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Gaining Efficiency in Human Assisted Transcription and Speech Annotation in Legislative Proceedings

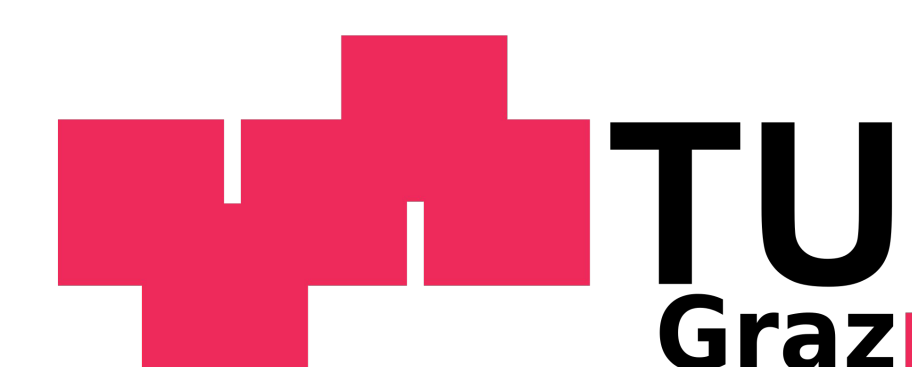
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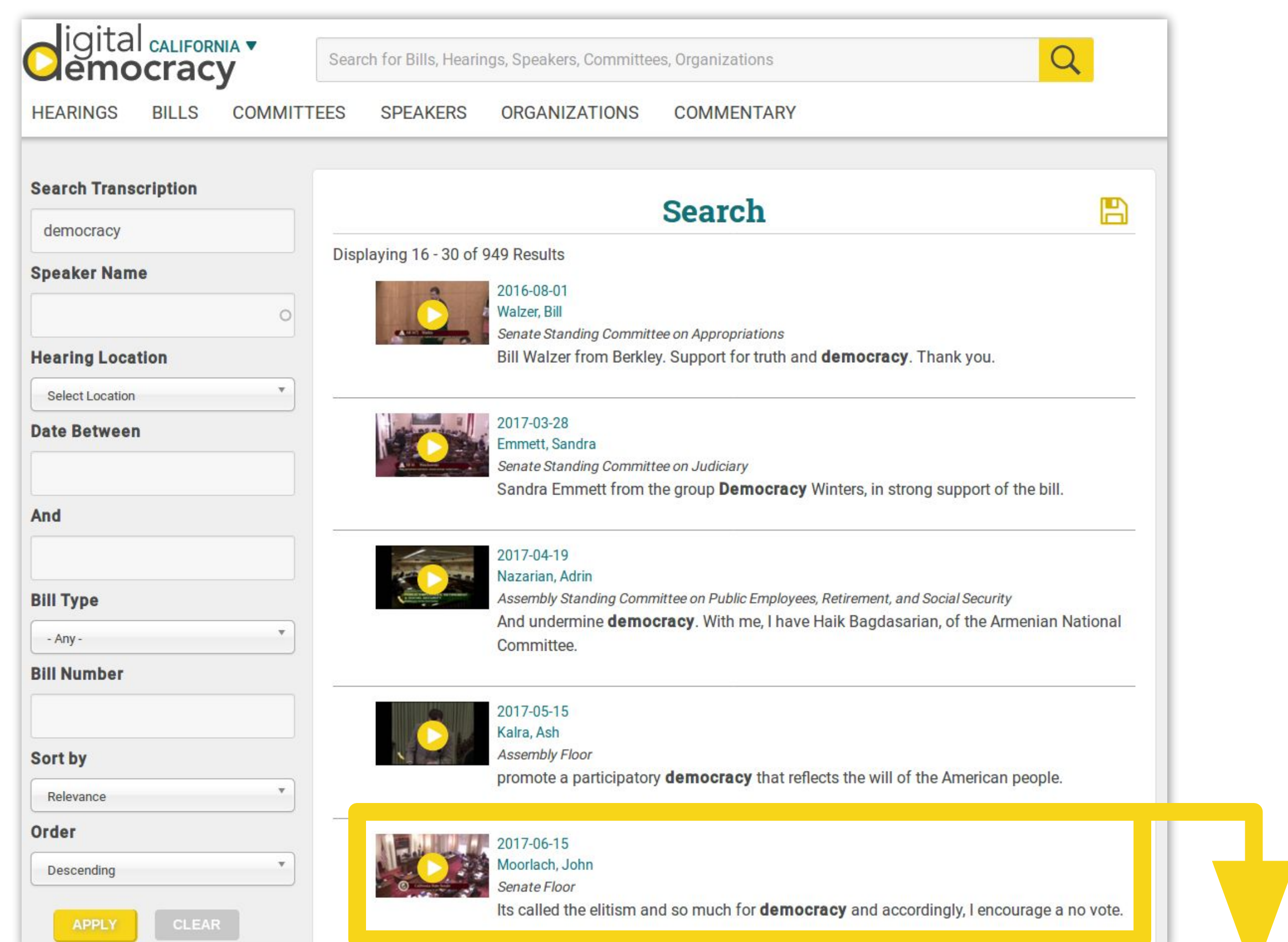
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Overview

Legislative and parliamentary proceedings present a rich source of multi-dimensional information that is crucial to citizens and journalists in a democratic system. At present no fully automated solution exists that is capable of capturing all the necessary information during such proceedings such as speaker identification. While many governments rely on manually-produced transcriptions and annotations, others are left entirely without digital transcriptions. Digital Democracy provides such records by implementing a human-assisted transcription approach. The work presented here focuses on Digital Democracy's Transcription Tool.

Digital Democracy Project

Digital Democracy aims to increase transparency in US state legislatures. Anyone can use the search interface at digitaldemocracy.org to find, analyze and study any legislative hearings on topics of interest. Users can search for terms mentioned in hearings. Results provide links to the exact position of the utterance in the found hearing text and video.

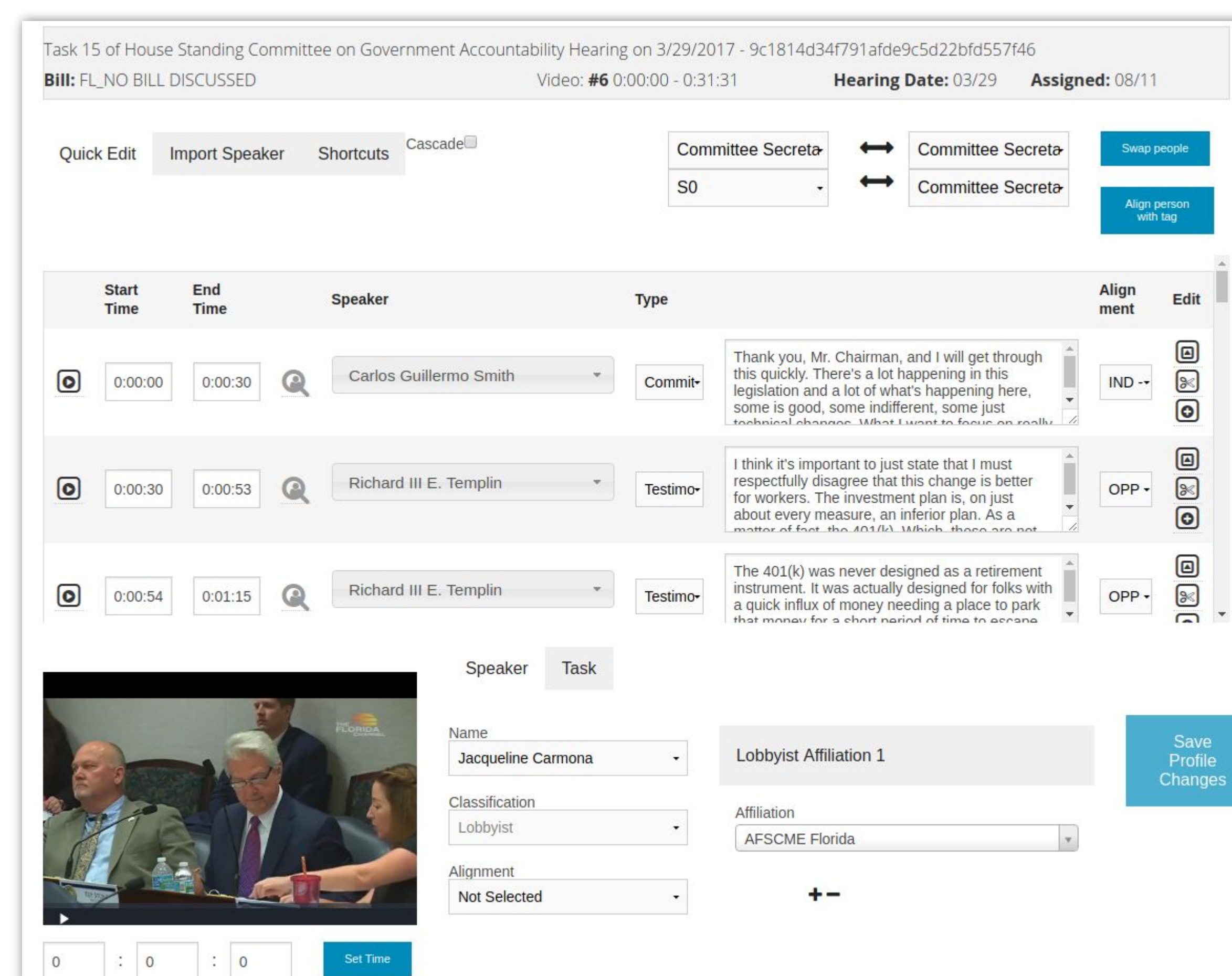


The hearing detail screen holds such information as:

- Hearing video
- Interactive transcript
- Discussed bills and votes on it
- Speaker district

Transcription Tool

Digital Democracy uses a human-assisted approach for generating transcription texts and metadata. While automatic transcription might be sufficient in other areas, a legislative setting requires professional transcripts. This is achieved by human editors manually up-leveling transcription text and performing annotations such as speaker and position identification using Digital Democracy's Transcription Tool.



The bottleneck created by the manual transcription process leads to a considerable obstacle for Digital Democracy, both in regards of monetary cost, as well as time delay before final transcripts are available. For these reasons, several changes aiming at improving stability, usability, and efficiency of Transcription Tool were developed. These changes were gradually introduced over the last few months of 2017 as four different tool versions.

The following table gives an overview of each version's functionality.

#	Name	Description
0	Baseline	No changes
1	Profile Preview	Hovering icon near people's names shows preview of their profile picture
2	Video Features	Full-screen for video player, UI to change playback rate for video
3	Utterance Navigation	Buttons for to directly jumping to utterance in video and going to next or previous utterance, interactive error messages, UI for manually setting video time
4	VFT	Incorporation of voice, face, and text analysis (VFT) to identify speakers

Research Questions

- To what extent do our improvements to the Transcription Tool increase efficiency in human-assisted transcription independent of the task, state, or the particular people doing the work?
- What kind of interactions do transcribers perform when working with the tool and how do these contribute to overall transcription time?

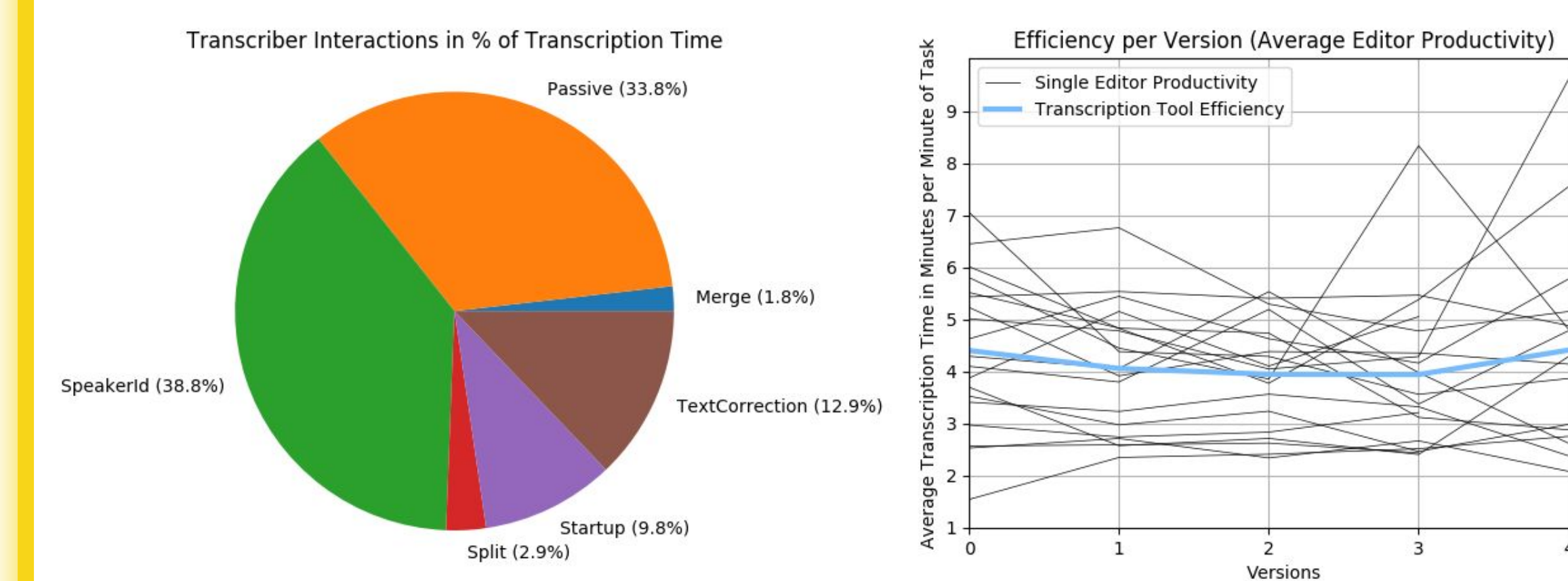
Experimental Setup and Dataset

- Interactions between transcribers and Transcription Tool were recorded via Javascript
- Logs stored in files with JSON format
- Collected logs for 7304 individual transcription sessions (= 1290 hours of video)
- Analysis on cohort of 20 transcribers who worked with all tool versions (2800 transcription sessions)

Results

- Efficiency improvement of 10.7 % from version 0 to 3
- Version 4 seems to be less efficient due to not having sufficient data
- Most of transcription time spent on speaker identification (38.8%) and proofreading or being idle (33.8 %)

Version	Transcription Time per Minute of Video	Improvement
0	4.401	-
1	4.014	8.793
2	3.943	1.768
3	3.938	0.129
4	4.407	-11.91



Acknowledgements

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