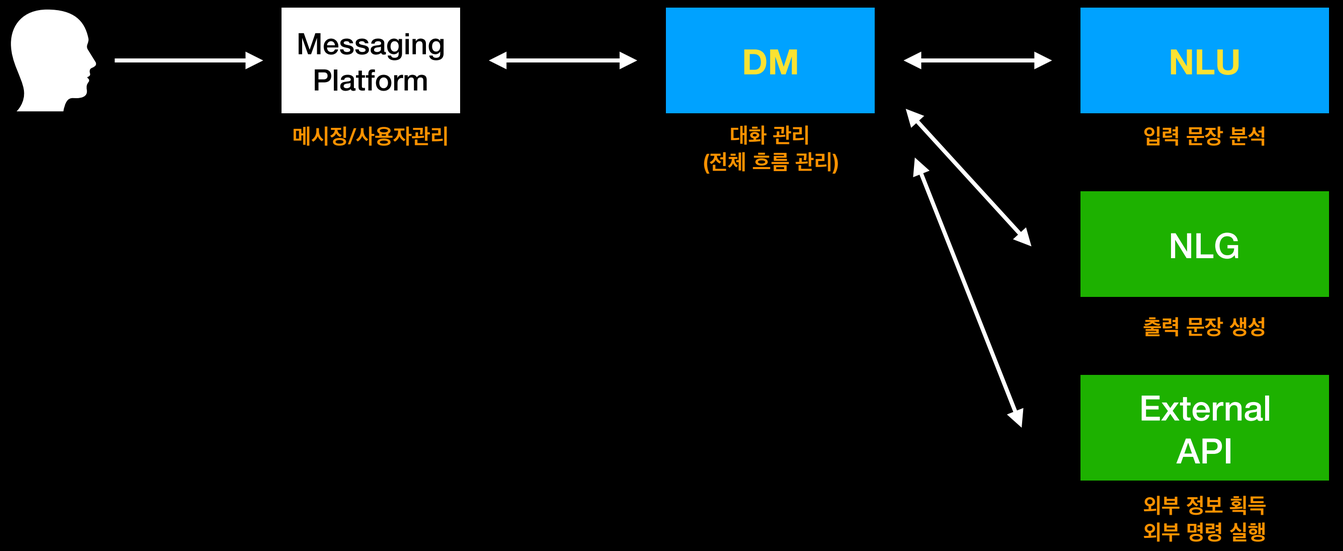
Chatbot System

DIY 챗봇



Chatbot System

Messaging Platform

userid: bage

DM

NLU

NLG

External API

Chatbot System

DIY 챗봇

input: “T멤버쉽 잔여 포인트 알려줘.”

Messaging Platform

userid: bage

DM

NLU

entity: T멤버쉽
intent: check.remain

NLG

External API

Chatbot System

DIY 챗봇

input: “T멤버쉽 잔여 포인트 알려줘.”

Messaging Platform

DM

NLU

entity: T멤버쉽
intent: check.remain

userid: bage

state: T멤버쉽포인트조회

NLG

External API

Chatbot System

DIY 챗봇

input: “T멤버쉽 잔여 포인트 알려줘.”

Messaging Platform

DM

NLU

entity: T멤버쉽
intent: check.remain

userid: bage

state: T멤버쉽포인트조회

NLG

template: “[name]님의 잔여 포인트는 [point]점입니다.”

External API

Chatbot System

DIY 챗봇

input: “T멤버쉽 잔여 포인트 알려줘.”

Messaging Platform

DM

NLU

entity: T멤버쉽
intent: check.remain

userid: bage

state: T멤버쉽포인트조회

NLG

template: “[name]님의 잔여 포인트는 [point]점입니다.”

External API

name: 박혜웅
point: 1000

Chatbot System

DIY 챗봇

input: “T멤버쉽 잔여 포인트 알려줘.”

Messaging Platform

DM

NLU

entity: T멤버쉽
intent: check.remain

userid: bage state: T멤버쉽포인트조회

output: “박혜웅님의 잔여 포인트는 1000점입니다.”

NLG

template: “[name]님의 잔여 포인트는 [point]점입니다.”

External API

name: 박혜웅
point: 1000

Chatbot System

DIY 챗봇

이 발표에서 다루는 내용

input: “T멤버쉽 잔여 포인트 알려줘.”

Messaging Platform

DM

NLU

entity: T멤버쉽
intent: check.remain

userid: bage

state: T멤버쉽포인트조회

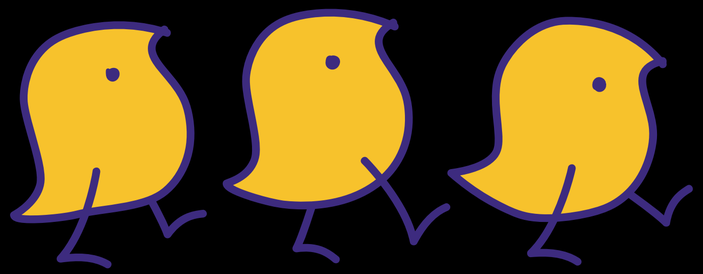
output: “박혜웅님의 잔여 포인트는 1000점입니다.”

NLG

template: “[name]님의 잔여 포인트는 [point]점입니다.”

External API

name: 박혜웅
point: 1000



DM

Dialogue Manager

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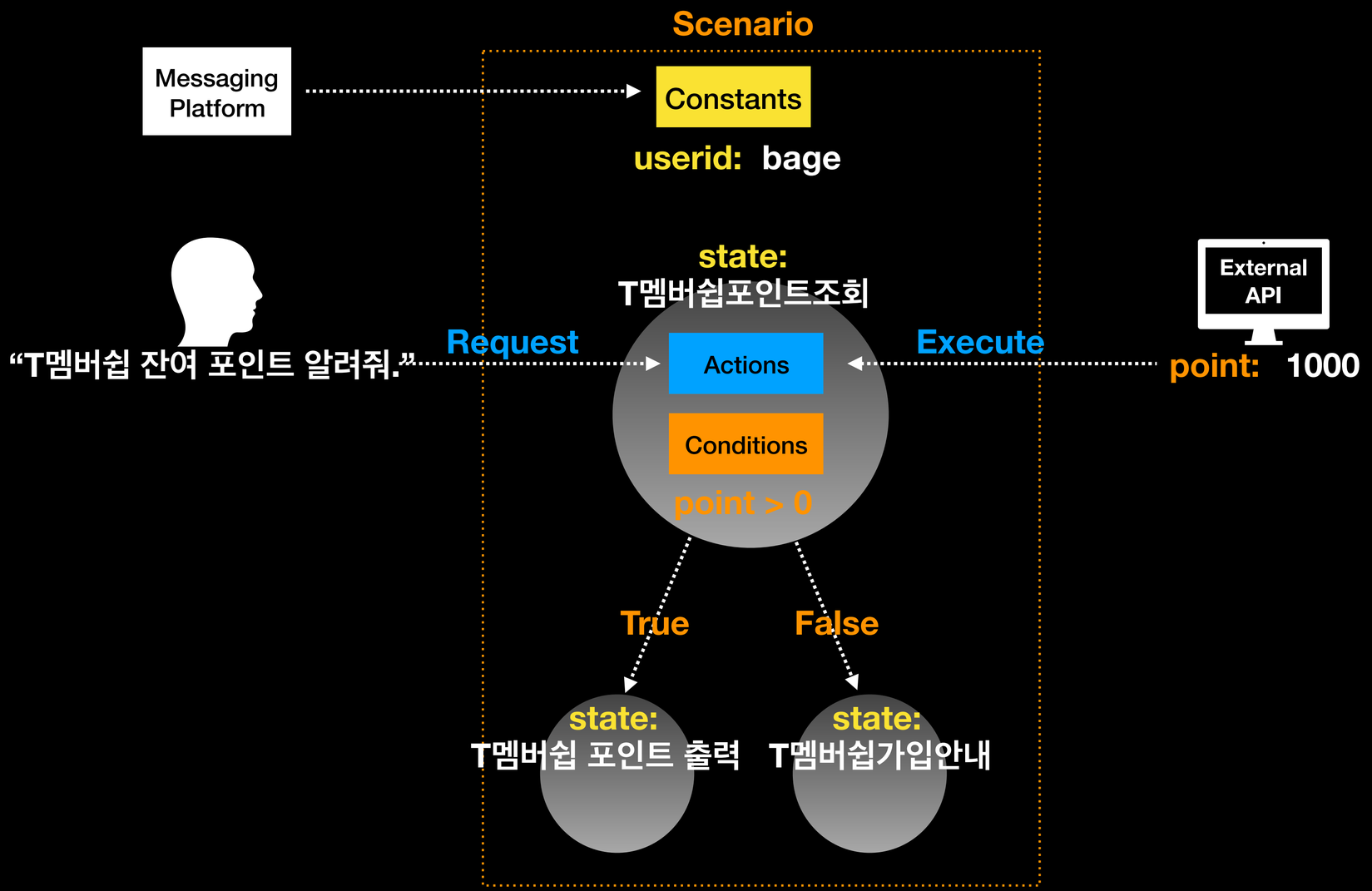
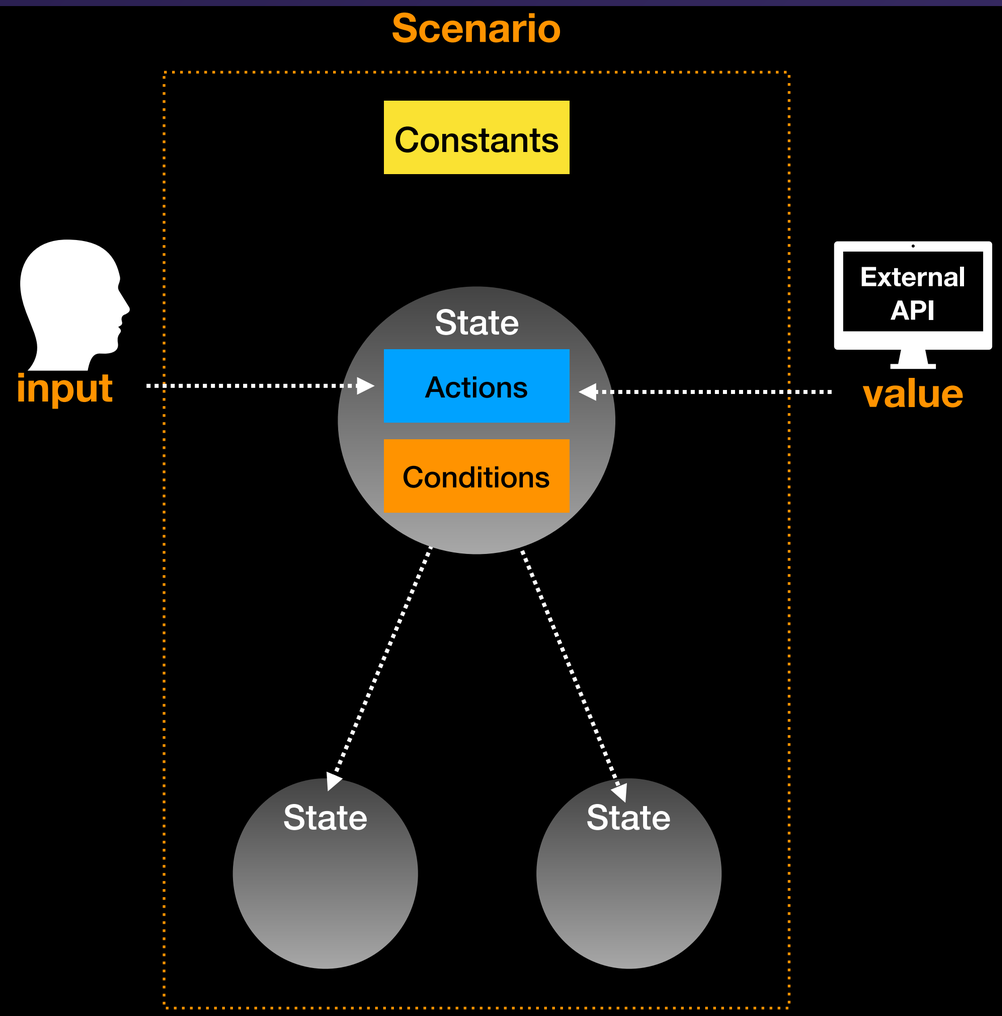
Scenario


Scenario
Messaging Platform
Constants
userid: bage
state:
T멤버쉽포인트조회
"T멤버쉽 잔여 포인트 알려줘."
Request
Actions
Conditions
point > 0
Execute
External API
point: 1000
True
False
state:
T멤버쉽 포인트 출력
state:
T멤버쉽가입안내

Scenario

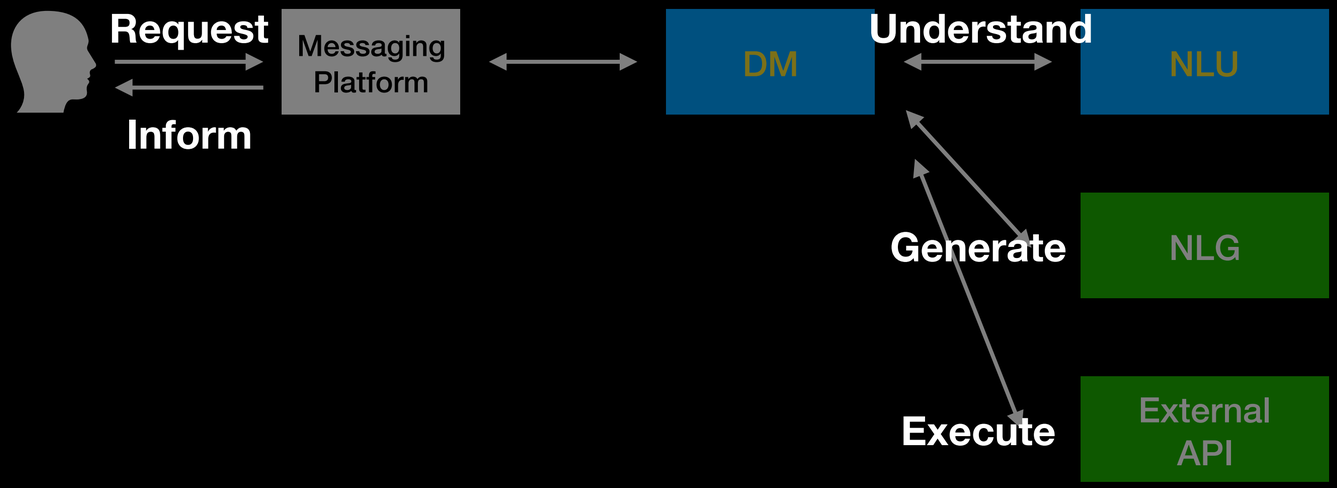
- Data Structure
  - Linked List
- Constants
  - Global
- Actions
  - for variables
- Variables
  - from User, API, NLU, NLG …
- Conditions
  - **equal**, greater, little, exists, …

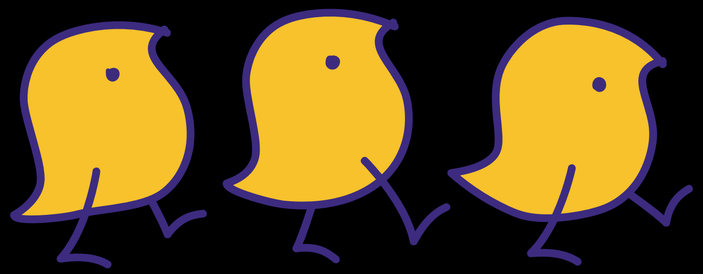


프로그래밍의 구성요소와 비슷합니다.

Actions

- Request
  - from a user
- Inform
  - to a user
- Understand
  - NLU
- Generate
  - NLG
- Execute
  - external API





NLU

Natural Language Understanding

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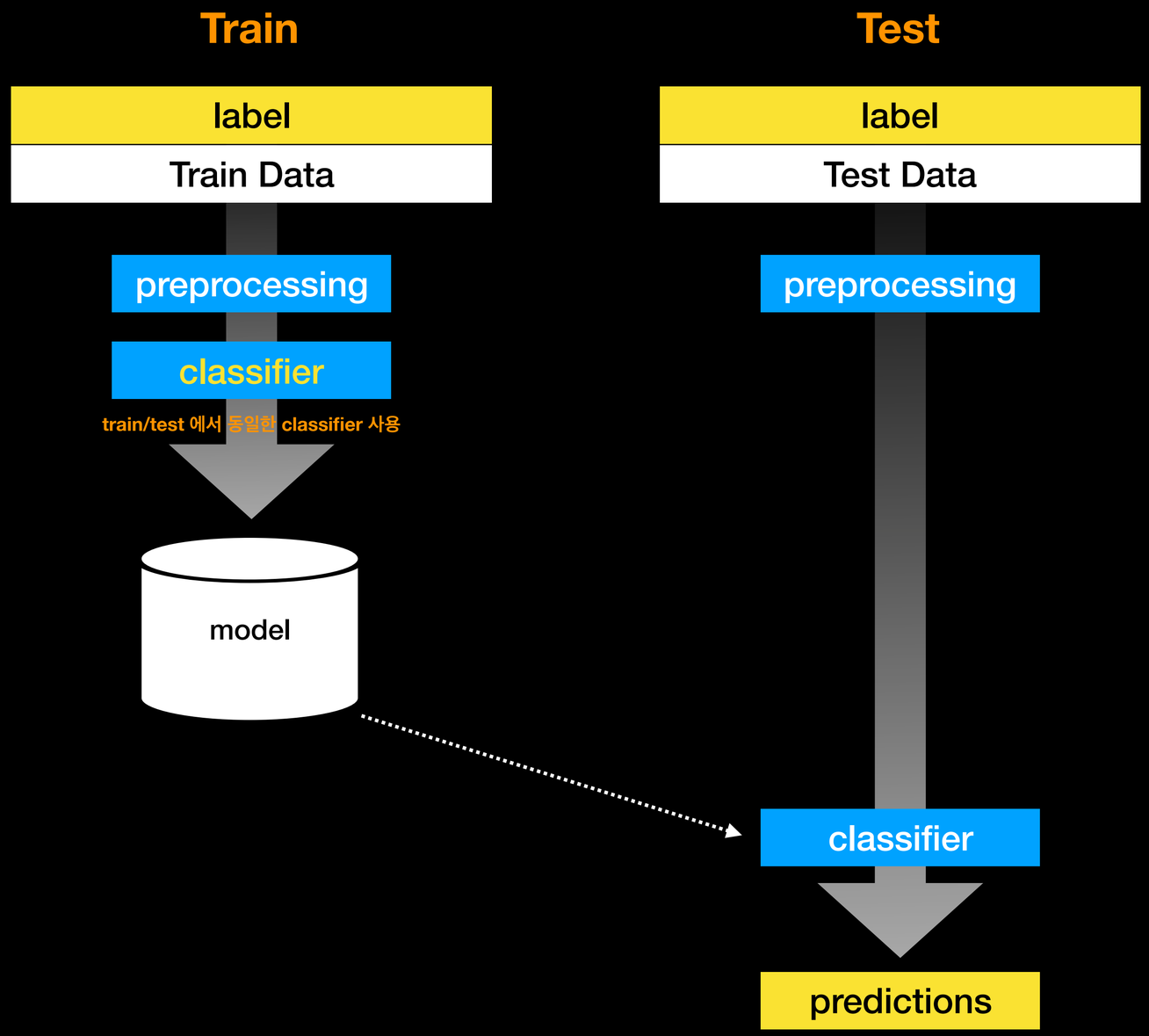
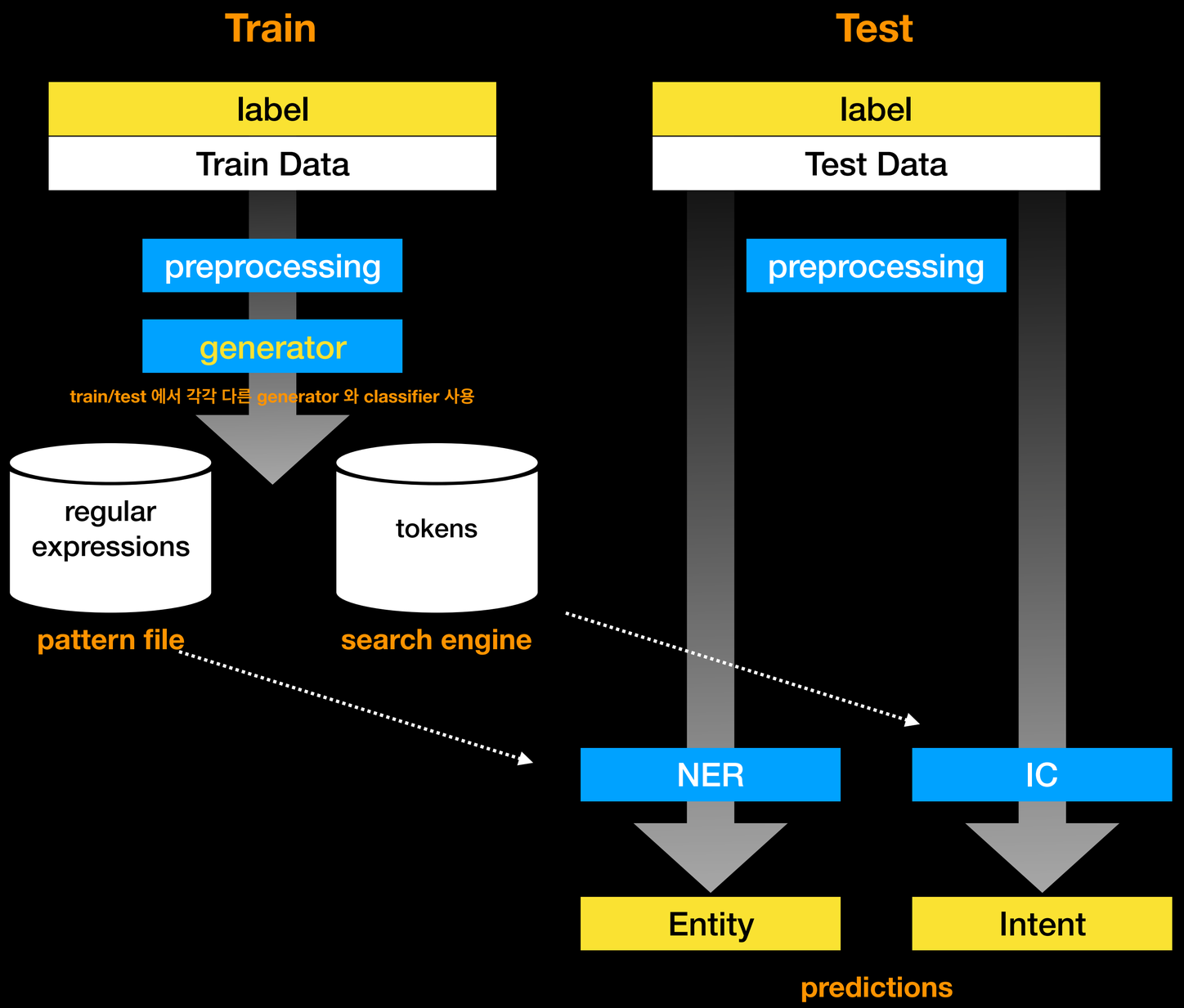
NLU with Deep Learning

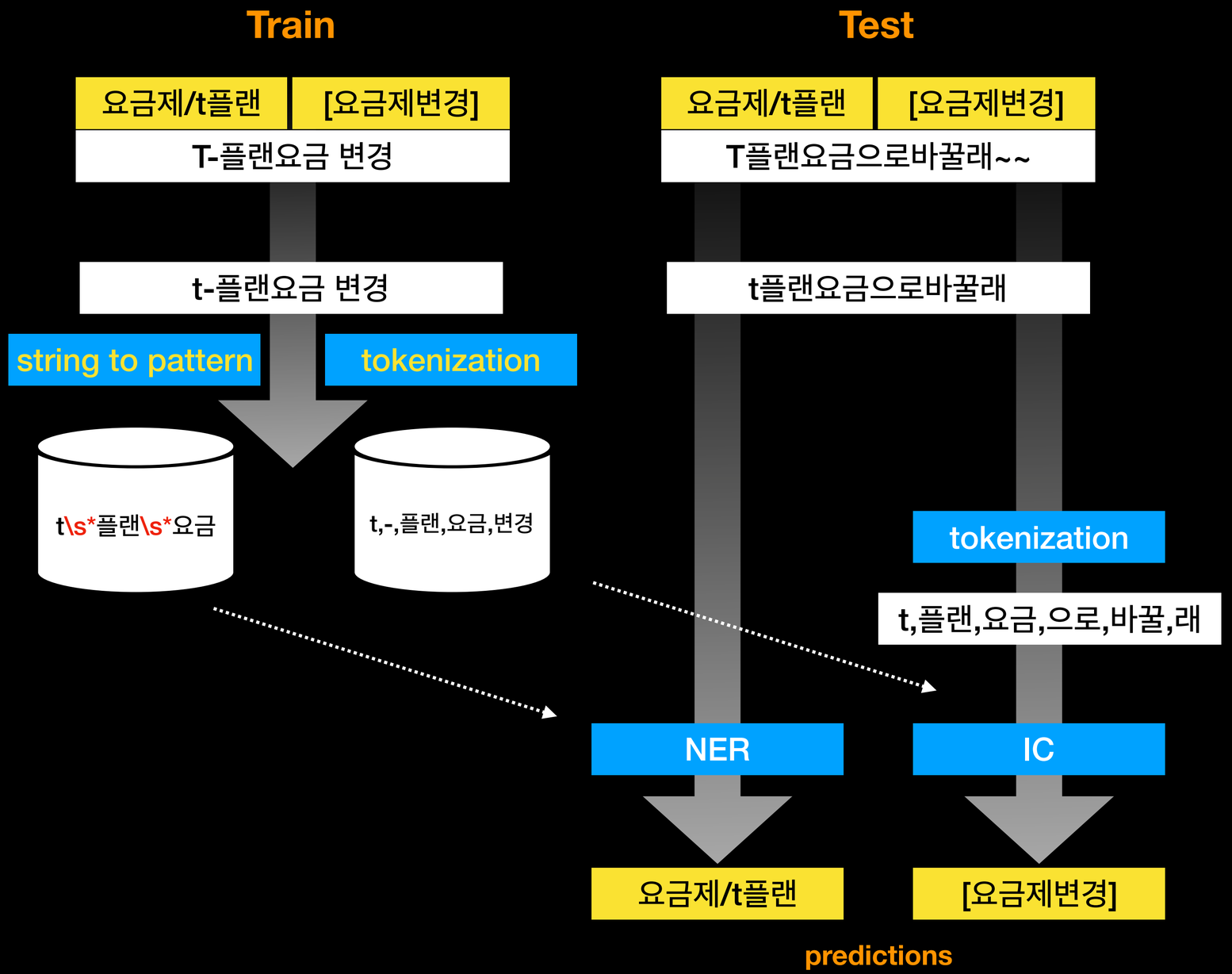


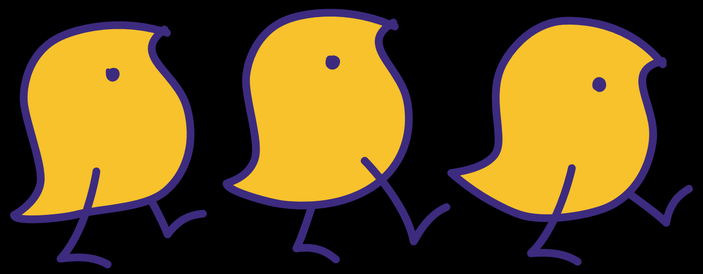
NLU without Deep Learning



NLU without Deep Learning

DIY 챗봇





IC

Intent Classification

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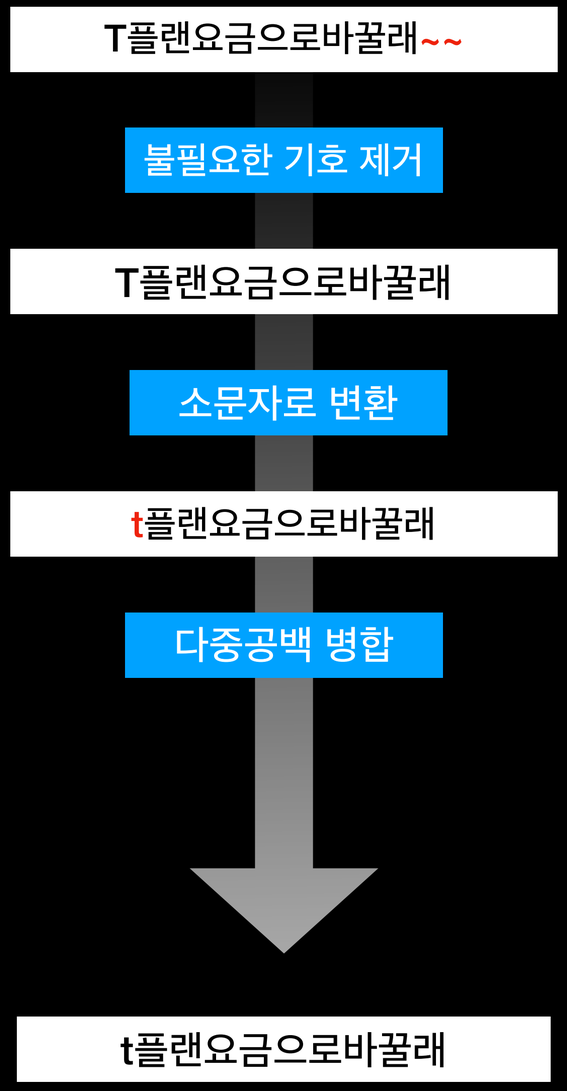
Preprocessing



Tokenization

t플랜요금으로바꿀래

word spacing

t,플랜,요금,으로,바꿀,래

word tokens

형태소분석기를 띄어쓰기용으로 사용하여, 어미나 조사도 분리된 경우

word spacing

morph analyzing

t,플랜,요금,으로,바꾸,ㄹ,래

morph tokens

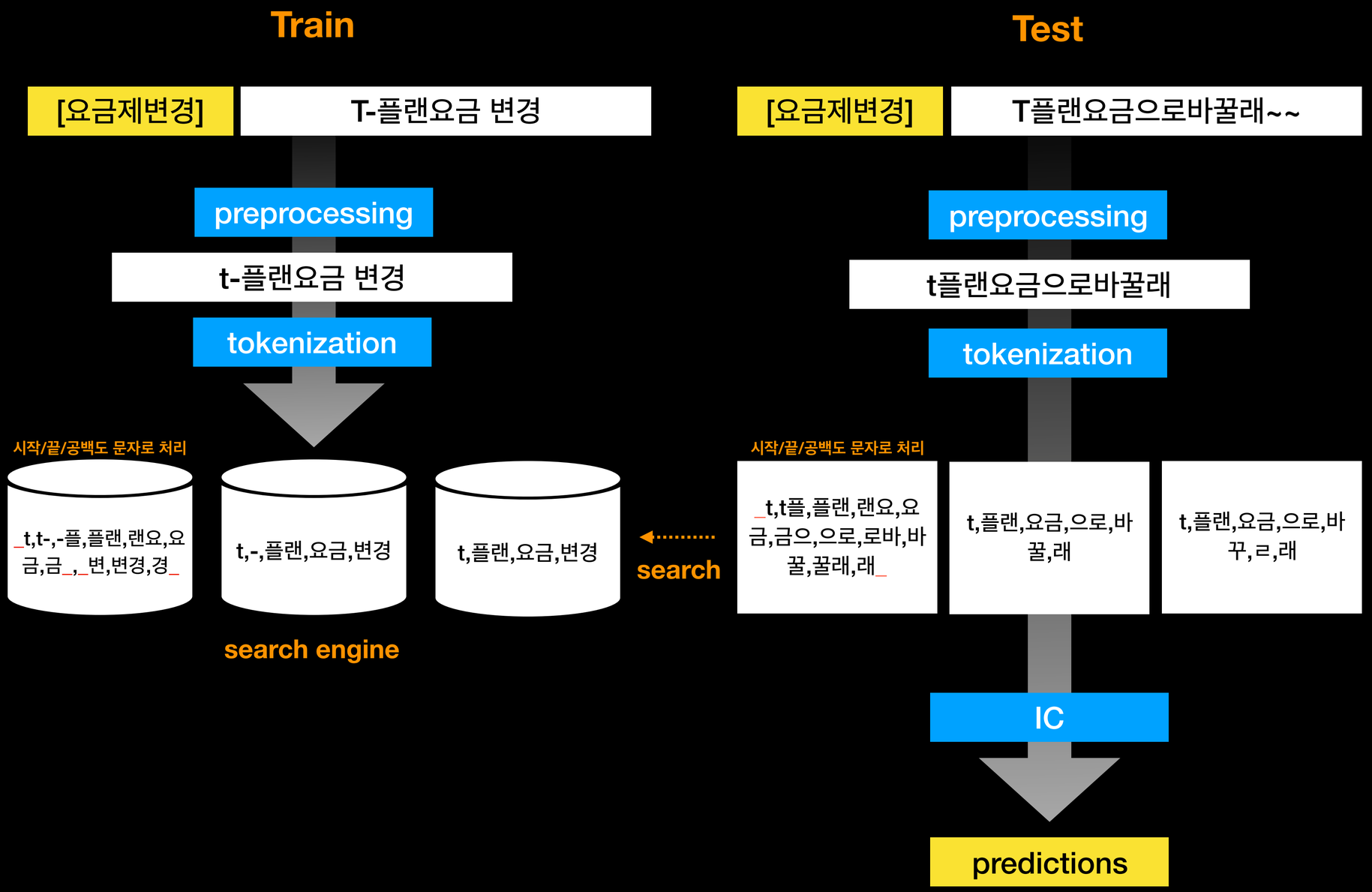
시작/끝/공백도 문자로 처리

_t,t플,플랜,랜요,요금,금으,으로,로바,바꿀,꿀래,래_

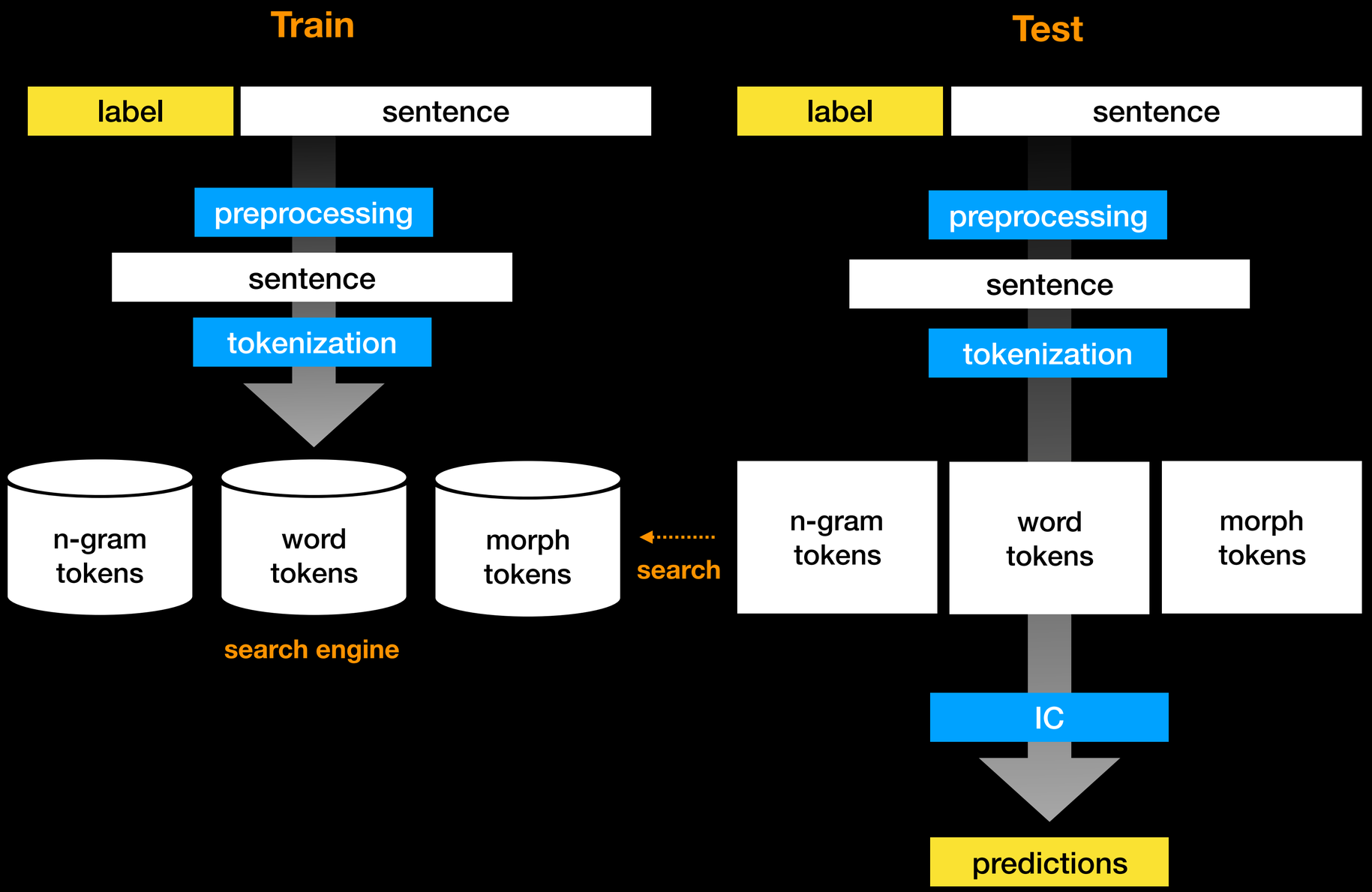
n-gram tokens

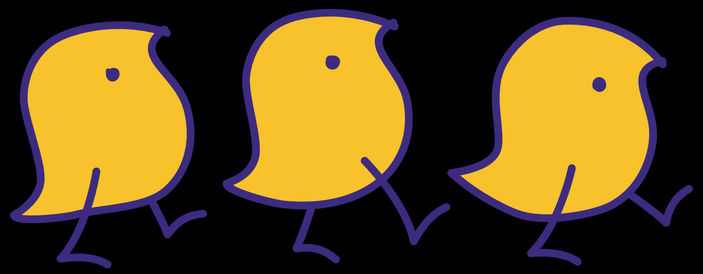
Intent Classification

DIY 챗봇



Intent Classification





NER

Named Entity Recognition

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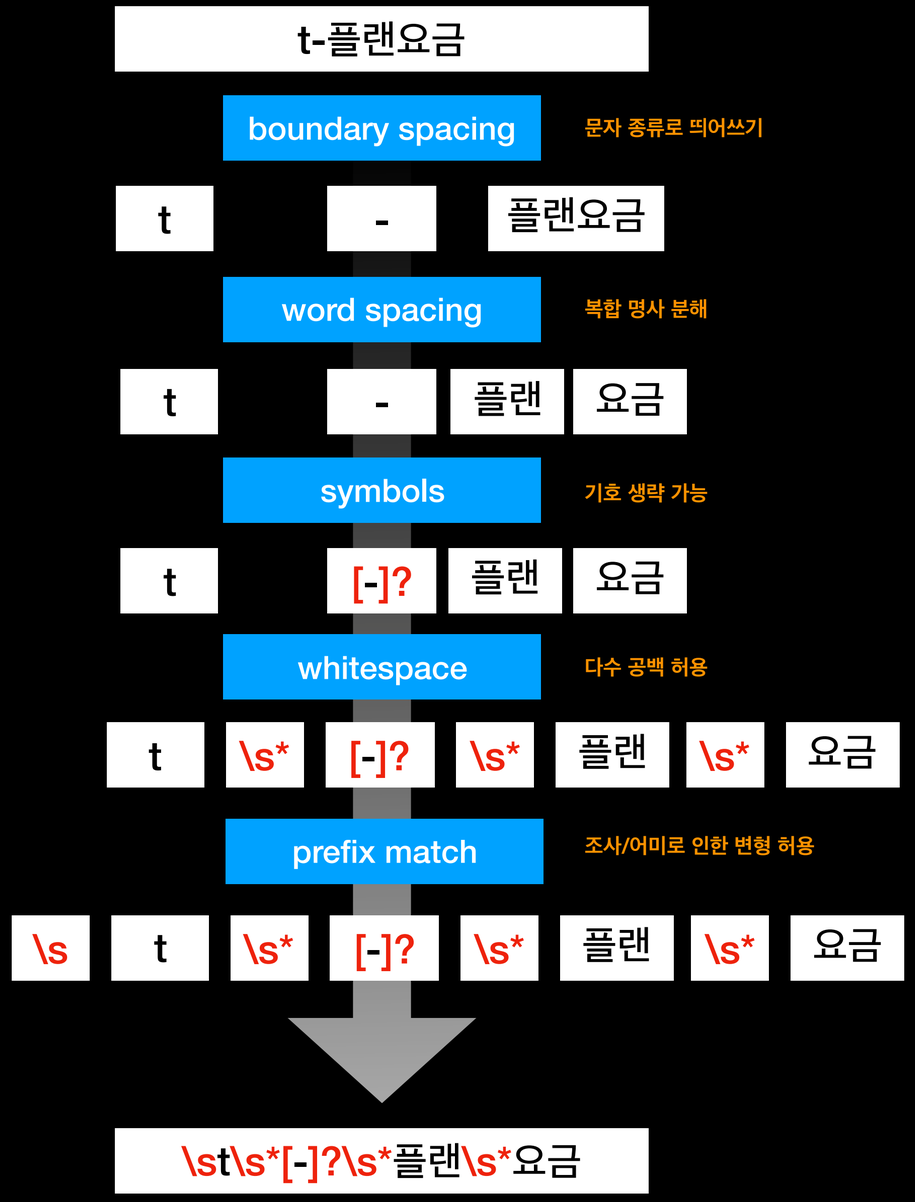
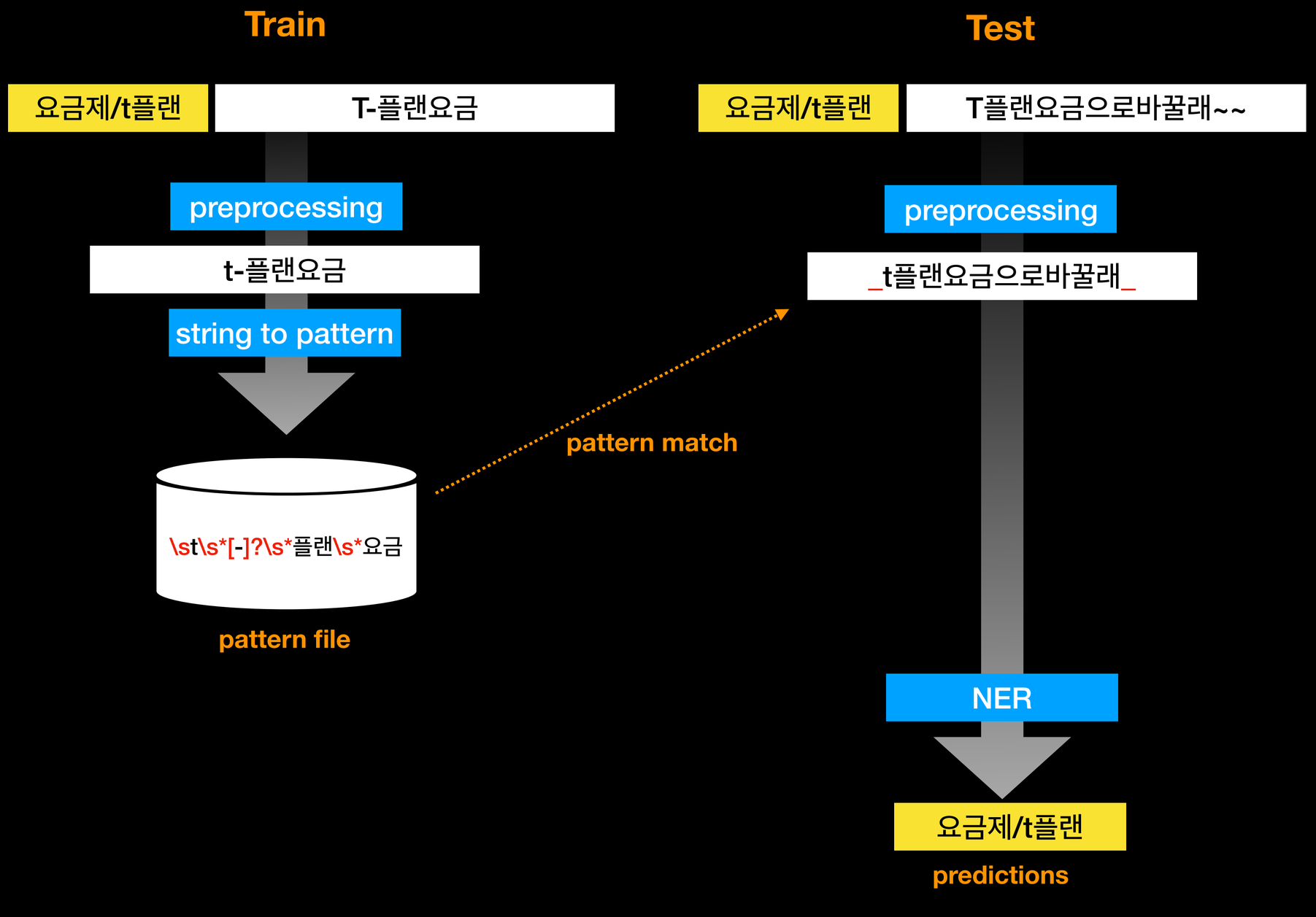
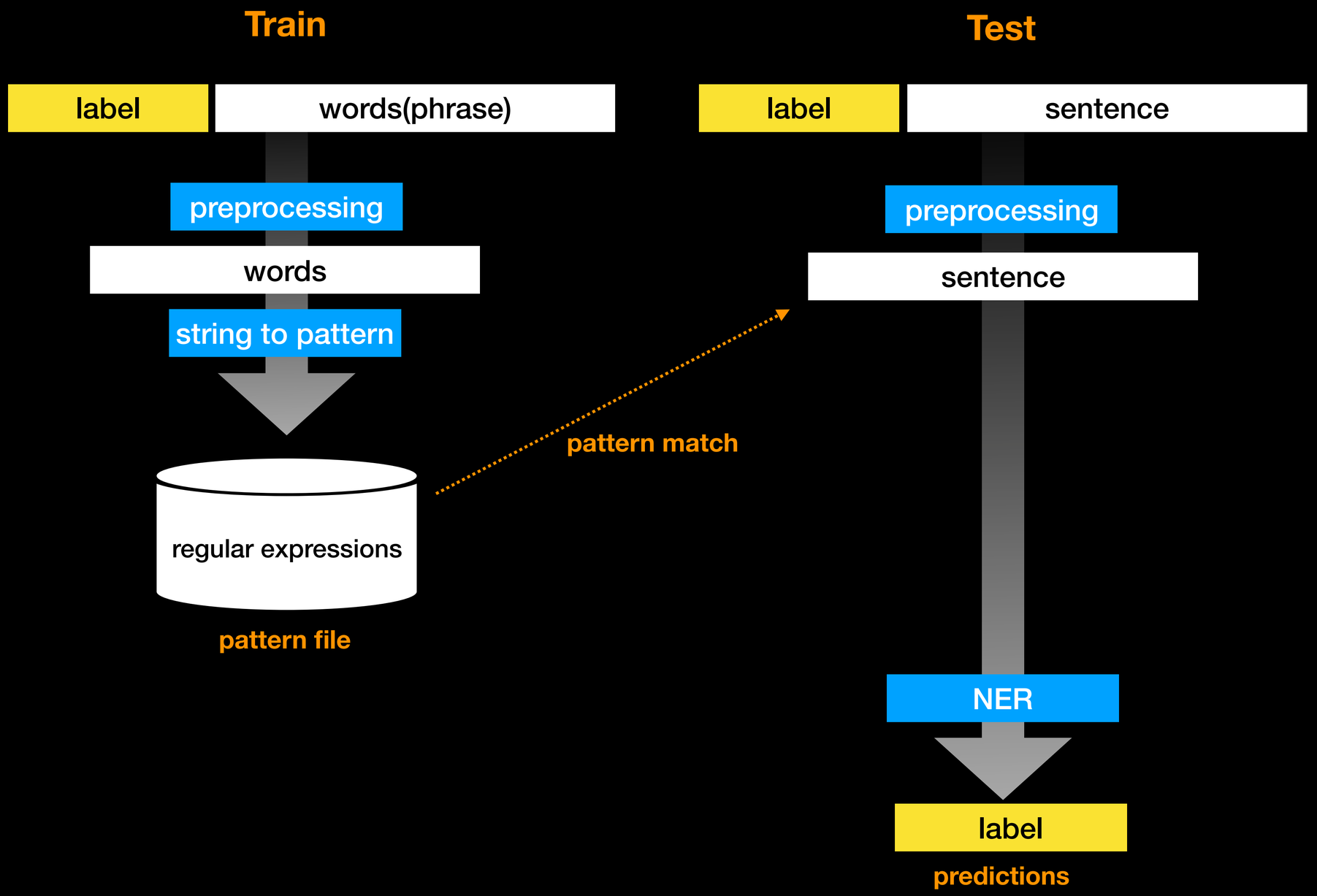
String to Pattern

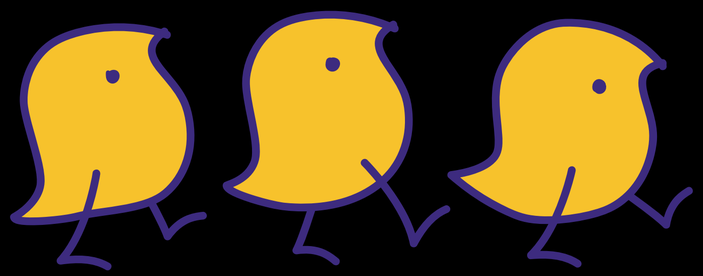


NER


Train
요금제/t플랜
T-플랜요금
preprocessing
t-플랜요금
string to pattern
\st\s*[-]?\s*플랜\s*요금
pattern file
pattern match
Test
요금제/t플랜
T플랜요금으로바꿀래~~
preprocessing
t플랜요금으로바꿀래
NER
요금제/t플랜
predictions

NER


Train
label
words(phrase)
preprocessing
words
string to pattern
regular expressions
pattern file
pattern match
Test
label
sentence
preprocessing
sentence
NER
label
predictions



One more thing... v0.2

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Overcome Spelling Errors - IC

t플랜요금

_t,t플,플랜,랜요,요금,금_

n-gram
tokens

v0.1

t플랜요금

tㅍㅡㄹㄹㅐㄴㅇㅛㄱㅡㅁ

_t,tㅍ,ㅍㅡ,ㅡㄹ,ㄹㄹ,ㄹㅐ,ㅐㄴ,
ㄴㅇ,ㅇㅛ,ㅛㄱ,ㄱㅡ,ㅡㅁ,ㅁ_

n-gram
tokens

v0.2

Overcome Spelling Errors - IC

DIY 챗봇

t플렌요금

user input

t플렌요금

character based
67%

Similiarity

alphabet based
85%

철자 오류 허용 안함

_t,t플,플렌,렌요,요금,금_

=4/6

n-gram
tokens

v0.1

철자 오류 허용함

_t,tㅍ,ㅍㅡ,ㅡㄹ,ㄹㄹ,ㄹㅐ,ㅐㄴ,
ㄴㅇ,ㅇㅍ,ㅍㄱ,ㄱㅡ,ㅡㅁ,ㅁ_

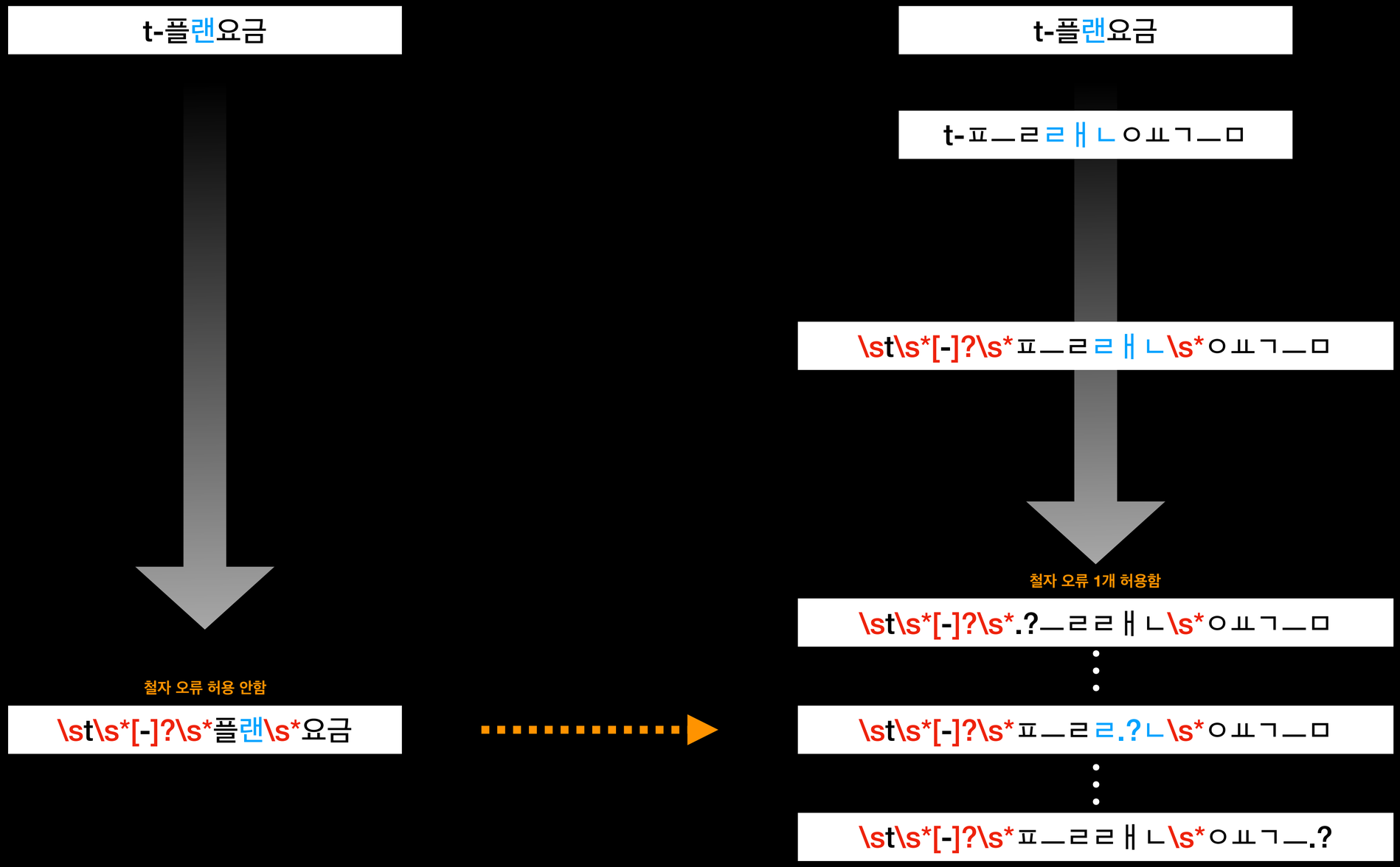
=11/13

n-gram
tokens

v0.2

Overcome Spelling Errors - NER

DIY 챗봇



Overcome Spelling Errors - NER

t-플렌요금

user input

t-플렌요금

failed

pattern matching

success

철자 오류 허용 안함

\st\s*[-]?\s*플랜\s*요금

철자 오류 1개 허용함

\st\s*[-]?\s*ㅍㅡㄹㄹ.?ㄴ\s*ㅇㅛㄱㅡㅁ

v0.1

v0.2

Overcome Typing Errors - NER

DIY 챗봇

t-플랜요금

t-ㅍㅡㄹㄹㅐㄴㅇㅛㄱㅡㅁ

오타 범위

철자 오류 1개 허용함

\st\s*[-]?\s*ㅍㅡㄹㄹ.?ㄴ\s*ㅇㅛㄱㅡㅁ

v0.2

t-플랜요금

t-ㅍㅡㄹㄹㅐㄴㅇㅛㄱㅡㅁ

오타만 허용함

\st\s*[-]?\s*ㅍㅡㄹㄹ[ㅐㅑ\(\)ㅔㅏㅣ]?ㄴ\s*ㅇㅛㄱㅡㅁ

v0.21