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Automatic Generation of Listing Ads by Reusing Promotional Texts

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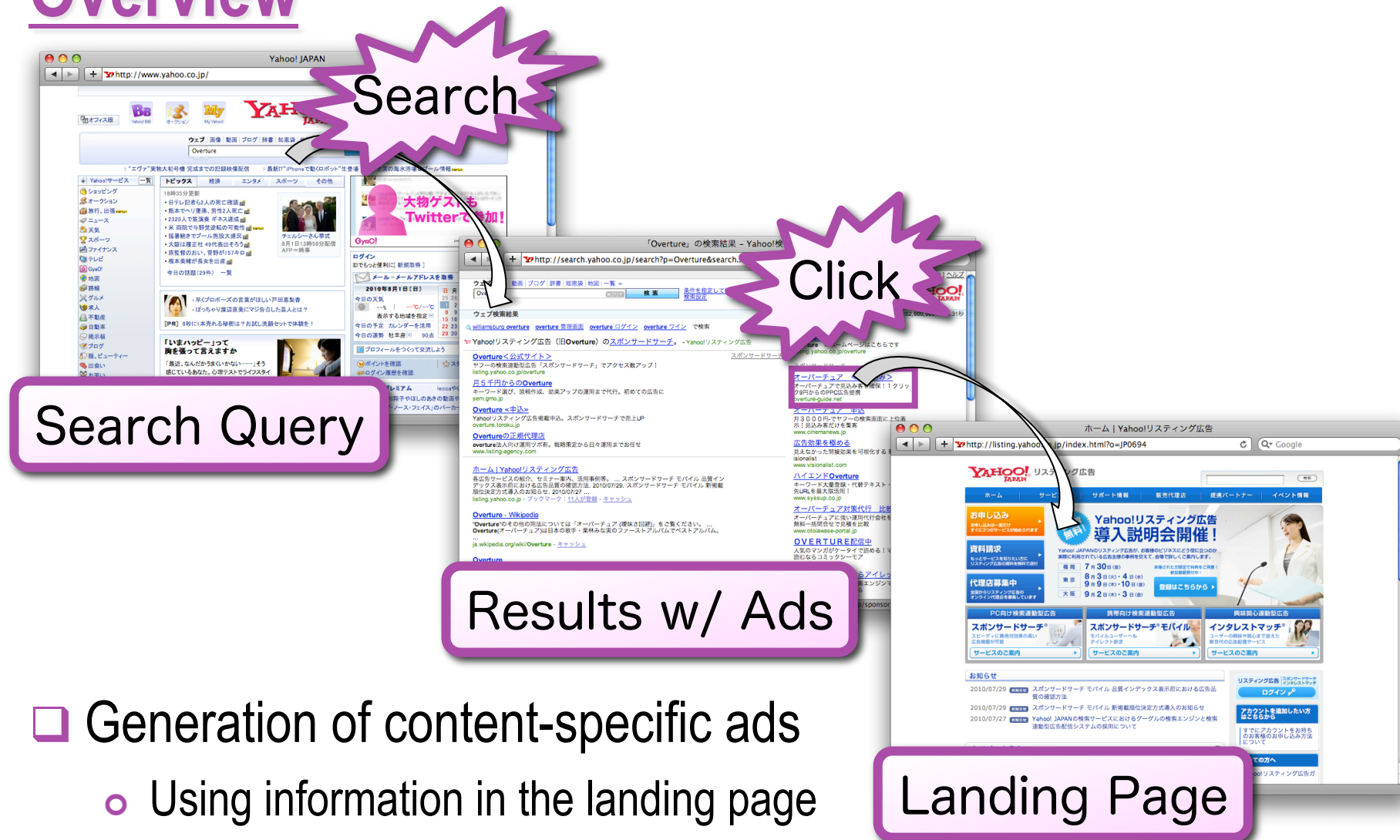Future University Hakodate, JAPAN

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Overview

Search

Click

Search Query

Results w/ Ads

Landing Page

☐ Generation of content-specific ads

- Using information in the landing page
- Tailored for the restaurant domain

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Outline

Money spent for advertising (in 2009 in Japan)

❑ Media-wise (cf. 2008) [Dentsu Inc., 10]

- Specialized media
  2,316B JPY (88.2%)
- TV programs
  1,714B JPY (89.8%)
- Internet
  707B JPY (101.2%)
- Newspapers
  674B JPY (81.4%)
- Magazines
  303B JPY (74.4%)
- Radio programs
  137B JPY (88.4%)

❑ Fee for media
545B JPY (101.4%)
  - For PCs: 442B JPY (99.0%)
    - Keyword driven ads: 171B JPY (108.6%)
  - For Mobiles: 103B JPY (112.9%)
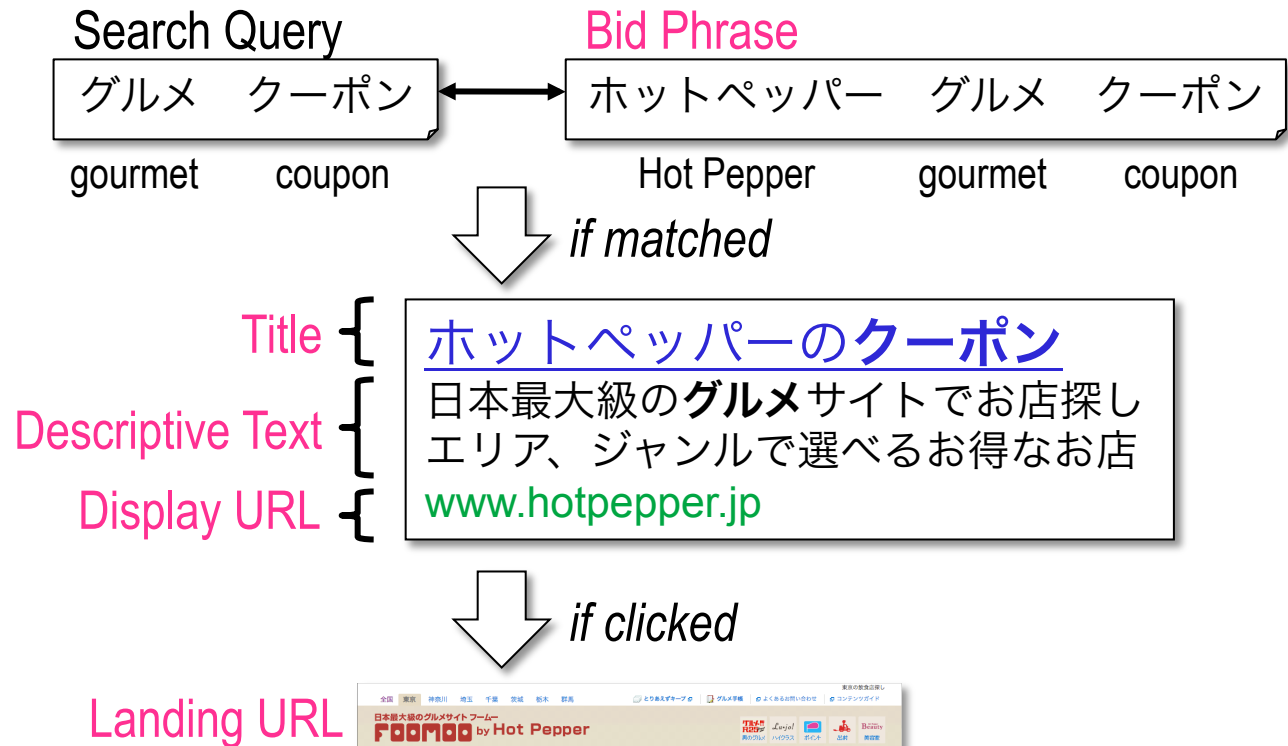   - Keyword driven ads: 22B JPY (131.8%)

❑ Cost for creating ads
162B JPY (100.7%)

Keyword driven ads (a.k.a. Listing ads)

❑ Textual ads
  ○ Bid Phrase
  ○ Title
  ○ Descriptive Text
  ○ Display URL
  ○ Landing URL

Search Query

グルメ　クーポン

gourmet　　　coupon

Bid Phrase

ホットペッパー　グルメ　クーポン

Hot Pepper　　　gourmet　　　coupon

if matched

Title {
Descriptive Text {
Display URL {

ホットペッパーのクーポン
日本最大級の**グルメ**サイトでお店探し
エリア、ジャンルで選べるお得なお店
www.hotpepper.jp

if clicked

Landing URL

❑ Pay-per-click (PPC)
  ○ Free for just displayed
  ○ Effective way of promotion

Issues on enhancing the ad performance

❑ Improve bid phrase

  o To make search engines show the ad more frequently

  o Intensive studies on keyword suggestion
  [Joshi+, 06] [Abhishek+, 07] [Chen+, 08] [Ravi+, 10]

    ◆ e.g., https://adwords.google.com/select/KeywordToolExternal

❑ Improve title and descriptive text

  o To make users to click on the ad more frequently

    ◆ Relevance and reliability [Jansen+, 05]

  o Only few work

    ◆ e.g., Ad Text Writer: http://adlab.microsoft.com/Ad-Text-Writer/

    ◆ Not so attractive yet

Aim of this research

❑ Develop an ad generator

- To reduce human labor and other costs spent for promotion
- To recommend thousands of contents more effectively

❑ Evaluate the attractiveness of ads

- Click-through-rate (CTR)
- Focus: descriptive texts
  - ◆ Compare the information source
  - ◆ Compare methods

Restaurant domain

日本最大級のグルメ・クーポン情報サイト フームー

FOOMOO by **Hot Pepper**
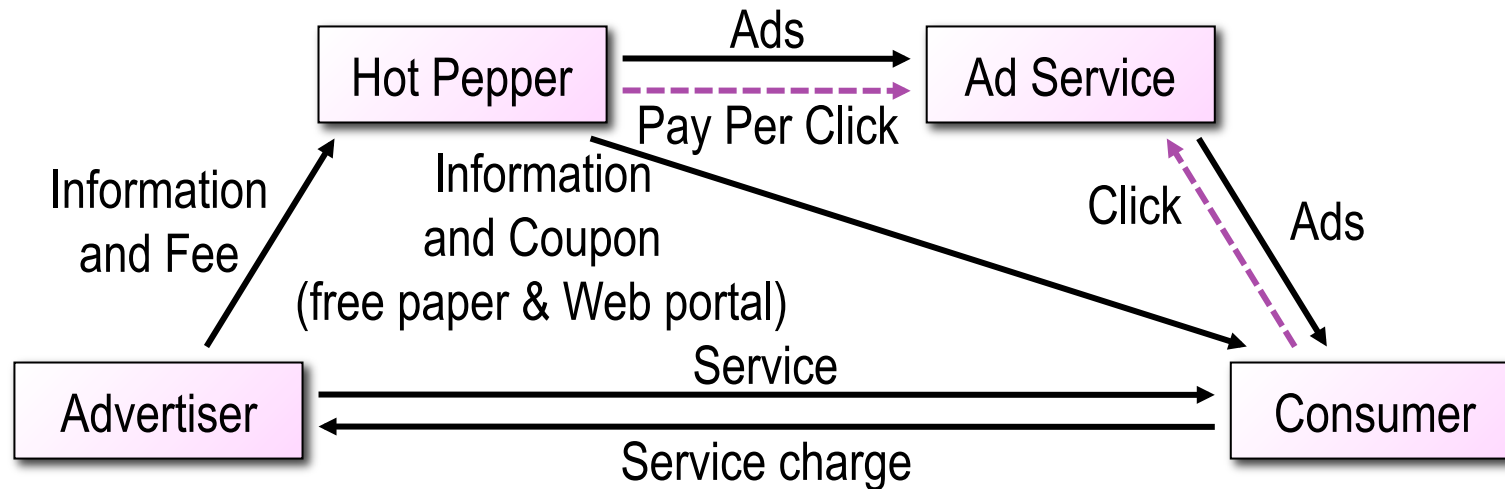
PRODUCED BY RECRUIT

Overture
Sponsored Search®

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Outline

Target domain: restaurant

❑ Hot Pepper FooMoo (http://hotpepper.jp/)

 - Powered by Recruit Co., Ltd.
 - Promoting 25,815 shops (October 2009)

▶ ホットペッパー フームー （ふーむー） | HotPepper FooMoo   検討リスト   グルメ手帳   ▶ ご利用ガイド   ▶ コンテンツガイド

クーポン・グルメ情報　ホットペッパー フームー （ふーむー） | HotPepper FooMoo

日本最大級のグルメ・クーポン情報サイト フームー

FOOMOO by Hot Pepper

PRODUCED BY RECRUIT

都道府県からお店を探す
次回からは選択した地域は自動で表示されます

ケータイ版 はこちら！
FooMooモバイル
http://hpr.jp

北海道・東北	北海道	青森	秋田	山形	岩手	宮城	福島
関東	東京	神奈川	埼玉	千葉	栃木	茨城	群馬
北陸・甲信越	新潟	山梨	長野	石川	富山	福井	
中部	愛知	岐阜	静岡	三重			
関西	大阪	兵庫	京都	滋賀	奈良	和歌山	
中国	岡山	広島	鳥取	島根	山口		
四国	香川	徳島	愛媛	高知			
九州・沖縄	福岡	佐賀	長崎	熊本	大分	宮崎	鹿児島	沖縄

クイック検索でお店を探す

都道府県	選択してください（※必須）
ジャンル	指定なし
予算	指定なし

検索

オトクなクーポンやグルメ情報満載のHotPepper FooMoo(ホットペッパー フームー)　エリア・最寄駅や食べたい料理で楽しく飲食店探しができます。宴会コースの検索もOK！
　［おことわり］一部の飲食店情報は、（株）昭文社が提供する「Mappleガイド」と、（株）リクルートが 提供する「ドコイク？」をもとに作成しています。それらの飲食店情報は、FooMoo byホットペッパー（HotPepper）が独自に取材したものではありませんので、ご了承下さい。

FooMooからのお知らせ
▶ お知らせ一覧

2010年07月12日	▶ 口蹄疫被害による義援金を募集しています（宮崎県）
2010年06月24日	▶ ◆Wi-Fiが使えるお店が探せるようになりました◆
2010年03月12日	▶ ニッポン放送×ＦＯＯＭＯＯコラボ番組! 本日１３:００～最終回放送！
2010年03月11日	▶ ニッポン放送×ＦＯＯＭＯＯコラボ番組! 本日１３:００～第４回放送！
2010年03月10日	▶ ニッポン放送×ＦＯＯＭＯＯコラボ番組! 本日１３:００～第３回放送！

HOT PEPPER
きっかけレッスン
やりたいことに気軽にチャレンジできる「きっかけレッスン」発見・予約サイト
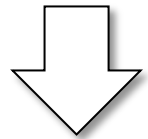掲載中エリア　札幌　仙台　東京　横浜　大阪　京都　神戸　広島　福岡

Hot Pepper
Beauty
ワタシの"なりたい"を叶えてくれる
ヘアサロン＆スタイリストが見つかる
北海道　東北　関東　北信越　東海

Advertising target

- Each shop in special feature sites
  - Users' typical search intentions
    - Search for the nearest branch of a particular franchise
    - Search for shops that serve particular brands of liquor
    - etc.

    Extract the corresponding shops

  - Special feature site as a shortcut
    - Franchise name: Saint-Marc, Za Watami (a bar), Gyukaku (a grill shop)
    - Shop type: grill, pub, sweets, bar
    - Specialty: Japanese sake, curry, organ meat
    - etc.

Available resources

- ❑ Shop-specific info. for 25,815 shops (partly in-house)
  - ○ General info.
  - ○ Advertising copy
  - ○ Photo captions
  - ○ Catch phrases
  - ○ etc.
- ❑ Info. of 200 special feature site
  - ○ Feature name: yakiniku-jyouhou.net → Yakiniku
  - ○ Feature type (manually labeled): e.g., Yakiniku → Shop type
- ❑ Search query log
  - ○ 483 thousand lines collected in the portal site

Outline

Spec of the ad generator

❑ I/O

- Input: shop ID (in Hot Pepper)
- Output: Bid Phrases, Titles, and Descriptive Texts
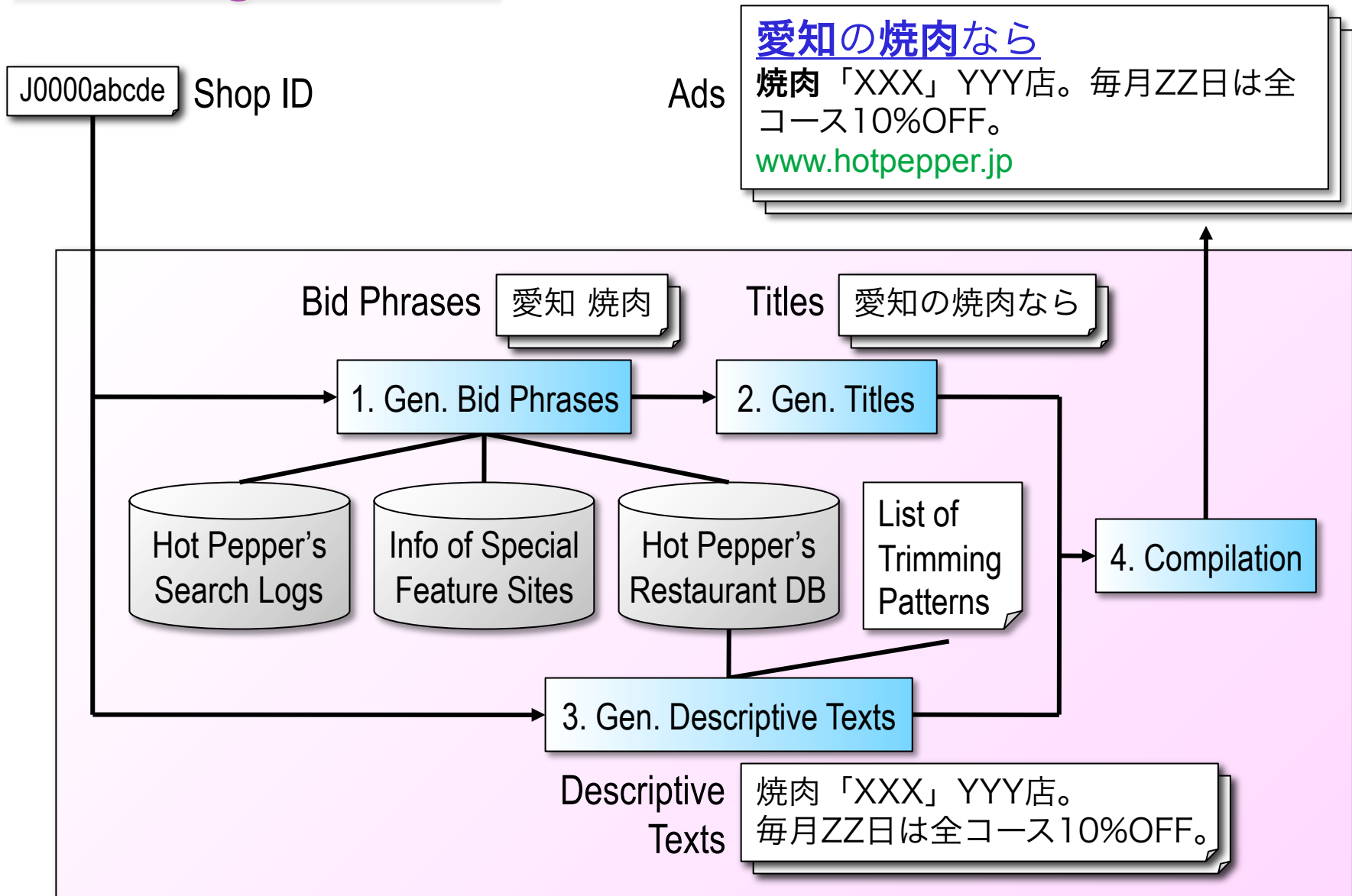
❑ Other ad components

- Landing URL: URL of the target shop
- Display URL: www.hotpepper.jp

❑ Ad service assumed: Overture Sponsored Search®

- Length of title <= 15
- Length of descriptive text <= 33
- Prohibited characters (★, ♪, etc.)
- etc.

Our ad generator

J0000abcde Shop ID

Ads
愛知の焼肉なら
焼肉「XXX」YYY店。毎月ZZ日は全コース10%OFF。
www.hotpepper.jp

Bid Phrases 愛知 焼肉   Titles 愛知の焼肉なら

1. Gen. Bid Phrases → 2. Gen. Titles

Hot Pepper's Search Logs

Info of Special Feature Sites

Hot Pepper's Restaurant DB

List of Trimming Patterns

4. Compilation

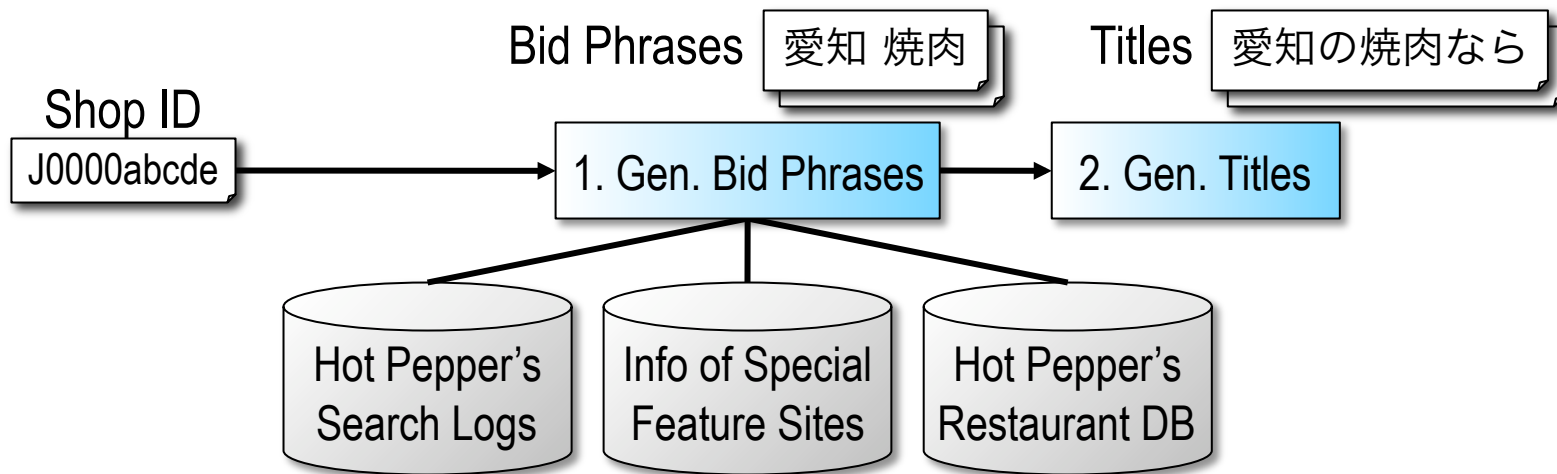3. Gen. Descriptive Texts

Descriptive Texts
焼肉「XXX」YYY店。
毎月ZZ日は全コース10%OFF。

Policy of generating bid phrase and title

❑ Utilize findings in the previous studies

- On the perception of users [Jansen+, 05] [Richardson+, 07]
- Domain-specific knowledge
  - Experiences of experts
  - Users' perception observed from search query

Shop ID

Bid Phrases 愛知 焼肉

Titles 愛知の焼肉なら

J0000abcde → 1. Gen. Bid Phrases → 2. Gen. Titles

Hot Pepper's Search Logs | Info of Special Feature Sites | Hot Pepper's Restaurant DB

1. Generation of bid phrases

❑ Place name AND shop genre

　　○ People are looking for restaurants

　　　　◆ To find a shop

　　　　◆ To get information about a specific shop
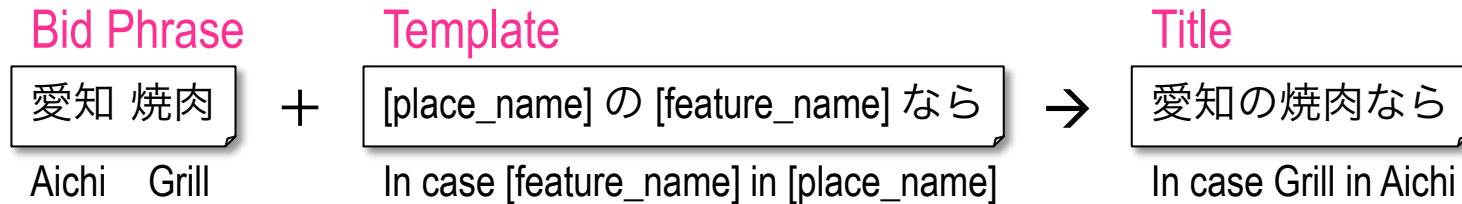
XXX Sta.
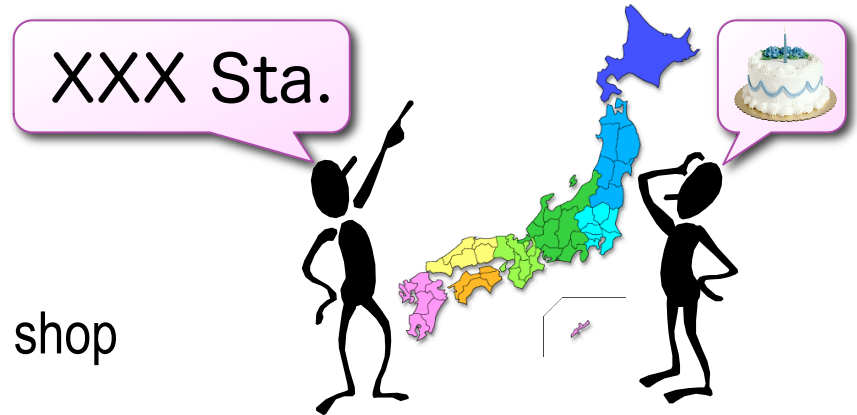
❑ Shop genre: feature name 焼肉 NAVI

❑ Place name: e.g., city name, station name, etc.

　　1. 3 types "area" fields of each shop

　　2. Apply 19 trimming patterns

　　　　◆ e.g., "XXX (YYY・ZZZ)" → "XXX", "YYY", "ZZZ"

　　3. Filter out those have not queried at the Web portal

　　→ Multiple candidates

2. Generation of titles

❑ By embedding the words of bid phrases into a template

Bid Phrase Template Title

| 愛知 焼肉 | + | [place_name] の [feature_name] なら | → | 愛知の焼肉なら |

Aichi   Grill   In case [feature_name] in [place_name]   In case Grill in Aichi

- To ensure the relevance to the query
  - **Bold-face** when displayed
- To satisfy the Overtures's criteria
  - on the use of place/area names for bid phrases

Policy of generating descriptive text

❑ Exploit shop-specific promotional texts (main focus)

- Summarization-based approach
- Incorporate findings of the former research
    - Patterns, weights, etc.

Hot Pepper's Restaurant DB

List of Trimming Patterns

Shop ID

J0000abcde

3. Gen. Descriptive Texts

Descriptive Texts

焼肉「XXX」YYY店。
毎月ZZ日は全コース10%OFF。
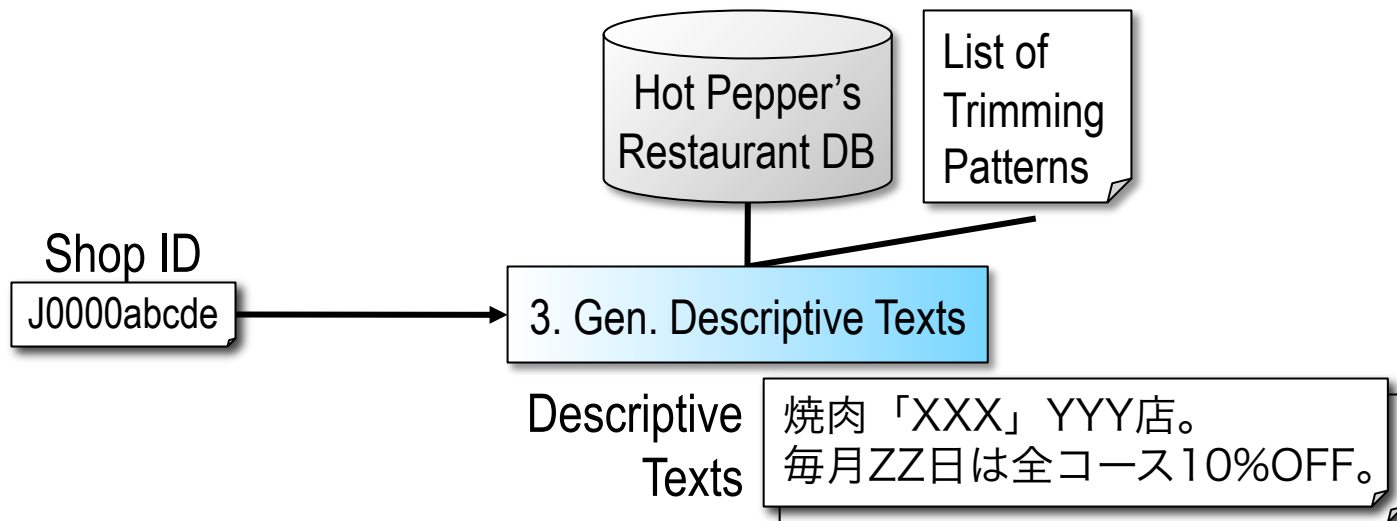
3. Generation of descriptive texts

❑ Key points

　　○ Characteristics of each shop

　　○ Relevance to the users' query

❑ Two-fold

　　○ Shop name

　　　　◆ Extract from DB

　　　　◆ Trim to make shorter than 16 chars (one line)

　　○ Shop-specific information
　　(length <= (limit)-(length of shop name))

　　　　◆ Method 1: sentence & phrase extraction

　　　　◆ Method 2: sentence trimming [Nomoto, 08]

　　　　◆ Method 3: sentence reconstruction [Oka+, 99]

焼肉「XXX」YYY店。黒毛和牛の飲放付コースが￥4515→￥3000

Discounts for Japanese beef course with free drink.

焼肉「XXX」YYY店。全席掘りごたつだから楽ちんだね。

Comfortable with foot warmers set in floor recesses.

焼肉「XXX」YYY店。毎月29日は何かが起こる！

Something happens in 29th every month.

Textual data used

❑ Basic text: advertising copy + α

★満足な宴会は焼肉で決まり★　　【焼肉】食べ放題＆【ドリンク】飲み放題＝クーポン利用で３０００・４０００円・５０００円がございます。　　コラーゲン付！国産牛しゃぶしゃぶの【食べ放題】＆ドリンク【飲み放題】もクーポン利用で３５００円で楽しめます。　　贅沢な食材で至福の時を満喫してください。　　全席掘りごたつで、カップルはもちろん宴会にピッタリの空間をご用意！！　　又、創業３０年、味自慢のXXXでは、カルビが絶対オススメ！！　　是非、味・食感・香と３拍子揃ったうまい肉をお召し上がり下さい！！皆様の御来店を、スタッフ一同心よりお待ちしております
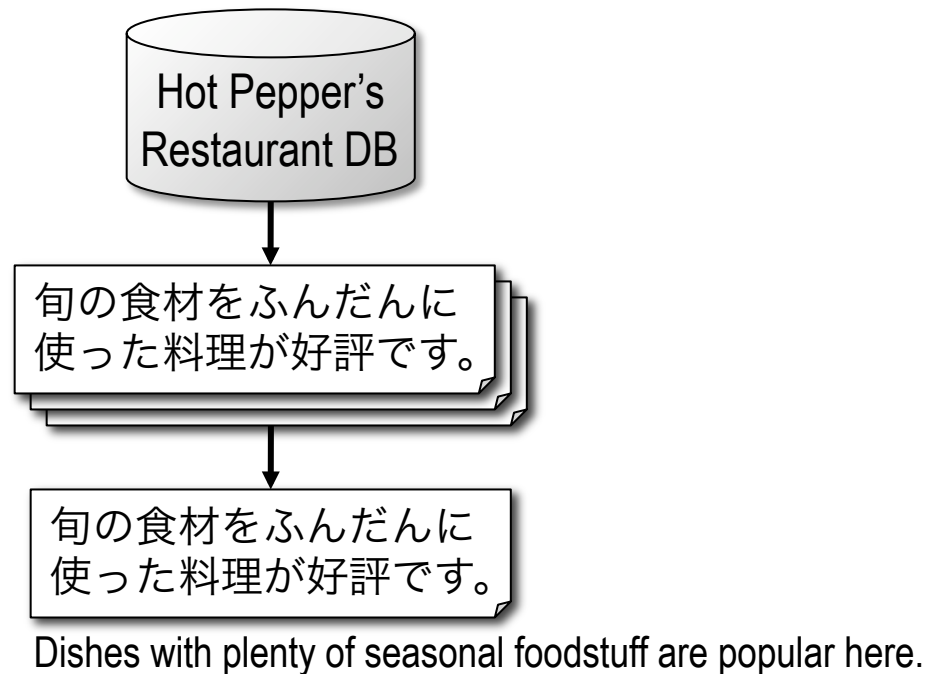
(8 sentences)

❑ 6 other attributive elements

Attributive element	Example of generated descriptive text
Access guide	金山総合駅南口徒歩3分
Course names	飲み放題120分付き！ふぐ満載コース
Photo caption (recommended dishes)	名古屋風の甘辛手羽先。やみつきになるよ！
Photo caption (atmosphere)	奥の大広間は大人数の宴会にぴったり
Catch phrase of genre	旬にこだわるお寿司＆居酒屋
Campaign types	20人以上の宴会が可能なお店

Method 1: sentence & phrase extraction

❑ Procedure

- ○ 1. Split text into sentences
- ○ 2. Filter out long sentences
- ○ 3. Select the best one

Hot Pepper's Restaurant DB

旬の食材をふんだんに使った料理が好評です。

旬の食材をふんだんに使った料理が好評です。

Dishes with plenty of seasonal foodstuff are popular here.

[Oka+, 99]

Score of relation (syntactic weight)

2 3 0 3 2

旬の　食材を　ふんだんに　使った　料理が　好評です。

Score of node (tf-idf) 36 20 30 11 14 24

Score of sentence = 2(36+20) + 3(20+11) + 0(30+11) + 3(11+14) + 2(14+24)

Score of edge

23
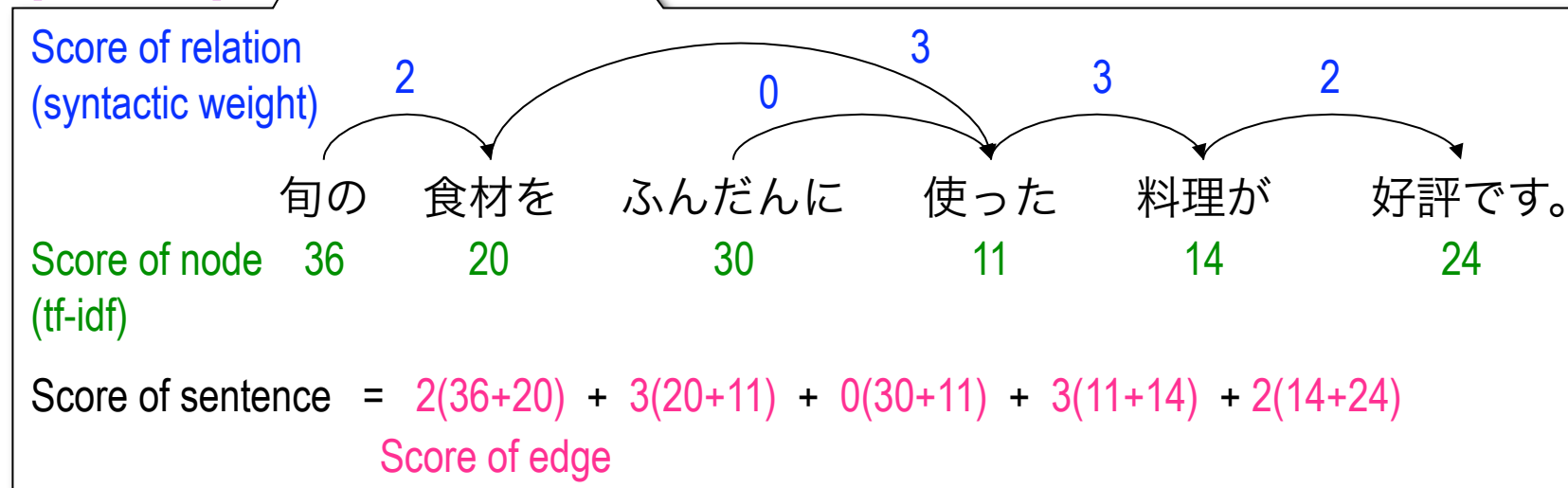
Method 2: sentence trimming

❑ Method 1 + candidate expansion at dependency tree level
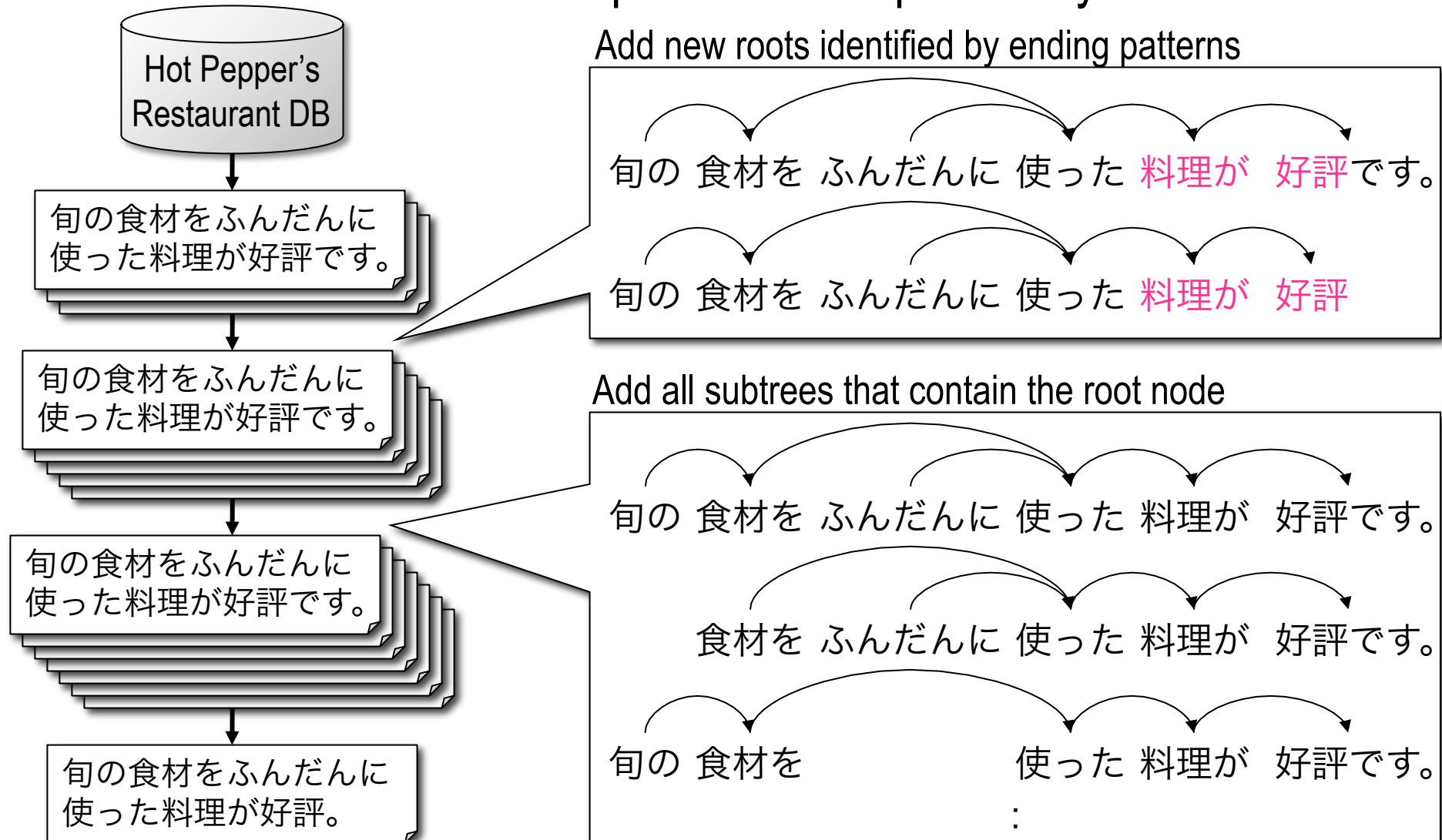
Hot Pepper's Restaurant DB

旬の食材をふんだんに
使った料理が好評です。

旬の食材をふんだんに
使った料理が好評です。

旬の食材をふんだんに
使った料理が好評です。

旬の食材をふんだんに
使った料理が好評。

Dishes with plenty of seasonal foodstuff are popular here.

Add new roots identified by ending patterns

旬の 食材を ふんだんに 使った 料理が 好評です。

旬の 食材を ふんだんに 使った 料理が 好評

Add all subtrees that contain the root node

旬の 食材を ふんだんに 使った 料理が 好評です。

食材を ふんだんに 使った 料理が 好評です。

旬の 食材を　　　　　　使った 料理が 好評です。
:

Method 3: sentence reconstruction

❑ Grow a subtree greedily adjoining dependency edges
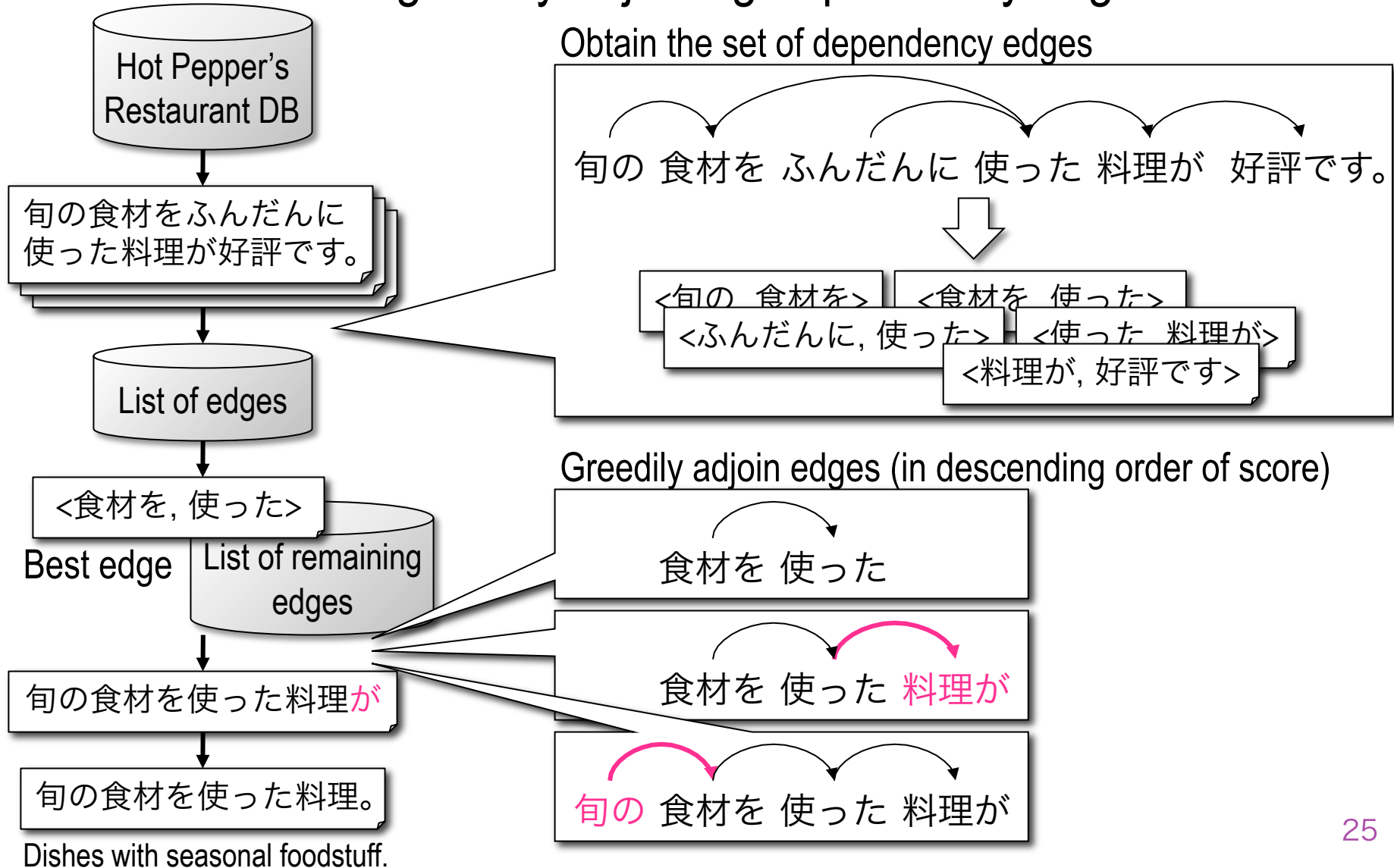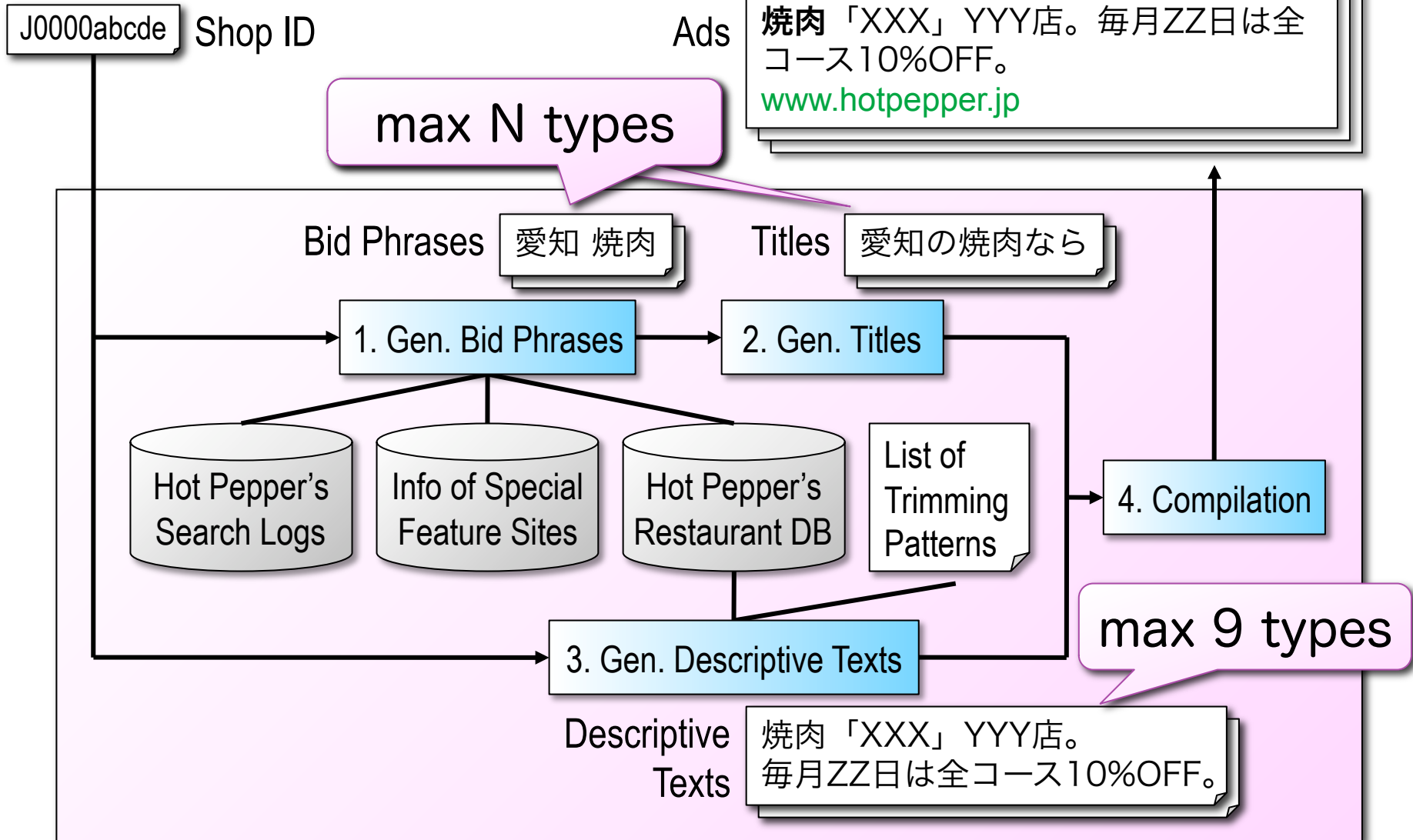
Hot Pepper's Restaurant DB

旬の食材をふんだんに使った料理が好評です。

List of edges

<食材を, 使った>

Best edge

List of remaining edges

旬の食材を使った料理が

旬の食材を使った料理。

Dishes with seasonal foodstuff.

Obtain the set of dependency edges

旬の 食材を ふんだんに 使った 料理が 好評です。

<旬の　食材を>　<食材を　使った>
<ふんだんに, 使った>　<使った　料理が>
<料理が, 好評です>

Greedily adjoin edges (in descending order of score)

食材を 使った

食材を 使った 料理が

旬の 食材を 使った 料理が

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Outline

1. Background & Goal
2. Research Platform
3. Our Ad Generator
4. [Evaluation](#)
5. Conclusion

Evaluation 1: Creativity of the proposed system

- ❏ 575 sampled shops, 2 place names → 7,974 ads
  - ○ 2 bid phrases and 2 titles for all shops: OK
  - ○ Manual judgment of descriptive texts (autogen part)
    - ◆ Ungrammatical ones
    - ◆ Ones referring to outside context

  付き選べる鍋コース 4,780円最大

  Selectable pot mal course with φ, ￥4780, up to φ

  まずはこれを食べて欲しい。

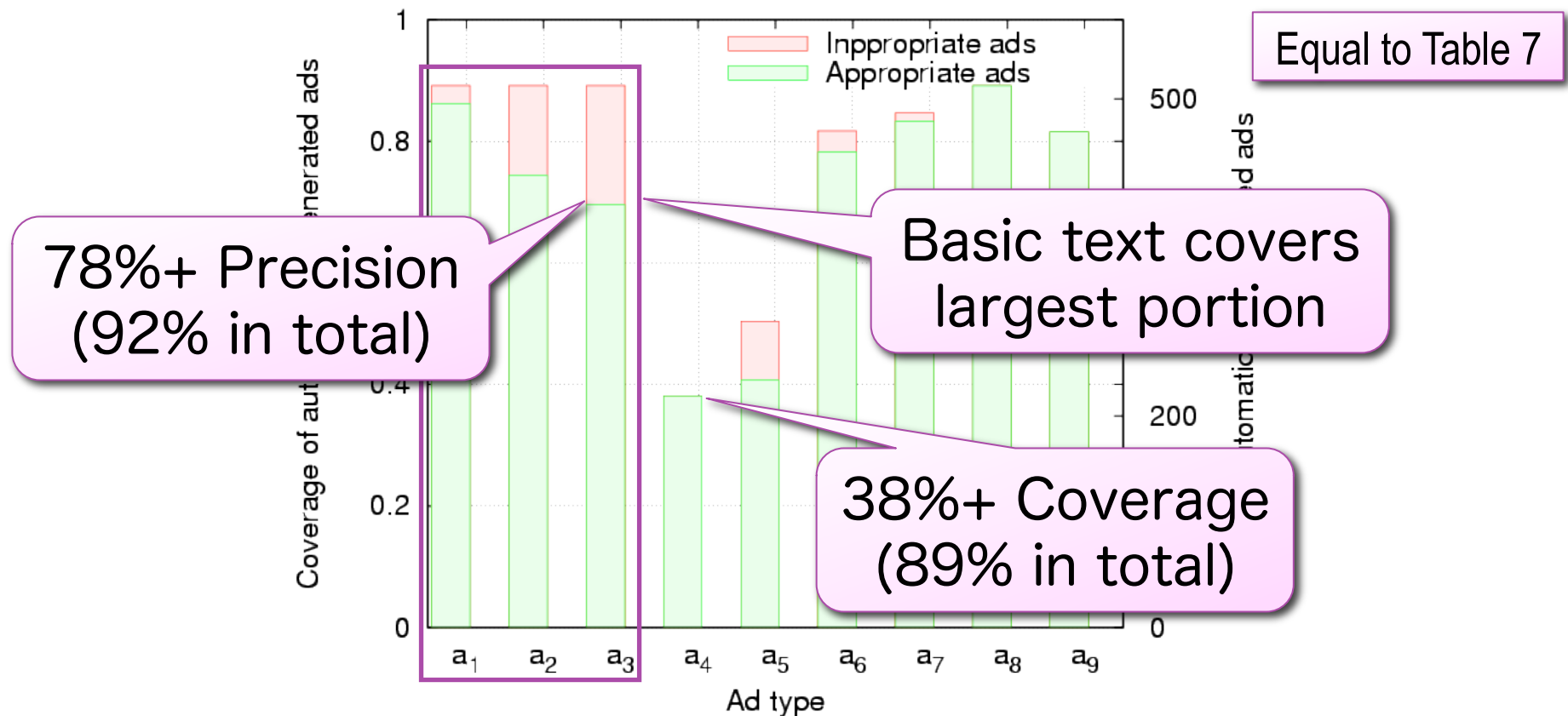 We'd like you to eat this first

- ❏ Measures
  - ○ Precision
    - ◆ # of appropriate descriptive texts / # of generated descriptive texts
    - ◆ High precision → less human effort for screening
  - ○ Coverage
    - ◆ # of shops appropriate descriptive texts cover / # of target shops
    - ◆ High coverage → less human effort for creating ads from scratch

Evaluation 1: Creativity of the proposed system

Equal to Table 7

78%+ Precision (92% in total)

Basic text covers largest portion

38%+ Coverage (89% in total)

❑ **Sufficiently high performance**

- ○ 6.8 appropriate descriptive texts per shop
  → contribute to reducing workload

- ○ But imperfect: need an effort for screening

Evaluation 2: Attractiveness of the ads

❑ 105 sampled shops, 2 place names → 1,418 ads

❑ CTR: # of clicks / # of impressions

- Ad service
  - Overture Sponsored Search®
  - One-month: November 18th - December 26th, 2009
- Pairwise evaluation with a baseline ad
  - Diversity of # of impressions
  - One good ad is enough for promotion
    - Ads w/ low CTRs are culled out by ad service
  - Baseline: template-based 210 ads
    - 105 shops * 2 pairs of bid phrase and title
    - Only descriptive text differs   [feature_name] ナビでお店探し

Find a shop using [feature_name] navigator

Evaluation 2: Attractiveness of the ads

Type 3 achieved highest rate

The simplest method led best results

Equal to Table 9
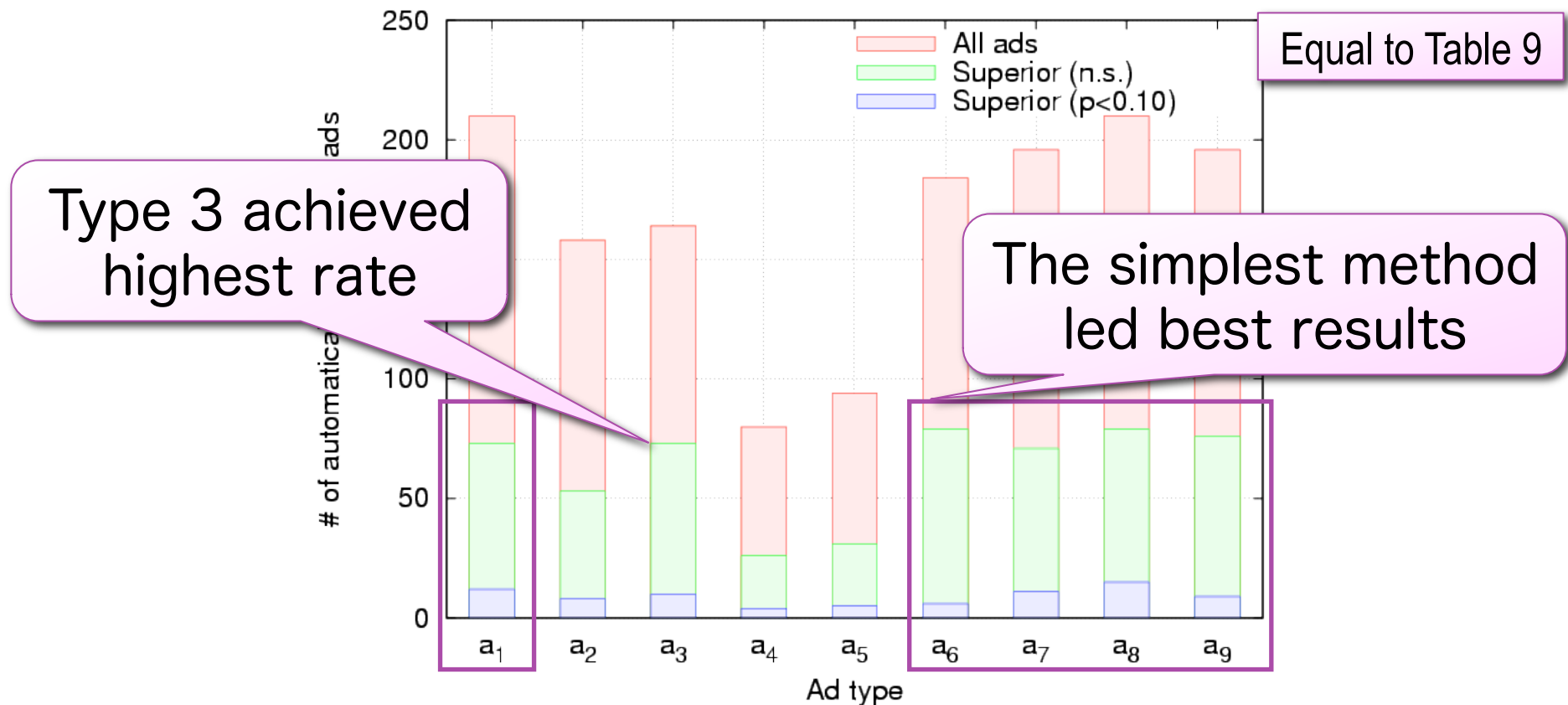
❑ Pairwise comparison of CTRs

- In total 39% of ads had higher CTRs than their baseline ad
- Even simple method led best results
  - Genre-specific ads (types 8 & 9) were comparable to types 1

Evaluation 2: Attractiveness of the ads

Unit	N	n.s.	$p < 0.10$
Ads	1,418	532 (39%)	77 (5%)
Groups	210	168 (80%)	38 (18%)
Shops	105	100 (95%)	33 (31%)

❑ **More effective promotion**

- 95% of shops
- 80% of groups (pairs of shop and bid phrase)

Outline

1. Background & Goal

2. Research Platform

3. Our Ad Generator

4. Evaluation

5. Conclusion

Conclusion

❑ Automatic generation of listing ads

- Ad generator uses promotional texts for a portal site on the Web
  - ◆ Bid phrase & Title: keywords and a template
    - At least two types can be generated for every shop
  - ◆ Description: trimming and summarizing promotional texts
    - 3 methods
    - Be of use: 90%+ Precision, 89% Coverage, 6.8 types for a shop
- Measurement of CTR
  - ◆ 39% of ads had higher CTRs than the template-based baseline ads
    - Only descriptive texts are different
    - 5% had significantly higher CTR
  - ◆ 95% of shops had higher CTRs by using shop-specific ads

Future work

❑ Extend the target

- All contents in the same domain

- Other domain (Recruit Co., Ltd. operates some)

❑ Improve the technology

- Linguistic analysis (partly done)

  ◆ To improve current system

  ◆ To improve bid phrase and title also

- Exploitation of consumer-generated media

  ◆ WOM advertising (can advertisers face the risks?)