Gotong Royong in NLP Research
A Mobile Tool for Collaborative Text Annotation in Indonesia

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Introduction

• The Indonesian language Bahasa Indonesia counts as a “low-resource” language

• Machine learning technology advanced the development of NLP tools in Indonesia

BUT:

Machine learning based NLP methods depend on the availability of annotated training data
Example – Named Entity Recognition

MAY DAY: Buruh KSPI Ancam Mogok Kerja Jika Tuntuan Tak Digubris.

May Day: KSPI workers threaten to strike if their demands are ignored
The Problem

Manual annotation of data is
- tedious and
- time-consuming
Solution Approach

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Mobile First Culture

The first Mobile Collaborative Annotation Tool
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Mobile First Culture

In today’s Indonesia, 93% of online users access the Internet via their smartphone (Andrews et al., 2015)
Solution

The First Mobile Collaborative Annotation Tool

- Colleagues
- Students
- Family
- Friends
Shortcomings for their application in Indonesia

1) Not Mobile Friendly
BRAT
Existing Systems

GATE

GATE, H. Cunningham, 2011
Existing Systems

Shortcomings for their application in Indonesia
1) Not Mobile Friendly
2) Interface does not support Bahasa Indonesia
The Solution

• We propose a tool

• that makes data annotation more efficient

• allows data to be annotated by several users at the same time

• and can be used anywhere, anytime – using a mobile phone
Klik tombol label dan kemudian klik token kata

#NewsGibol  Otamendi  Siapkan  Aksi  Mogok  |  http://t.co/z1zFrzvU1G

Orang/Organisasi  Lokasi  Waktu  Lainnya

Tidak relevan  Hapus  >
Example Binary Classification

Is this Tweet related to
labour strikes or protests?

Dear mahasiswa yg lg 'aksi' demo, bagus
sih merujuangin hak rakyat. TAPI YA GAK
NUTUPIN JALAN JUGA. HUH. Pengguna
jalan raya juga RAKYAT btw.
Experimental Evaluation

- 15 Indonesian students/alumni from 5 Universities
- Labelled 100 Tweets each
- Using one of three NLP data annotation tasks:
  - Named Entity Recognition
  - Semantic Role Labeling
  - Binary Classification
- In one week, using KataKita on their mobile phones
Evaluation Criteria

Experiment

- Post Experiment Survey
- System Logs
  - Usability
  - User Activity
  - Annotation Quality
I could use KataKita from mobile phone so I can annotate anytime and anywhere.

When I use KataKita, I need to wait couple of minutes until all the tokens were loaded on the screen.

KataKita annotation guideline is easy to understand.

I think KataKita is too complicated.

I think KataKita is easy to use.

I think I need technical support to use KataKita.

I imagine that most of KataKita users could learn to use KataKita quickly.

I think KataKita is impractical to use.

I feel very confident when doing the annotation using KataKita.

I must learn a lot of things before using KataKita.
User Activity – Annotation Speed

Time per Record - Density

- **Tasks**
  - **BIN**
  - **SRL**
  - **NER**

<table>
<thead>
<tr>
<th>Task</th>
<th>Median Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binary Classification</td>
<td>5s</td>
</tr>
<tr>
<td>Named Entity Recognition</td>
<td>17s</td>
</tr>
<tr>
<td>Semantic Role Labelling</td>
<td>41s</td>
</tr>
</tbody>
</table>
User Activity – Annotation Time per User

Total duration per user [s]

- Task SRL: user1, user2, user3, user4, user5
- Task NER: user6, user7, user8, user9
- Task BIN: user10, user11, user12, user13, user14, user15
Experimental Evaluation
### Annotation Quality

<table>
<thead>
<tr>
<th>Task</th>
<th>Fleiss’ Kappa</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binary Classification</td>
<td>0.45</td>
<td>Moderate Agreement</td>
</tr>
<tr>
<td>Named Entity Recognition</td>
<td>0.22</td>
<td>Low Agreement</td>
</tr>
<tr>
<td>Semantic Role Labelling</td>
<td>0.41</td>
<td>Moderate Agreement</td>
</tr>
</tbody>
</table>

0 = no agreement, 1 = perfect agreement
Future Work

• How to improve annotation quality? What are the factors and user attributes influencing the quality?
• How to present guidelines and provide training on the phone?
Questions?
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https://github.com/strikesensor/

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