# Overview of the NTCIR-12 MobileClick Task

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## ABSTRACT

This is an overview of the NTCIR-12 MobileClick-2 task (a sequel to 1CLICK in NTCIR-9 and NTCIR-10). In the MobileClick task, systems are expected to output a concise summary of information relevant to a given query and to provide immediate and direct information access for mobile users. We designed two types of MobileClick subtasks, namely, iUnit ranking and summarization subtasks, in which four research teams participated and submitted ? runs. We describe the subtasks, test collection, and evaluation methods and then report official results for NTCIR-12 MobileClick.

## 1. INTRODUCTION

Current web search engines usually return a ranked list of URLs in response to a query. After inputting a query and clicking on the search button, the user often has to visit several web pages and locate relevant parts within those pages. While these actions require significant effort and attention, especially for mobile users, they could be avoided if a system returned a concise summary of relevant information to the query [9].

The NTCIR-12 MobileClick task (and its predecessors, 1CLICK tasks organized in NTCIR-9 [10] and NTCIR-10 [1]) aims to directly return a summary of relevant information and immediately satisfy the user without requiring a lot of interaction with the device. Unlike the 1CLICK tasks, we expect the output to be a two-layered summary where the first layer contains the most important information and an outline of additional relevant information, while the second layer contains detailed information that can be accessed by clicking on links in the first layer. As shown in Figure 1, for query "NTCIR-11", a MobileClick system presents general information about NTCIR-11 and a list of core tasks in the first layer. When the "MobileClick" link is clicked by the user, the system shows text in the second layer that explains the topic of that link.

Textual output of the MobileClick task is evaluated based on *information units* (*iUnits*) rather than document relevance. The performance of a submitted system is scored higher if it generates summaries including more important iUnits. In addition, we require systems to minimize the amount of text the user has to read or, equivalently, the time she has to spend in order to obtain relevant information. Although these evaluation principles were also taken into account in the 1CLICK tasks, they are extended to two-layered summaries where users can read a summary in multiple ways. We assume a user model that reads different parts of the summary by probabilistically clicking on links and compute an evaluation metric based on the importance of iUnits read as well as the time spent to obtain them.

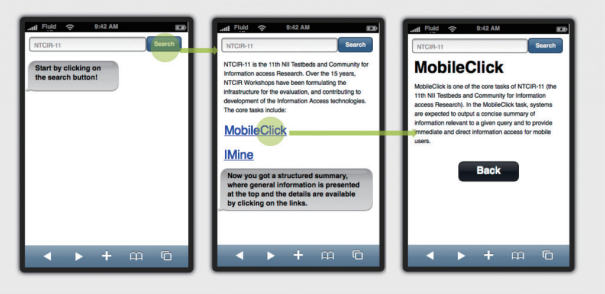


**Figure 1: An application of the MobileClick task. A concise two-layered summary can fit a small screen of the mobile device, and can satisfy diverse information needs.**

MobileClick-2 attracted ? research teams from ? countries: ?, ?, and ?. Table ? provides a list of NTCIR-12 MobileClick participants with the number of iUnit ranking and summarization submissions. The total number of submissions was ?.

One of the biggest changes from the previous round of MobileClick was the evaluation system: we finished all the evaluation processes before releasing test data, and have returned evaluation results right after run submissions at our website [1]. This might enable participants to improve their systems based on returned results. In addition, the reproducibility was highly improved since there is no need to conduct additional assessments for new submissions. Another new trial in MobileClick-2 was *leader board*, by which participants can see evaluation results of the others. We expected more participants and higher performances by enhancing the visibility of state-of-the-arts performances achieved so far.

The remainder of this paper is structured as follows. Section 2 describes the details of the iUnit ranking and summarization subtasks. Section 3 introduces a test collection consisting of queries, iUnits, and a document collection. Section 4 describes our evaluation methodology. Section 5 reports on the official evaluation results for both subtasks. Finally, Section 6 concludes this paper.

## 2. SUBTASKS

MobileClick-2 comprises iUnit ranking and summarization subtasks. This section explains the two types of subtasks, and their input, output, and evaluation methodology.

### 2.1 iUnit Ranking Subtask

[1] http://www.mobileclick.org/

The iUnit ranking subtask is a task where systems are expected to rank a set of information pieces (iUnits) based on their importance for a given query. This subtask was devised to enable *componentized* evaluation, where we could separately evaluate the performance of estimating important iUnits and summarizing iUnits into a two-layered summary.

We provided a set of queries, a set of iUnits, and documents from which the iUnits were extracted. Note that the set of iUnits included irrelevant iUnits, which participants should rank below the other iUnits. We then asked participants to submit, for each query, a list of iUnits that are ordered by their estimated importance. More concretely, we accept a tab-delimited-values (TSV) file as an iUnit ranking run, where the first line must be a simple system description, and each of the other lines must represents a single iUnit. Therefore, a run file should look like the one shown below:

**Listing 1: Example of an iUnit ranking run**

```
This is an example run file
qid    uid    score
qid    uid    score
....
```

where "qid" is a query ID, "uid" is a iUnit ID, and "score" is estimated importance of the iUnit. In many ways, the iUnit ranking runs are similar with TREC ad-hoc runs in that they are essentially a ranked list of the objects retrieved. Note that we did not use "score" values for evaluation, and used the order of iUnits in run files.

## 2.2 iUnit Summarization Subtask

The iUnit summarization subtask is defined as follows: Given a query, a set of iUnits, and a set of intents, generate a structured textual output. In MobileClick, more precisely, the output must consist of two layers. The first layer is a list of iUnits and links to the second layer, while the second layer consists of lists of iUnits. Each link must be one of the provided intents and be associated with one of the iUnit lists in the second layer. Each list of iUnits in the first and second layers can include at most $X$ characters so that it fits ordinary mobile screen size. The length of links is counted, while symbols and white spaces are excluded. In MobileClick-2, $X$ is set to 420 for English and 280 for Japanese.

Each run must be a XML file that satisfies a DTD shown below:

**Listing 2: DTD for an iUnit summarization run**

```
<!ELEMENT results (sysdesc, result*)>
<!ELEMENT sysdesc (#PCDATA)>
<!ELEMENT result (first, second*)>
<!ELEMENT first (iunit | link)*>
<!ELEMENT second (iunit)*>
<!ELEMENT iunit EMPTY>
<!ELEMENT link EMPTY>
<!ATTLIST result qid NMTOKEN #REQUIRED>
<!ATTLIST iunit uid NMTOKEN #REQUIRED>
<!ATTLIST link iid NMTOKEN #REQUIRED>
<!ATTLIST second iid NMTOKEN #REQUIRED>
```

where

- The XML file includes a [results] element as the root element;
- The [results] element contains exactly one [sysdesc] element;
- The [results] element also contains [result] elements, each of which corresponds a two-layered summary and has a [qid] attribute;
- A [result] element contains a [first] element and [second] elements;
- The [first] element contains [iunit] and [link] elements;
- A [second] element has an attribute [iid], and contains [iunit] elements.
- An [iunit] element has an attribute [uid] (iUnit ID); and
- A [link] element has an attribute [iid] (intent ID), which identifies a [second] element to be linked.

Note that the same [iunit] element may appear multiple times, e.g. an iUnit may appear in the [first] element and two [second] elements.

An XML file example that satisfies the DTD is shown below:

**Listing 3: Example of an iUnit summarization run**

```
<?xml version="1.0" encoding="UTF-8" ?>
<results>
  <sysdesc>
  Organizer Baseline
  </sysdesc>
  <result qid="MC-E-0001">
    <first>
      <iunit uid="MC-E-0001-U001" />
      <iunit uid="MC-E-0001-U003" />
      <link iid="MC-E-0001-I006" />
      <iunit uid="MC-E-0001-U004" />
      <link iid="MC-E-0001-I002" />
    </first>
    <second iid="MC-E-0001-I006">
      <iunit uid="MC-E-0001-U011" />
      <iunit uid="MC-E-0001-U019" />
    </second>
    <second iid="MC-E-0001-I002">
      <iunit uid="MC-E-0001-U029" />
      <iunit uid="MC-E-0001-U021" />
    </second>
  </result>
</results>
```

# 3. TEST COLLECTION

The NTCIR-12 MobileClick test collection includes queries, iUnits, intents, and a document collection. We describe the details of those components in the following subsections.

## 3.1 Queries

The NTCIR-12 MobileClick test collection includes 100 English and 100 Japanese queries (see Appendix A for the complete lists). Unlike the MobileClick-1 task, we selected more ambiguous/underspecified, or short queries like the 1CLICK tasks held in the past NTCIR. This is because we opt to focus on queries that are often utilized in mobile devices, and to tackle the problem of diverse intents in searchers.

We used a Wider Planet toolbar log from April to July 2014 for obtaining real-users' queries, and translated them into English and Japanese. We selected frequent queries that belong to either *CELEBRITY*, *LOCAL*, and *DEFINITION* categories. Questions posted on Yahoo! Japan Chiebukuro [2] were used to generate *QA* queries. Those query categories were also employed in the 1CLICK tasks, since they are frequently used by mobile users [2].

[2] http://chiebukuro.yahoo.co.jp/

The definition of those categories is shown below (numbers in the brackets indicate the number of queries in the category):

**CELEBRITY (20)** names of celebrities such as artists, actors, politicians, and athletes.

**LOCAL (20)** landmarks and facilities (*e.g.* "tokyo sky tree"), or entities with geographical constraints (*e.g.* "banks Kyoto").

**DEFINITION (40)** ambiguous terms that are often input to know their definition.

**QA (20)** natural language questions

## 3.2 Documents

To provide participants with a set of iUnits for each query, we downloaded 500 top-ranked documents that were returned by Bing search engine [3] in response to each query, from which we extracted iUnits as explained in the next subsection. This crawling was conducted from May 29 to June 1, 2016. As we failed to access some of the documents, the number of downloaded documents per query is fewer than 500. The average number of documents for English queries is 418 and that for Japanese queries is 442.

NTCIR participants can obtain this document collection after their registration, and utilize them to estimate the importance of each iUnit and intent probability, *etc.*

## 3.3 iUnits

Like the 1CLICK tasks held in the past NTCIR, we used iUnits as a unit of information in the MobileClick task. iUnits are defined as *relevant*, *atomic*, and *dependent* pieces of information, where

- *Relevant* means that an iUnit provides useful factual information to the user;
- *Atomic* means that an iUnit cannot be broken down into multiple iUnits without loss of the original semantics; and
- *Dependent* means that an iUnit can depend on other iUnits to be relevant.

Please refer to the 1CLICK-2 overview paper for the details of the definition [1]. Although iUnits can depend on other iUnits to be relevant according to our definition, we excluded depending iUnits in this round for simplicity.

As this work requires careful assessment lasting for a long time and consideration on the three requirements of iUnits, we decided not to use crowd-sourcing mainly due to low controllability and high education cost. We hired assessors for extracting iUnits by hand and kept the quality of extracted iUnits by giving timely feedback on their results. Assessors were asked to extract as many iUnits as possible within an hour, by using *iUnit Extractor* [4], a Firefox plugin we developed. The screenshot of the tool for iUnit extraction is shown in Figure 2. Each assessor worked on different sets of queries.

The total number of iUnits is 2,317 (23.8 iUnits per query) for English queries and 4,169 (41.7 iUnits per query) for Japanese queries. Examples of iUnits for English queries are shown in Table 1.

[3] https://datamarket.azure.com/dataset/bing/search

[4] https://addons.mozilla.org/ja/firefox/addon/iunit-extractor/

## 3.4 Intents

We introduce the notion of *intents* to the MobileClick-2 task, which have been utilized in the NTCIR INTENT and IMine tasks [3, 7, 12]. An intent can be defined as either a specific interpretation of an ambiguous query ("Mac OS" and "car brand" for "jaguar"), or an aspect of a faceted query ("windows 8" and "windows 10" for "windows"). In this round, intents were taken into account in evaluating the importance of iUnits, and were used as candidates of links to the second layer in the iUnit summarization subtask.

In the NTCIR INTENT and IMine tasks, the organizers clustered subtopics to form intents, while we constructed intents by clustering iUnits as follows:

(1) Cluster iUnits by using a clustering interface,

(2) Give each cluster a label representing iUnits included in the cluster, and

(3) Let each label of a cluster represents an intent.

We hired assessors for the manual iUnit clustering, in which two iUnits were grouped together if

(1) They are information about the same interpretation of an ambiguous query or the same aspect of a faceted query, and

(2) They are likely to be interesting for the same user.

The criteria used in the label selection are listed below:

(1) The label of a cluster should be descriptive enough for users to grasp the iUnits included in the cluster, and

(2) The label of a cluster should be often used as a query or anchor text for the included iUnits.

These clustering and labeling tasks were conducted on *Clusty* [5], a Web system for clustering. The screenshot of this system is shown in Figure 3.

As a result, we obtained 4.48 intents per query on average in the English subtasks, while we obtained 4.37 intents per query on average in the Japanese subtasks.

Subsequently, we let 10 crowd sourcing workers vote whether each intent is important or not. This voting was carried out to estimate the intent probability, which is the probability of intents of users who input a particular query, as was conducted in the NTCIR INTENT and IMine tasks. The assessors were asked to vote for multiple intents if they believed that they were interested in the intent when they had a chance to search by the query. We normalized the number of votes for each intent by the total number of votes for a query, and let $P(i|q)$ denote the normalized one for $i$, which we call intent probability of intent $i$ of query $q$. More precisely, $P(i|q) = n_{i,q}/n_{\cdot,q}$ where $n_{i,q}$ is the number of votes intent $i$ received, and $n_{\cdot,q}$ is the total number of votes for query $q$.

## 3.5 iUnit Importance

The importance of each iUnit was evaluated in terms of each intent, and *global importance* was derived from the per-intent importance and intent probability.

We asked two assessors to assess each iUnit in terms of each intent, and evaluate the importance at a five-point scale: 0 (unimportant), 1, 2 (somewhat important), 3, and 4 (highly important). The assessors were instructed to evaluate the importance by assuming

[5] https://github.com/mpkato/clusty

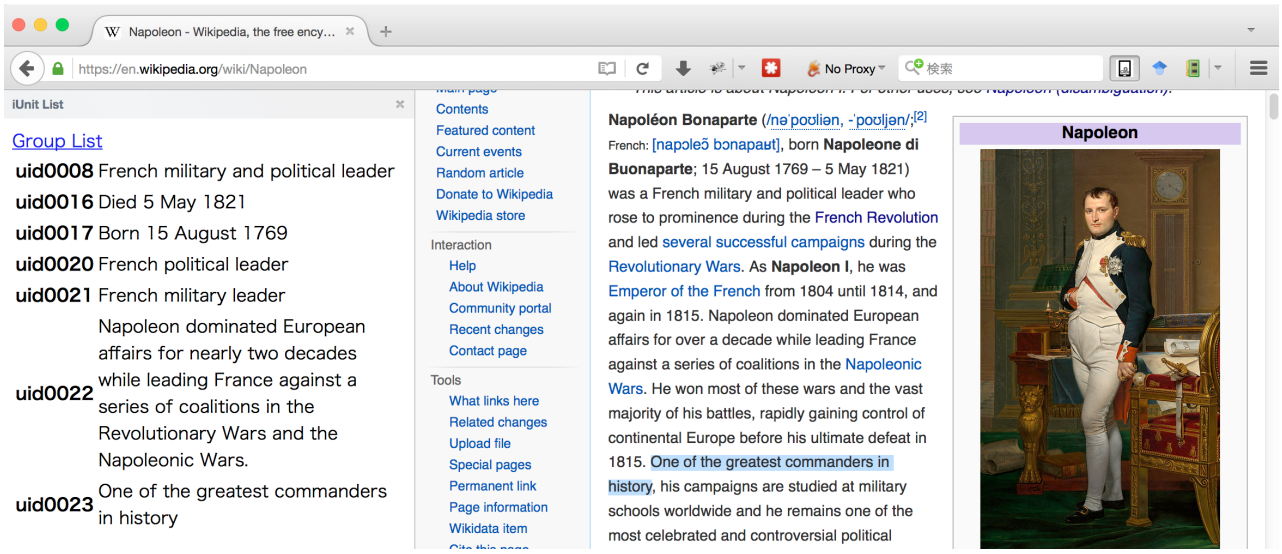


**Figure 2: iUnit Extractor, a Firefox plugin for extracting iUnits from Web pages. Assessors can select a part of sentences and save its text, position, and URL by pressing Shift+Ctrl+x.**

**Table 1: Examples of iUnits for NTCIR-12 MobileClick English queries. Query MC2-E-0007 is "napoleon".**

| Query ID | iUnit ID | iUnit |
|---|---|---|
| MC2-E-0007 | MC2-E-0007-0001 | born on the island of Corsica |
| MC2-E-0007 | MC2-E-0007-0002 | defeated at the Battle of Waterloo |
| MC2-E-0007 | MC2-E-0007-0003 | established legal equality and religious toleration |
| MC2-E-0007 | MC2-E-0007-0004 | an innovator |
| MC2-E-0007 | MC2-E-0007-0005 | absent during Peninsular War |
| MC2-E-0007 | MC2-E-0007-0006 | cut off European trade with Britain |
| MC2-E-0007 | MC2-E-0007-0007 | general of the Army of Italy |
| MC2-E-0007 | MC2-E-0007-0008 | one of the most controversial political figures |
| MC2-E-0007 | MC2-E-0007-0009 | won at the Battle of Wagram |
| MC2-E-0007 | MC2-E-0007-0010 | baptised as a Catholic |

that they were interested in a given intent. We defined the importance of an iUnit in terms of an intent as follows: *an iUnit is more important if it is more necessary for more users who are interested in the intent*. For example, given intent "Mac OS" in response to query "jaguar", iUnit "car company in UK" is *unimportant*, while it is *highly important* given intent "car brand".

We used the average of the per-intent importance scores given by multiple assessors in our evaluation. The inter-assessor agreement was moderate: 0.556 in terms of *quadratic-weighted kappa* [11].

In the iUnit ranking subtask, we used the global importance of each iUnit for evaluation. Letting $P(i|q)$ be the intent probability of query $q$, the global importance of iUnit $u$ is defined as follows:

$$G(u) = \sum_{i \in I_q} P(i|q) g_i(u), \tag{1}$$

where $I_q$ is a set of intents for query $q$, and $g_i(u)$ denotes the per-intent importance of iUnit $u$ in terms of intent $i$.

# 4. EVALUATION MEASURES

This section describes evaluation methodology used in the NTCIR-12 MobileClick tasks.

## 4.1 iUnit Ranking Subtask

Runs submitted by participants include a ranked list of iUnit IDs for each query, which can be handled in the same way as ad-hoc retrieval runs. Therefore, we employed standard evaluation metrics for ad-hoc retrieval in this subtask.

One of the evaluation metrics used in the iUnit ranking subtask was *normalized discounted cumulative gain* (nDCG). Discounted cumulative gain (DCG) is defined as follows:

$$\mathrm{nDCG@}K = \sum_{r=1}^{K} \frac{G(u_r)}{\log_2(r+1)}, \tag{2}$$

where $K$ is a cutoff parameter, and $u_r$ is the $r$-th iUnit in a submitted ranked list. The normalized version of DCG (nDCG) is therefore defined as follows:

$$\mathrm{nDCG@}K = \frac{\mathrm{DCG@}K}{\mathrm{iDCG@}K}, \tag{3}$$

where iDCG is DCG of the ideal ranked list of iUnits, which can be constructed by sorting all the iUnits for a query by their global importance.

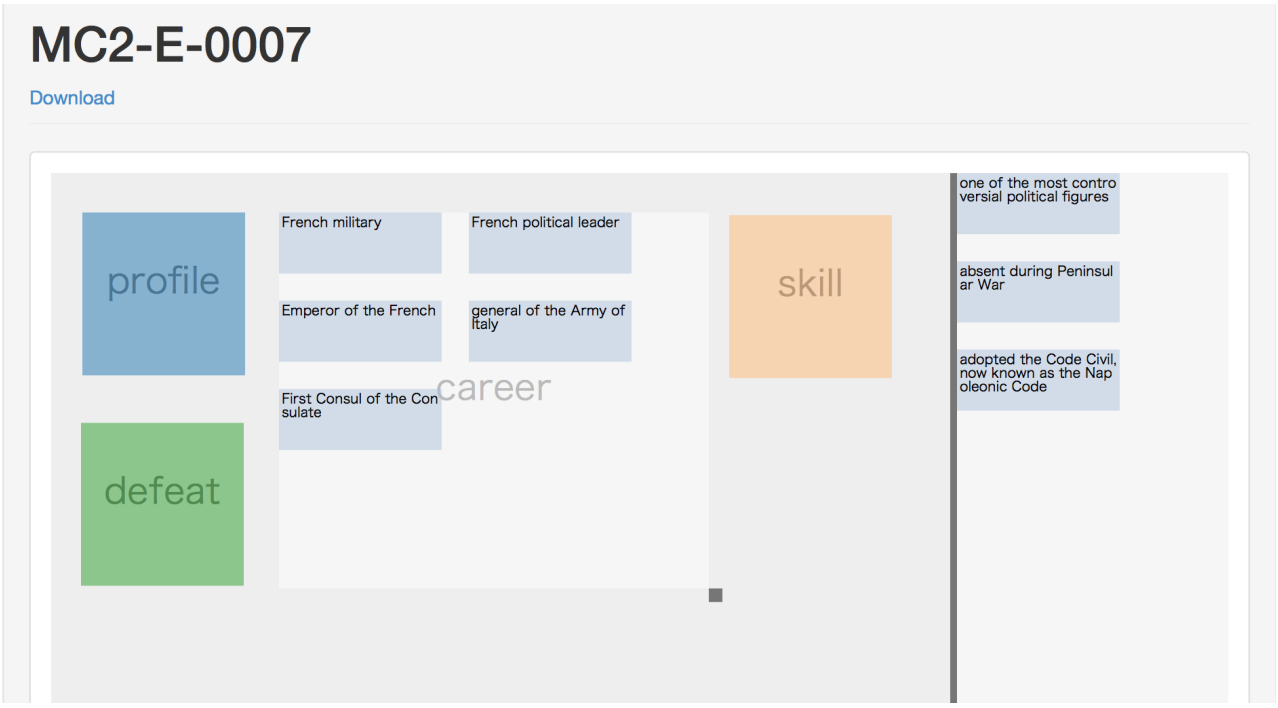


**Figure 3: Clusty, a Web system for clustering. Assessors can drag iUnits (blue rectangles) shown at the right pane, and drop them at one of the clusters shown at the left pane. In the screenshot, only "career" cluster was expanded to display all the iUnits in it.**

Another evaluation metric is Q-measure proposed by Sakai [5]:

$$Q = \frac{1}{R}\sum_{r=1}^{M} \mathrm{IsRel}(u_r)\frac{\sum_{r'=1}^{r}(\beta G(u_{r'}) + \mathrm{IsRel}(u_{r'}))}{\beta\sum_{r'=1}^{r} G(u^*_{r'}) + r}, \qquad (4)$$

where $\mathrm{IsRel}(u)$ is an indicator function that returns 1 if $G(u) > 0$; otherwise 0, $R$ is the number of iUnits with non-zero global importance (*i.e.* $\sum_u \mathrm{IsRel}(u)$), $M$ is the length of a ranked list, $u^*_r$ is the $r$-th iUnit in the ideal ranked list of iUnits, and $\beta$ is a patience parameter which we set to 1 following established standards [4]. Q-measure is used for ranking submitted runs since it can take into account the quality of the whole ranking.

Q-measure is a recall-based graded-relevance metric, while nDCG is a rank-based graded-relevance metric. Thus, we expect that using both metrics will enable us to measure the performance from different perspectives. Moreover, both of them were shown to be reliable [5].

## 4.2 iUnit Summarization Subtask

Runs submitted to the iUnit summarization subtask consists of the first layer $\mathbf{f}$ and second layers $S = \{\mathbf{s}_1, \mathbf{s}_2, \ldots, \mathbf{s}_n\}$. The first layer $\mathbf{f}$ consists of iUnits and links (*e.g.* $\mathbf{f} = (u_1, u_2, l_1, u_3)$ where $u_j$ is an iUnit and $l_j$ is a link). Each link $l_j$ links to a second layer $\mathbf{s}_j$. A second layer $\mathbf{s}_j$ is composed of iUnits (*e.g.* $\mathbf{s}_1 = (u_{1,1}, u_{1,2}, u_{1,3})$).

The principles of the iUnit summarization evaluation metric are summarized as follows:

(1) The evaluation metric is the expected utility of users who probabilistically read a summary.

(2) Users are interested in one of the intents by following the intent probability $P(i|q)$.

(3) Users read a summary following the rules below:

(a) They read the summary from the beginning of the first layer in order and stop after reading $L$ characters except symbols and white spaces.

(b) When they reach the end of a link $l_i$, they click on the link and start to read its second layer if they are interested in the intent of $l_i$.

(c) When they reach the end of a second layer $s_j$, they continue to read the first layer from the end of the link $l_j$.

(4) The utility is measured by U-measure proposed by Sakai and Dou [6], which consists of a position-based gain and a position-based decay function.

We then generate the user tails (or *trailtext*) according to the user model explained above, compute a U-measure score for each trailtext, and finally estimate the expected U-measure by combining all the U-measure scores of different trailtexts. *M-measure*, an iUnit summarization evaluation metric, is defined as follows:

$$M = \sum_{\mathbf{t}\in T} P(\mathbf{t})U(\mathbf{t}), \qquad (5)$$

where $T$ is a set of all possible trailtexts, $P(\mathbf{t})$ is a probability of going through a trail $\mathbf{t}$, and $U(\mathbf{t})$ is the U-measure score of the trail. The computation of M-measure is illustrated in Figure 4.

A trailtext is a concatenation of all the texts read by a user, and can be defined as a list of iUnits and links in our case. According to our user model, a trailtext of a user who are interested in intent $i$ can be obtained by inserting after the link of $i$ a list of iUnits in its second layer. More specifically, trailtext $\mathbf{t}$ of intent $i$ is obtained as follows:

(1) Let $\mathbf{f} = (\ldots, u_{j-1}, l_k, u_j, \ldots)$ where $l_k$ is a link of intent $i$.

(2) Generate $\mathbf{t} = (\ldots, u_{j-1}, l_k, u_{k,1}, \ldots, u_{k,|\mathbf{s}_k|}, u_j, \ldots)$ for second layer $\mathbf{s}_k = (u_{k,1}, \ldots, u_{k,|\mathbf{s}_k|})$.

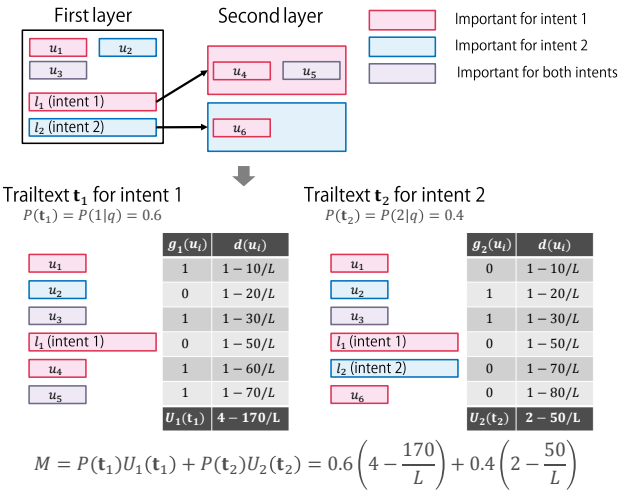


**Figure 4: Illustration of M-measure computation. Two trailtexts are generated from a two-layered summary. U-measure of each trailtext is computed and summed with the probability of trailtexts (= intent probability). The length of iUnits is 10, while that of links is 20 in this example.**

Note that a link in the trailtext is regarded as a non-relevant iUnit for the sake of convenience. Also note that only the first appearance of the same iUnit is relevant, while the other appearances are regarded as non-relevant.

As mentioned above, we can generate a trailtext for each intent, and do not need consider the other trailtexts as the way to read a summary only depends on the intent of users. In addition, the probability of a trailtext is equivalent to that of an intent for which the trailtext is generated. Thus, M-measure can be simply re-defined as follows:

$$M = \sum_{i \in I_q} P(i|q) U_i(\mathbf{t}_i). \quad (6)$$

The U is now measured in terms of intent $i$ in the equation above, since we assume that users going through $\mathbf{t}_i$ are interested in $i$.

The utility is measured by U-measure proposed by Sakai and Dou [6], and is computed by the importance and offset of iUnits in a trailtext. The offset of iUnit $u$ in a trailtext is defined as the number of characters between the beginning of the trailtext and the end of $u$. More precisely, the offset of the $j$-th iUnit in trailtext $\mathbf{t}$ is defined as $\mathrm{pos}_{\mathbf{t}}(u) = \sum_{j'=1}^{j} \mathrm{chars}(u_{j'})$ where $\mathrm{chars}(u)$ is the number of characters of iUnit $u$ except symbols and white spaces. Recall that a link in the trailtext contributes to the offset as a non-relevant iUnit. According to Sakai and Dou's work [6], U-measure is defined as follows:

$$U_i(\mathbf{t}) = \frac{1}{\mathcal{N}} \sum_{j=1}^{|\mathbf{t}|} g_i(u_j) d(u_j), \quad (7)$$

where $d$ is a position-based decay function, and $\mathcal{N}$ is a normalization factor (which we simply set to 1). The position-based decay function is defined as follows:

$$d(u) = \max\left(0, 1 - \frac{\mathrm{pos}_{\mathbf{t}}(u)}{L}\right), \quad (8)$$

where $L$ is a patience parameter of users. Note that no gain can be obtained after $L$ characters read, *i.e.* $d(u) = 0$. This is consistent with our user model in which users stop after reading $L$ characters.

In MobileClick-2, $L$ is set to twice as many as $X$: 840 for English and 560 for Japanese, since $L = 500$ (or 250) for Japanese was recommended by a study on S-measure [8].

## 5. RESULTS

Results will be reported after February 4, 2016.

## 6. CONCLUSIONS

This paper presents the overview of the MobileClick task at NTCIR-12. This task aims to develop a system that returns a concise summary of information relevant to a given query, and brings a structure into the summarization so that users can easily locate their desired information. In this paper, we mainly explained the task design, and evaluation methodology.

## 7. ACKNOWLEDGMENTS

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# APPENDIX

## A. QUERIES

Full lists of English and Japanese queries used in MobileClick-2 are shown in Tables 2 and 3, respectively.

**Table 2: NTCIR-12 MobileClick English queries.**

| ID | Query |
|---|---|
| MC2-E-0001 | hulk hogan |
| MC2-E-0002 | bruno mars |
| MC2-E-0003 | ryan giggs |
| MC2-E-0004 | sharon stone |
| MC2-E-0005 | christopher nolan |
| MC2-E-0006 | john jones |
| MC2-E-0007 | napoleon |
| MC2-E-0008 | selena gomez |
| MC2-E-0009 | hemingway |
| MC2-E-0010 | gareth bale |
| MC2-E-0011 | tarantino |
| MC2-E-0012 | darvish |
| MC2-E-0013 | george clooney |
| MC2-E-0014 | emma stone |
| MC2-E-0015 | ronaldo |
| MC2-E-0016 | park ji-sung |
| MC2-E-0017 | robert downey jr |
| MC2-E-0018 | millet |
| MC2-E-0019 | miranda kerr |
| MC2-E-0020 | emilia clarke |
| MC2-E-0021 | bank adelanto |
| MC2-E-0022 | cafe killeen |
| MC2-E-0023 | cincinnati art museum |
| MC2-E-0024 | delaware memorial bridge |
| MC2-E-0025 | dermatology pittsburgh |
| MC2-E-0026 | florida state university |
| MC2-E-0027 | hotel oak creek |
| MC2-E-0028 | junior high school sacramento |
| MC2-E-0029 | kfc snohomish |
| MC2-E-0030 | library cleveland tn |
| MC2-E-0031 | mcdonald tooele |
| MC2-E-0032 | museum allentown |
| MC2-E-0033 | nahanni national park |
| MC2-E-0034 | orlando international airport |
| MC2-E-0035 | orthopedic saint louis |
| MC2-E-0036 | pharmacy nevada city |
| MC2-E-0037 | pizza hut chichester |
| MC2-E-0038 | post office olathe |
| MC2-E-0039 | scottsdale stadium |
| MC2-E-0040 | starbucks visalia |
| MC2-E-0041 | bitcoin |
| MC2-E-0042 | jaguar |
| MC2-E-0043 | divers disease |
| MC2-E-0044 | kebab |
| MC2-E-0045 | windows 7 |
| MC2-E-0046 | april fool |
| MC2-E-0047 | asiana airlines |
| MC2-E-0048 | euro |
| MC2-E-0049 | tetris |
| MC2-E-0050 | nlb |
| MC2-E-0051 | health insurance |
| MC2-E-0052 | leica |
| MC2-E-0053 | subarachnoid hemorrhage |
| MC2-E-0054 | golf |
| MC2-E-0055 | gold lacquer |
| MC2-E-0056 | mango |
| MC2-E-0057 | kakaotalk |
| MC2-E-0058 | the age of discovery |
| MC2-E-0059 | minecraft |
| MC2-E-0060 | putty |
| MC2-E-0061 | ups |
| MC2-E-0062 | godzilla |
| MC2-E-0063 | playstation |
| MC2-E-0064 | smartphone |
| MC2-E-0065 | aladdin |
| MC2-E-0066 | pomeranian |
| MC2-E-0067 | enka |
| MC2-E-0068 | premier league |
| MC2-E-0069 | quadcopter |
| MC2-E-0070 | lettuce |
| MC2-E-0071 | yellow ribbon |
| MC2-E-0072 | real madrid |
| MC2-E-0073 | baguette |
| MC2-E-0074 | titanic |
| MC2-E-0075 | accent |
| MC2-E-0076 | yahoo! |
| MC2-E-0077 | acai |
| MC2-E-0078 | melon |
| MC2-E-0079 | fuji xerox |
| MC2-E-0080 | lineage |
| MC2-E-0081 | difference between red and white wine |
| MC2-E-0082 | aftershock mechanism |
| MC2-E-0083 | how to cook coleslaw |
| MC2-E-0084 | role of animal tail |
| MC2-E-0085 | difference across to bcc cc |
| MC2-E-0086 | difference across republic democratic republic federal |
| MC2-E-0087 | way to reduce belly fat |
| MC2-E-0088 | pc remote control method |
| MC2-E-0089 | what is mirror made of |
| MC2-E-0090 | why is white chocolate white |
| MC2-E-0091 | why do children in costumes ask for candy at halloween |
| MC2-E-0092 | difference in pepper types |
| MC2-E-0093 | reason why dove is a symbol of peace |
| MC2-E-0094 | etymology of japan |
| MC2-E-0095 | how to make macaroons |
| MC2-E-0096 | meaning of h and b pencil |
| MC2-E-0097 | why is salt added when boiling spaghetti |
| MC2-E-0098 | how to write a report |
| MC2-E-0099 | principle of magic mirror |
| MC2-E-0100 | difference of gdp and gnp |

**Table 3: NTCIR-12 MobileClick Japanese queries.**

| ID | Query |
|---|---|
| MC2-J-0001 | ハルクホーガン |
| MC2-J-0002 | 八木アリサ |
| MC2-J-0003 | ライアン·ギグス |
| MC2-J-0004 | シャロン·ストーン |
| MC2-J-0005 | ミーシャ |
| MC2-J-0006 | ジョン·ジョーンズ |
| MC2-J-0007 | ナポレオン |
| MC2-J-0008 | セレナ·ゴメス |
| MC2-J-0009 | ヘミングウェイ |
| MC2-J-0010 | 能年玲奈 |
| MC2-J-0011 | タランティーノ |
| MC2-J-0012 | ダルビッシュ |
| MC2-J-0013 | 東野圭吾 |
| MC2-J-0014 | エマ·ストーン |
| MC2-J-0015 | ロナウド |
| MC2-J-0016 | パク·チソン |
| MC2-J-0017 | Yui |
| MC2-J-0018 | ミレー |
| MC2-J-0019 | ミランダ·カー |
| MC2-J-0020 | エミリア·クラーク |
| MC2-J-0021 | 図書館明石市 |
| MC2-J-0022 | 博物館豊橋市 |
| MC2-J-0023 | 郵便局江ノ島 |
| MC2-J-0024 | とんかつ静岡市駅前 |
| MC2-J-0025 | kfc 宇都宮駅 |
| MC2-J-0026 | 国立近代美術館 |
| MC2-J-0027 | マクドナルド博多駅 |
| MC2-J-0028 | 最高裁判所 |
| MC2-J-0029 | ダイソー大宮駅周辺 |
| MC2-J-0030 | スターバックス岡山駅 |
| MC2-J-0031 | 中学校東淀川区 |
| MC2-J-0032 | ロッテリア鳥取 |
| MC2-J-0033 | 整形外科恵比寿 |
| MC2-J-0034 | ホテル勝浦駅 |
| MC2-J-0035 | カフェ川之江駅 |
| MC2-J-0036 | 国会図書館 |
| MC2-J-0037 | 銀行いすみ市 |
| MC2-J-0038 | 皮膚科京都市北区 |
| MC2-J-0039 | 高速バスターミナル札幌 |
| MC2-J-0040 | ピザハット川口市 |
| MC2-J-0041 | ビットコイン |
| MC2-J-0042 | ジャガー |
| MC2-J-0043 | 潜水病 |
| MC2-J-0044 | ケバブ |
| MC2-J-0045 | Windows 7 |
| MC2-J-0046 | エイプリルフール |
| MC2-J-0047 | アシアナ航空 |
| MC2-J-0048 | ユーロ |
| MC2-J-0049 | テトリス |
| MC2-J-0050 | nlb |
| MC2-J-0051 | 健康保険 |
| MC2-J-0052 | ライカ |
| MC2-J-0053 | くも膜下出血 |
| MC2-J-0054 | ゴルフ |
| MC2-J-0055 | 蒔絵 |
| MC2-J-0056 | マンゴー |
| MC2-J-0057 | カカオトーク |
| MC2-J-0058 | 大航海時代 |
| MC2-J-0059 | マインクラフト |
| MC2-J-0060 | putty |
| MC2-J-0061 | ups |
| MC2-J-0062 | ゴジラ |
| MC2-J-0063 | プレイステーション |
| MC2-J-0064 | スマートフォン |
| MC2-J-0065 | アラジン |
| MC2-J-0066 | ポメラニアン |
| MC2-J-0067 | 演歌 |
| MC2-J-0068 | プレミアリーグ |
| MC2-J-0069 | 神の贈り物 |
| MC2-J-0070 | レタス |
| MC2-J-0071 | 黄色いリボン |
| MC2-J-0072 | レアル·マドリード |
| MC2-J-0073 | バゲット |
| MC2-J-0074 | タイタニック |
| MC2-J-0075 | アクセント |
| MC2-J-0076 | ヤフー |
| MC2-J-0077 | アサイー |
| MC2-J-0078 | メロン |
| MC2-J-0079 | 富士ゼロックス |
| MC2-J-0080 | リネージュ |
| MC2-J-0081 | 赤ワインと白ワインの違い |
| MC2-J-0082 | 余震が起きるメカニズム |
| MC2-J-0083 | コールスローを作る方法 |
| MC2-J-0084 | 動物の尻尾の役割 |
| MC2-J-0085 | To、Bcc、Ccの違い |
| MC2-J-0086 | 共和国と民主共和国と連邦の違い |
| MC2-J-0087 | おなかの脂肪を減らす方法 |
| MC2-J-0088 | コンピュータのリモート制御方法 |
| MC2-J-0089 | 鏡は何からできているのか |
| MC2-J-0090 | ホワイトチョコが白い理由 |
| MC2-J-0091 | ハロウィンでなぜ子供が変装してお菓子をもらうのか |
| MC2-J-0092 | ペッパーの種類の違い |
| MC2-J-0093 | 鳩が平和の象徴とされる由来 |
| MC2-J-0094 | Japanの語源は何ですか |
| MC2-J-0095 | マカロンの作り方 |
| MC2-J-0096 | 鉛筆のHやBの意味 |
| MC2-J-0097 | スパゲティをゆでる時に塩を入れるのは何故 |
| MC2-J-0098 | レポートを書く方法 |
| MC2-J-0099 | マジックミラーの原理 |
| MC2-J-0100 | GDPとGNPの違い |