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

Lisa Madlberger

Ade Romadhony

Ayu Purwarianti

Introduction

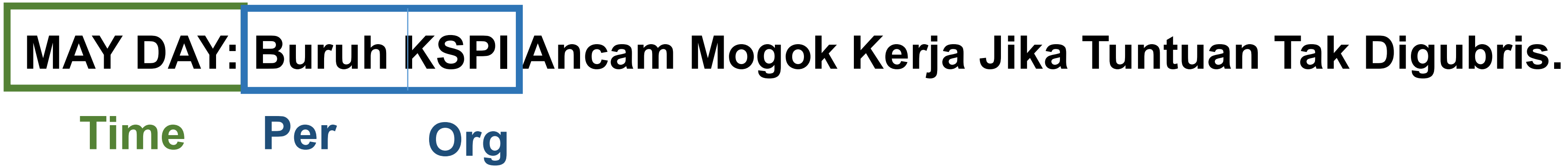
- The Indonesian language Bahasa Indonesia counts as a "low-resource" language
- Machine learning technology advanced the development of NLP tools in Indonesia

BUT:

Machine learning based NLP methods
depend on the availability of annotated training data

Annotated Training Data

Example – Named Entity Recognition

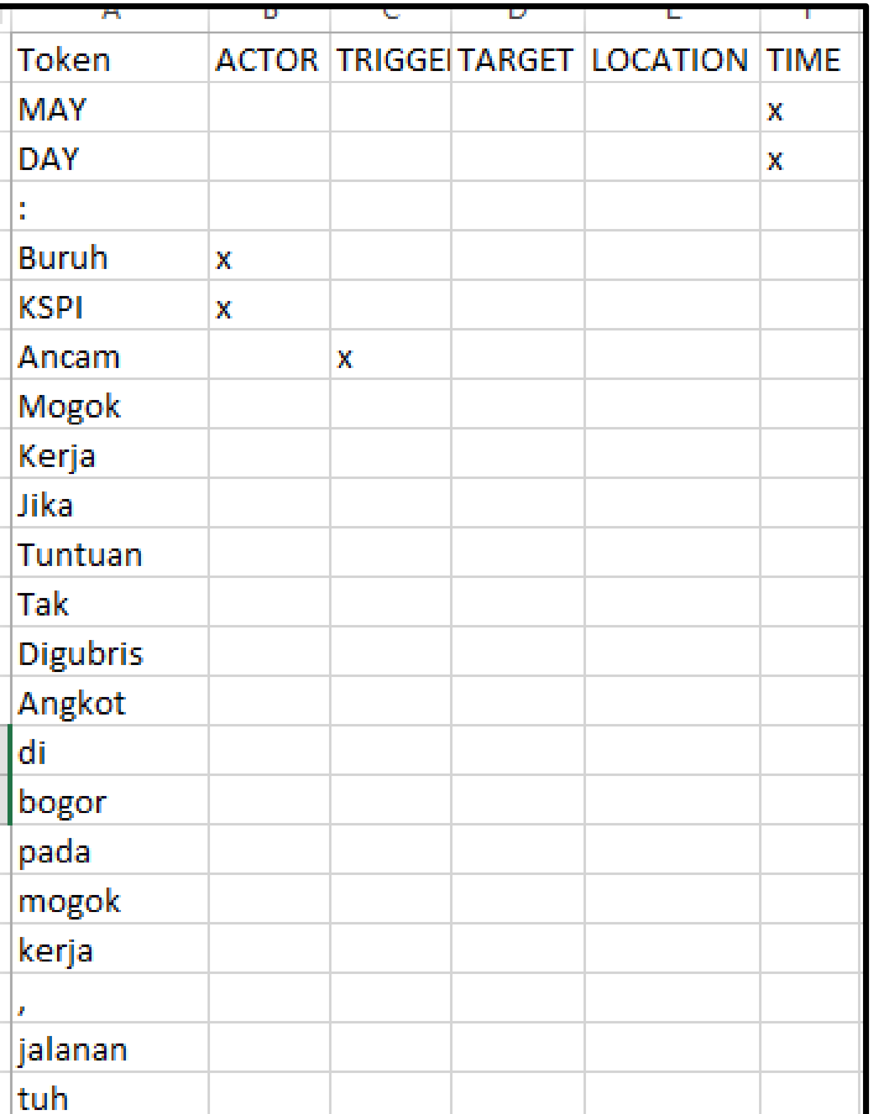


MAY DAY: Buruh KSPI Ancam Mogok Kerja Jika Tuntuan Tak Digubris.

Time Per Org

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

The Problem



Token	ACTOR	TRIGGEI	TARGET	LOCATION	TIME
MAY					x
DAY					x
:					
Buruh	x				
KSPI	x				
Ancam		x			
Mogok					
Kerja					
Jika					
Tuntuan					
Tak					
Digubris					
Angkot					
di					
bogor					
pada					
mogok					
kerja					
,					
jalanan					
tuh					

Manual annotation of data is

- tedious and
- time-consuming

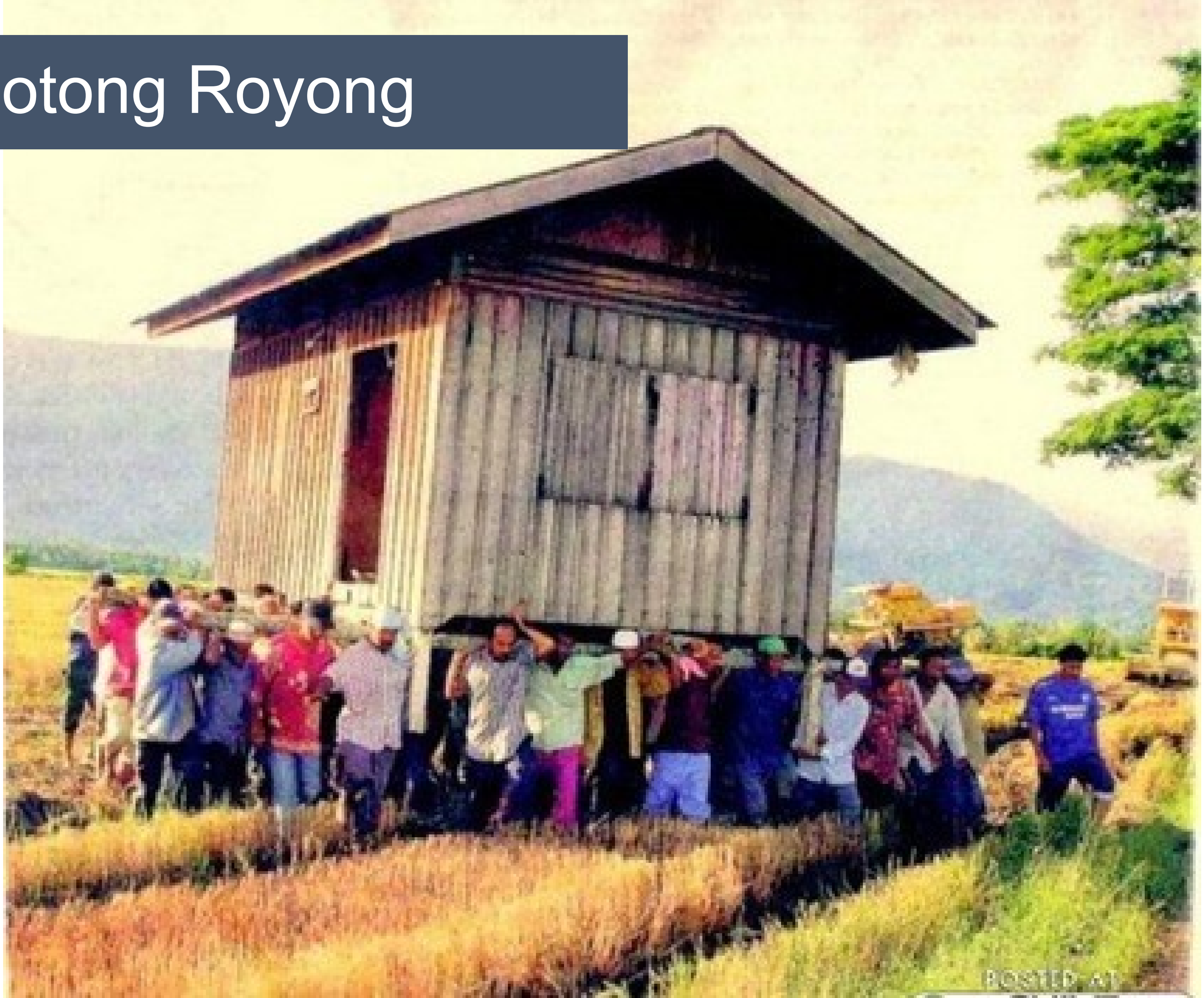
Solution Approach

Gotong Royong

Mobile First Culture

The first Mobile Collaborative Annotation Tool

Gotong Royong



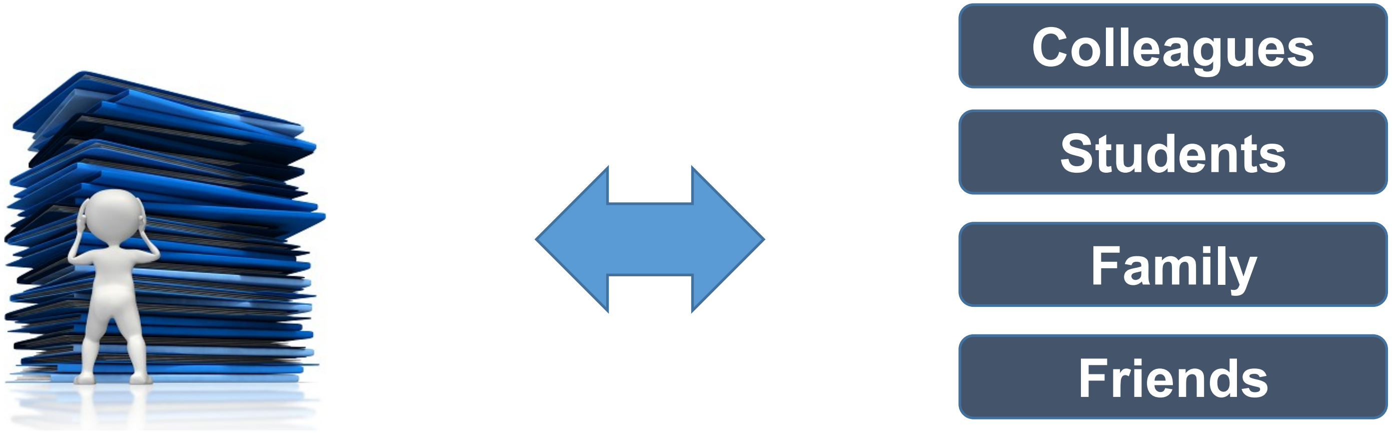
Mobile First Culture

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

Solution

katakita.click

The First Mobile Collaborative Annotation Tool



Colleagues

Students

Family

Friends

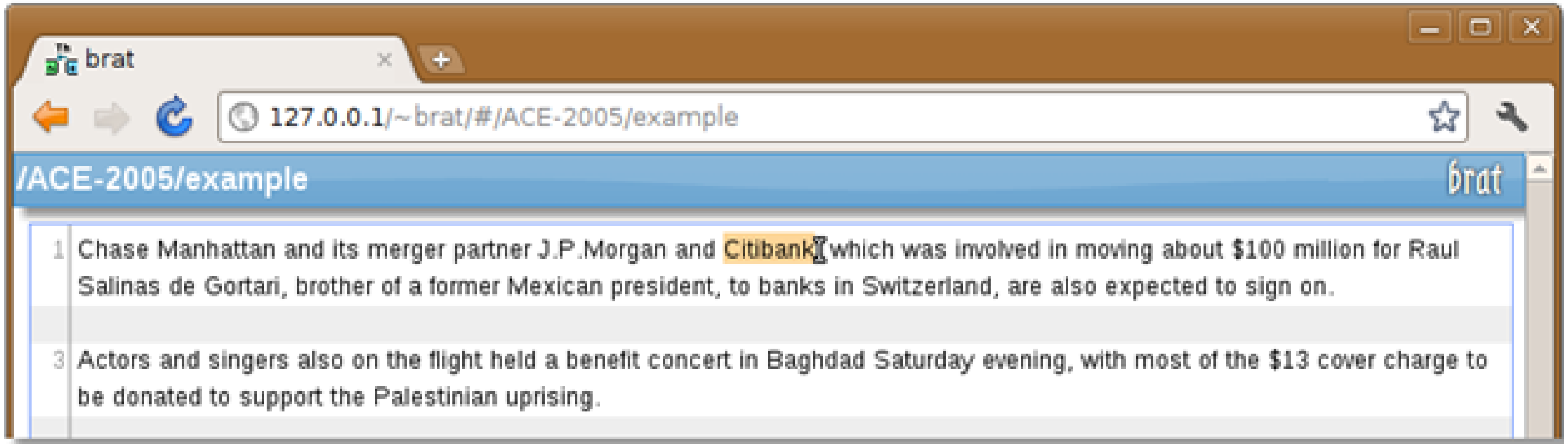
Existing Systems

Shortcomings for their application in Indonesia

1) Not Mobile Friendly

Existing Systems

BRAT



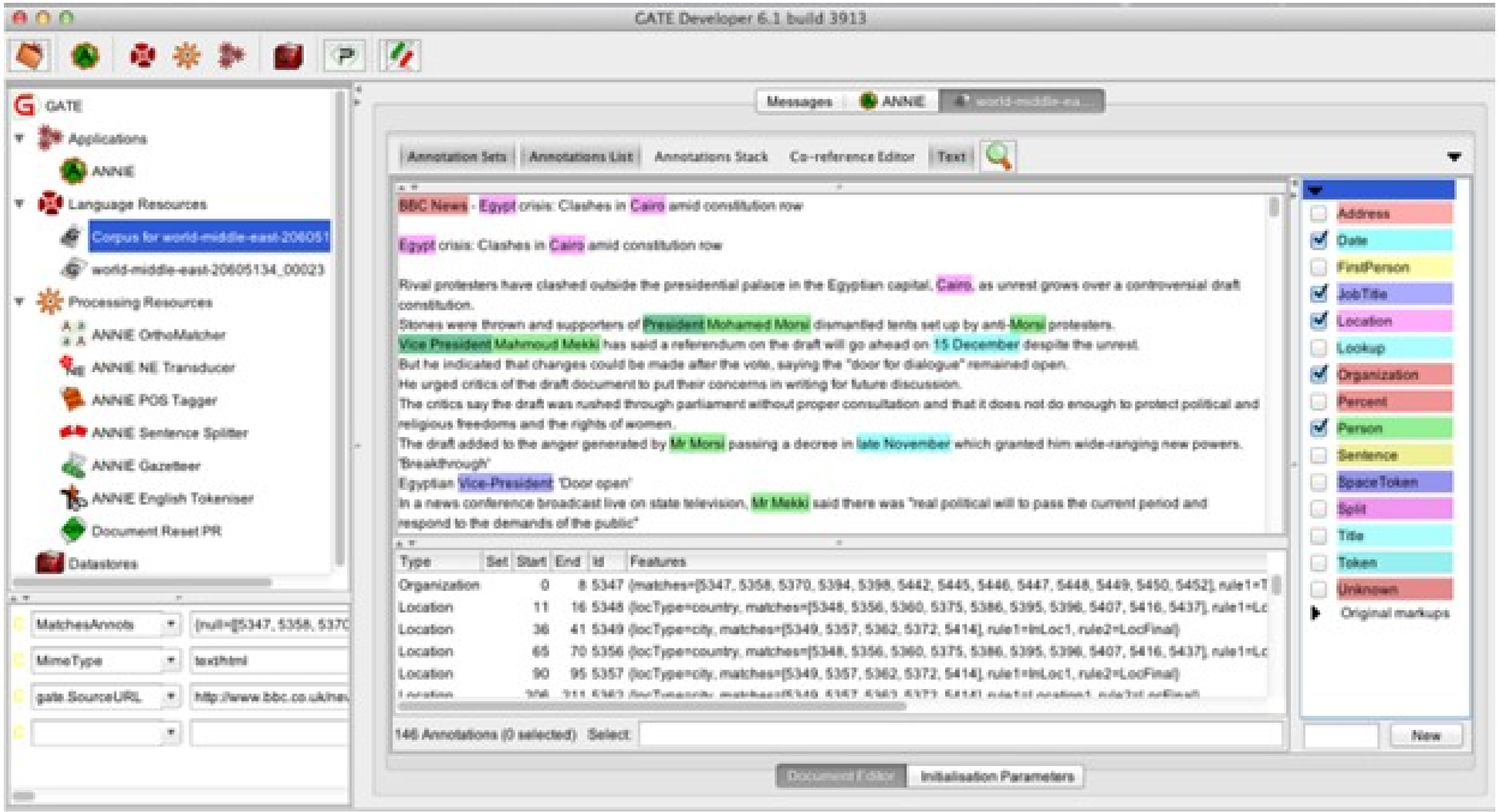
1 Chase Manhattan and its merger partner J.P.Morgan and Citibank which was involved in moving about $100 million for Raul Salinas de Gortari, brother of a former Mexican president, to banks in Switzerland, are also expected to sign on.

3 Actors and singers also on the flight held a benefit concert in Baghdad Saturday evening, with most of the $13 cover charge to be donated to support the Palestinian uprising.

BRAT, P. Stenetorp, 2012

Existing Systems

GATE



MatchesAnnots	{null=[[5347, 5358, 537(
MimeType	text/html
gate.SourceURL	http://www.bbc.co.uk/nev

BBC News - Egypt crisis: Clashes in Cairo amid constitution row

Egypt crisis: Clashes in Cairo amid constitution row

Rival protesters have clashed outside the presidential palace in the Egyptian capital, Cairo, as unrest grows over a controversial draft constitution.
Stones were thrown and supporters of President Mohamed Morsi dismantled tents set up by anti-Morsi protesters.
Vice President Mahmoud Mekki has said a referendum on the draft will go ahead on 15 December despite the unrest.
But he indicated that changes could be made after the vote, saying the "door for dialogue" remained open.
He urged critics of the draft document to put their concerns in writing for future discussion.
The critics say the draft was rushed through parliament without proper consultation and that it does not do enough to protect political and religious freedoms and the rights of women.
The draft added to the anger generated by Mr Morsi passing a decree in late November which granted him wide-ranging new powers.
'Breakthrough'
Egyptian Vice-President 'Door open'
In a news conference broadcast live on state television, Mr Mekki said there was "real political will to pass the current period and respond to the demands of the public"

Type	Set	Start	End	Id	Features
Organization		0	8	5347	{matches=[5347, 5358, 5370, 5394, 5398, 5442, 5445, 5446, 5447, 5448, 5449, 5450, 5452], rule1=T
Location		11	16	5348	{locType=country, matches=[5348, 5356, 5360, 5375, 5386, 5395, 5396, 5407, 5416, 5437], rule1=Lc
Location		36	41	5349	{locType=city, matches=[5349, 5357, 5362, 5372, 5414], rule1=InLoc1, rule2=LocFinal}
Location		65	70	5356	{locType=country, matches=[5348, 5356, 5360, 5375, 5386, 5395, 5396, 5407, 5416, 5437], rule1=Lc
Location		90	95	5357	{locType=city, matches=[5349, 5357, 5362, 5372, 5414], rule1=InLoc1, rule2=LocFinal}

146 Annotations (0 selected) Select:

GATE, H. Cunningham, 2011

Existing Systems

Shortcomings for their application in Indonesia

1) Not Mobile Friendly
2) Interface does not support Bahasa Indonesia

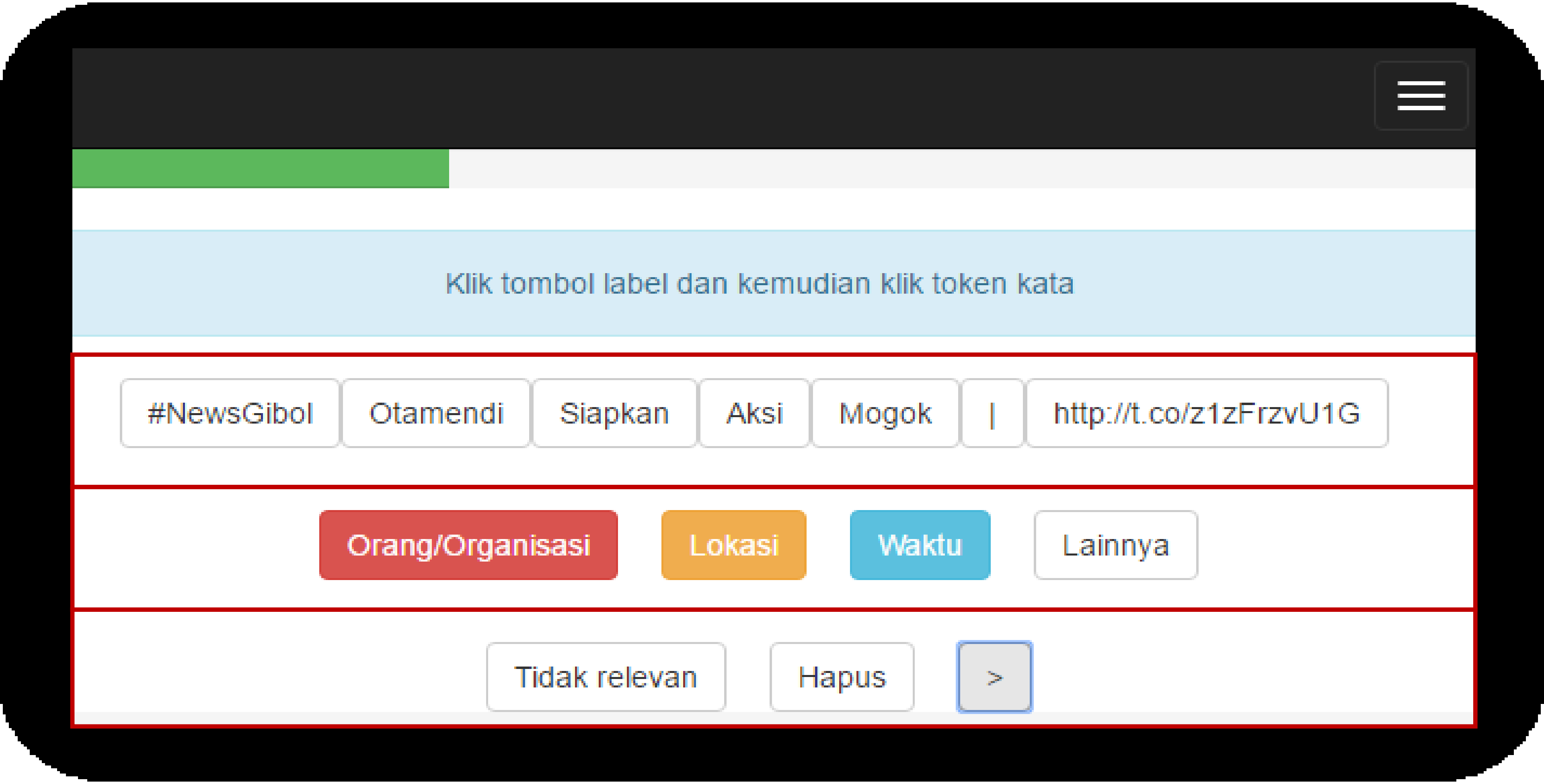
The Solution

- We propose a tool

- that makes data annotation more efficient

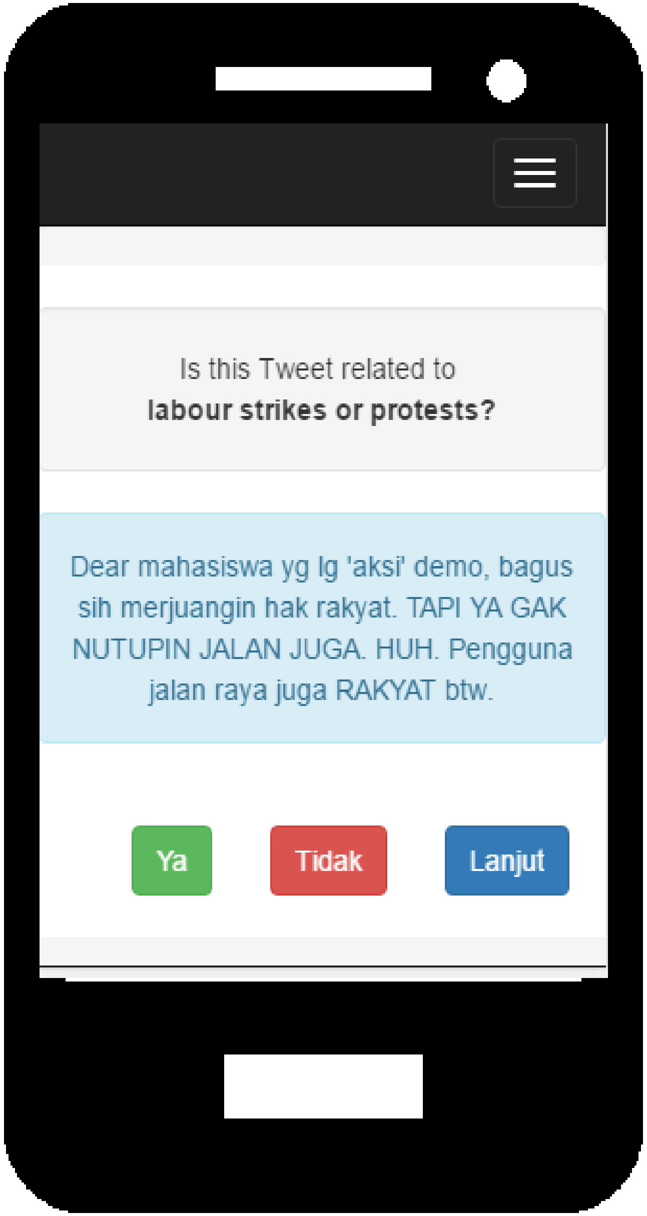
- allows data to be annotated
  by several users at the same time

- and can be used anywhere, anytime
  – using a mobile phone



Klik tombol label dan kemudian klik token kata

Example Binary Classification



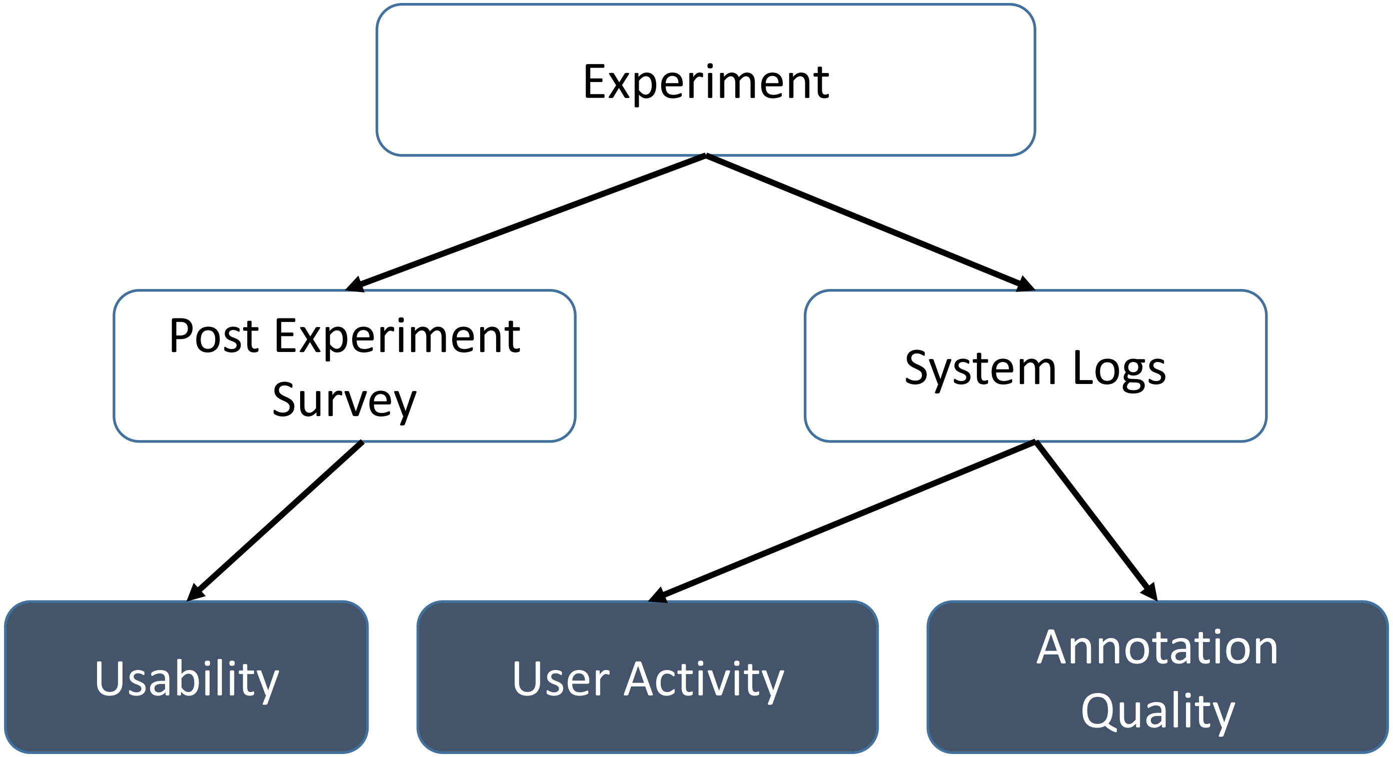
Is this Tweet related to
labour strikes or protests?

Dear mahasiswa yg lg 'aksi' demo, bagus sih merjuangin 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

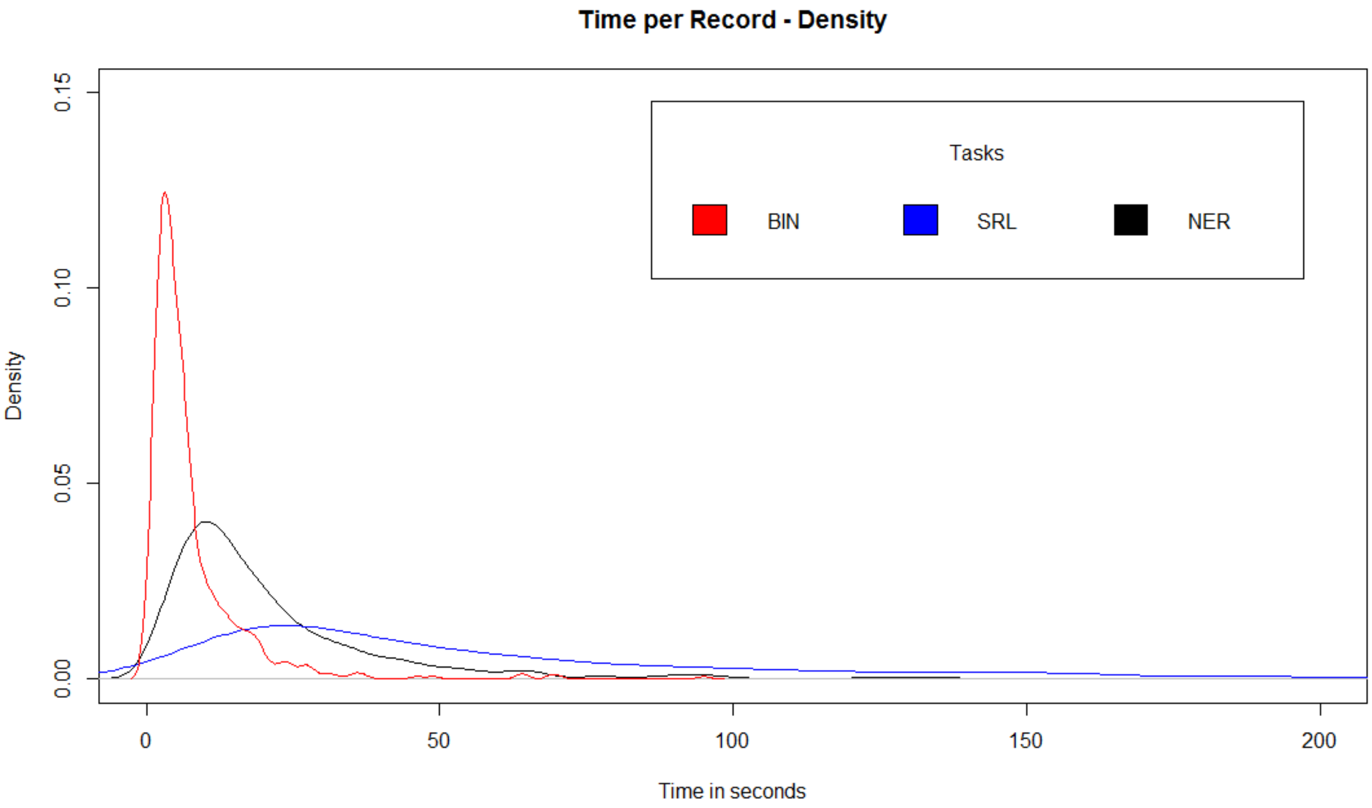
Evaluation Criteria



Usability

	Strongly disagree				Strongly agree
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.	🟦	🟦	🟦	⬜	⬜

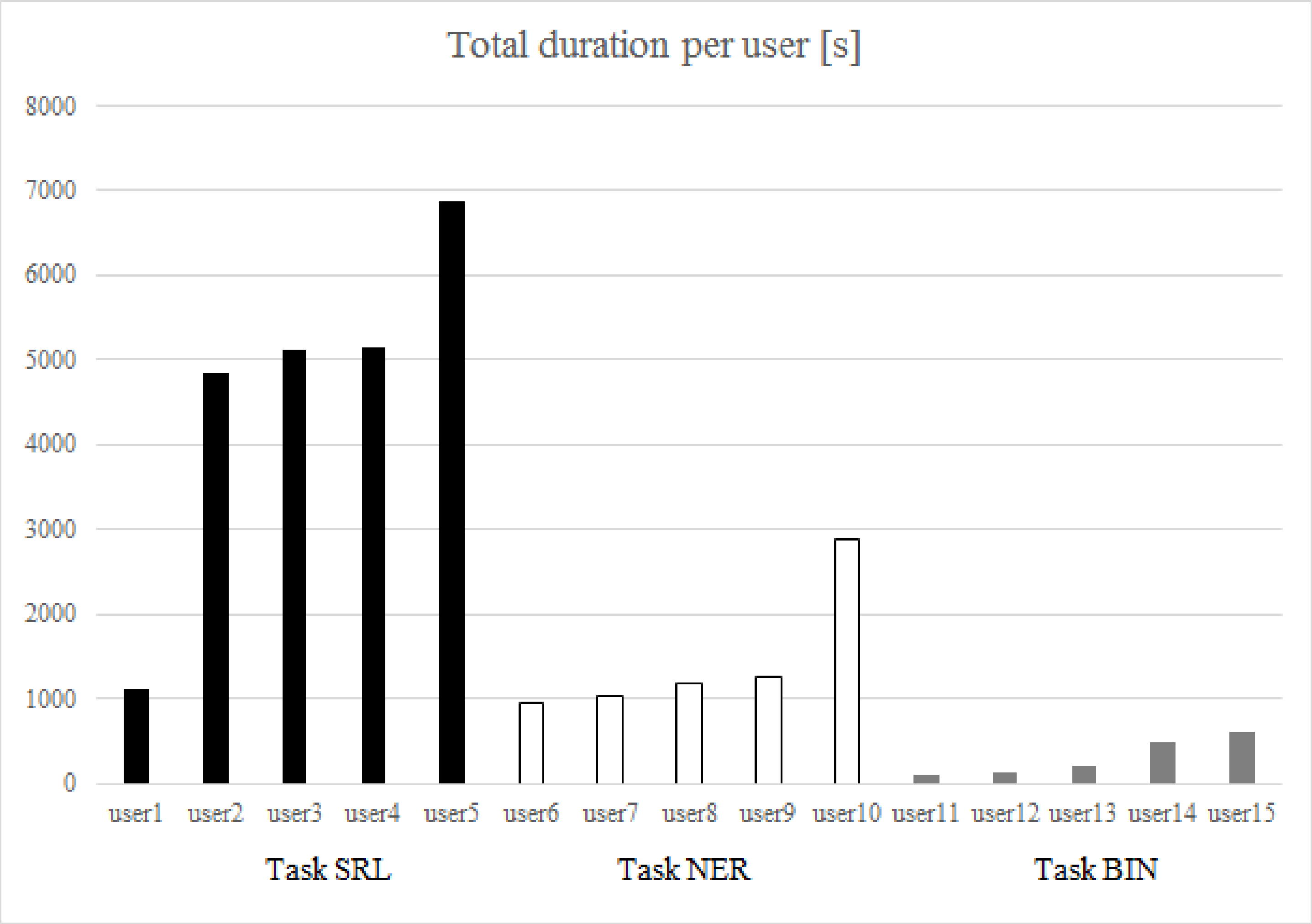
User Activity – Annotation Speed



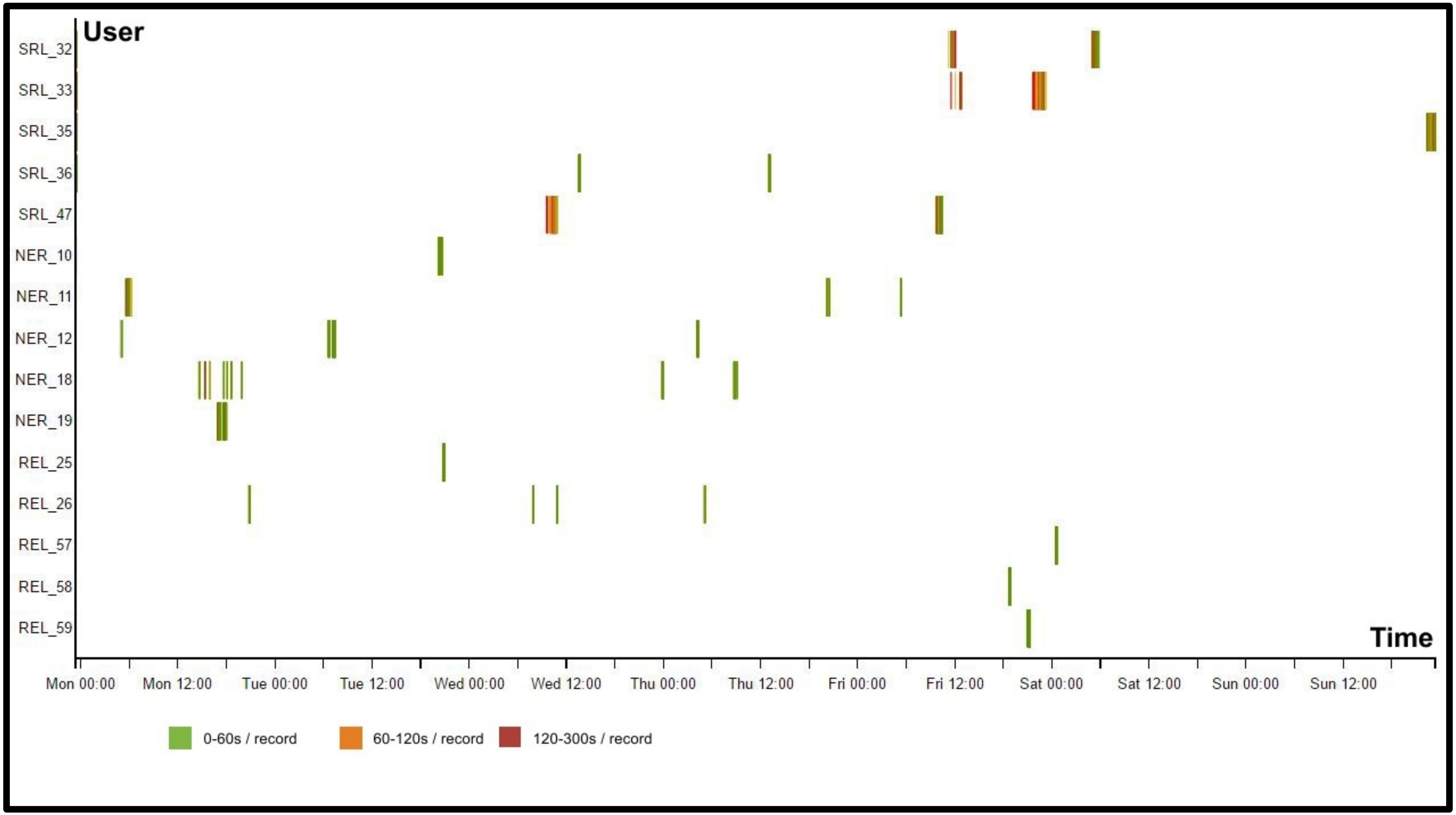
Median Time

Binary Classification	5s
Named Entity Recognition	17s
Semantic Role Labelling	41s

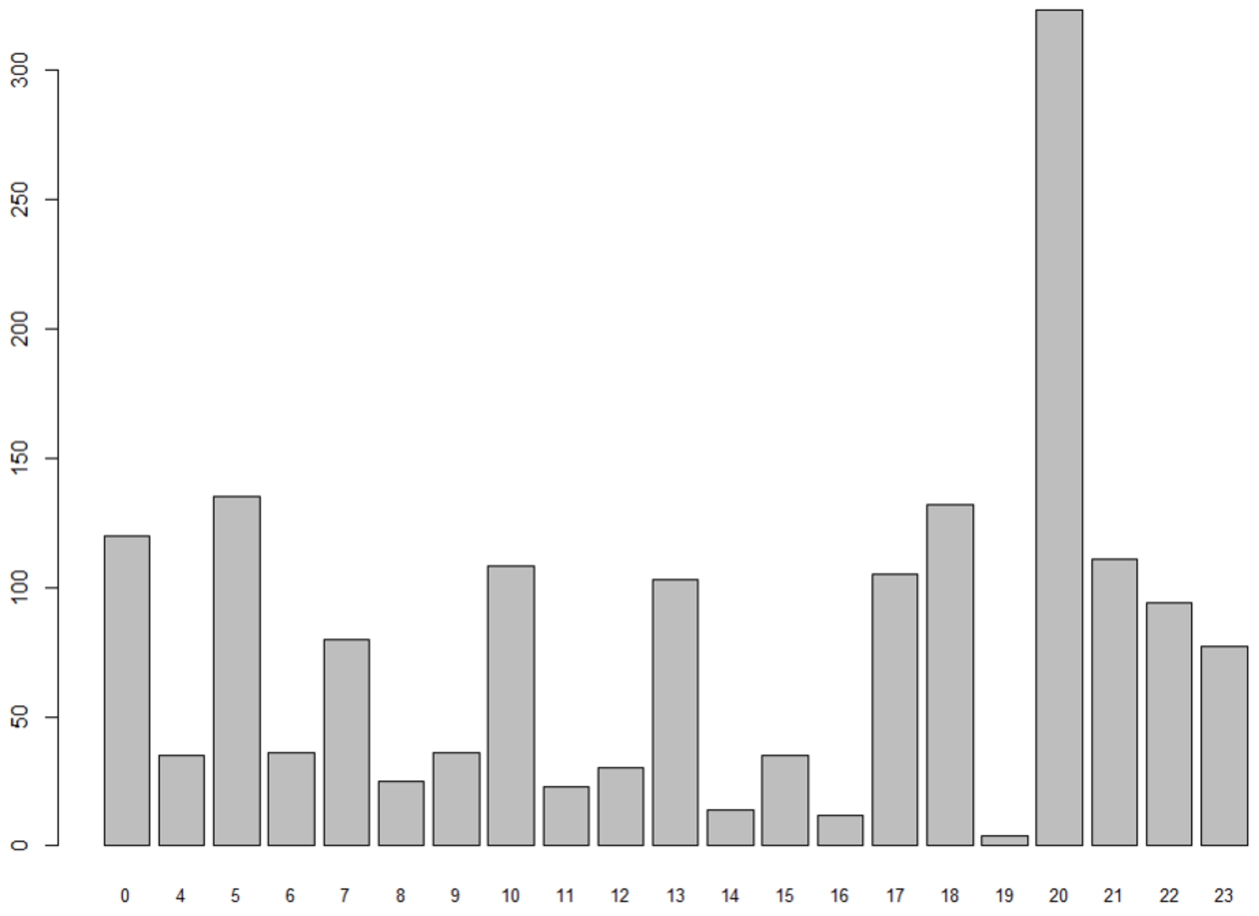
User Activity – Annotation Time per User



Experimental Evaluation



Experimental Evaluation



Annotation Quality

Task	Fleiss' Kappa	Interpretation
Binary Classification	0.45	Moderate Agreement
Named Entity Recognition	0.22	Low Agreement
Semantic Role Labelling	0.41	Moderate Agreement

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?

Please contact us!

ade_romadhony@students.itb.ac.id
lisa.madlberger@tuwien.ac.at

https://github.com/strikesensor/

Lisa Madlberger
Ade Romadhony
Ayu Purwarianti