A Self-Training Framework for Automatic Identification of Exploratory Dialogue

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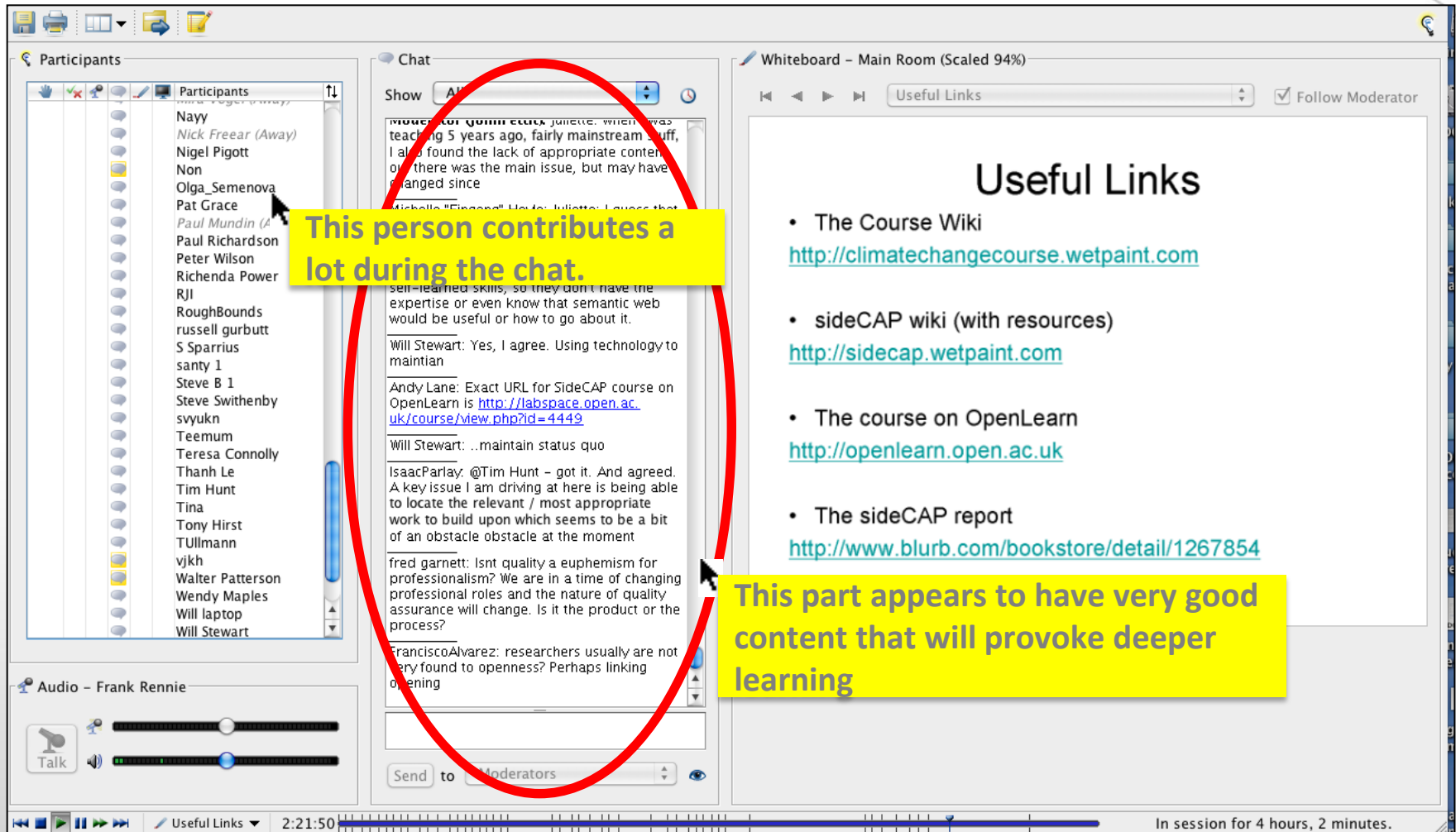
Background

Learning Forum

Online Seminar

Distant Education Platform

Online Conference

USDOE

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Motivation

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Exploratory dialogue analysis

- Exploratory dialogue
  - *......represents a joint, coordinated from of co-reasoning in language, with speakers sharing knowledge, challenging ideas, evaluating evidence and considering options ... ...*

Category	Description	Example
Challenge	Identifies that something may be wrong and in need of correction	**I disagree.** Freemind is a superb piece of software to use...
Evaluation	Has a descriptive quality	**That's a really** interesting approach
Extension	Builds on or provides resources that support discussion	I've embedded helen's slide share over in cloudworks **http://link.com**
Reasoning	The process of thinking an idea through.	**Why intranet only?** What meaning CLOSED in humanistic tradition?

Mercer, N. (2004). Sociocultural discourse analysis: analysing classroom talk as a social mode of thinking. *Journal of Applied Linguistics, 1(2),* 137-168.

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Exploratory dialogue detection

- **Problem Statement**
  - Given an online chatting session $S = \{d_0, d_1 \ldots \ldots d_n\}$, d_k stands for the k_{th} dialogue, detect exploratory dialogues $E = \{e_0, e_1 \ldots \ldots e_m\}$.

- **Solution**
  - Sociocultural discourse analysis method
    - Manual
    - High precision and low recall

Category	Cue-phrase
Challenge	But if, have to respond, my view …
Evaluation	Good example, good point …
Extension	More links, for example …
Reasoning	That is why, next step …

Challenges

- **The annotated dataset is limited.**
  - First try
  - Domain dependent

- **Exploratory dialogue is a form of discourse.**
  - Not the traditional topic based classification.

- **The identification of exploratory dialogue is also topic related.**
  - Although some sentences contain cue-phrases, it is not a exploratory dialogue.

A self-training framework
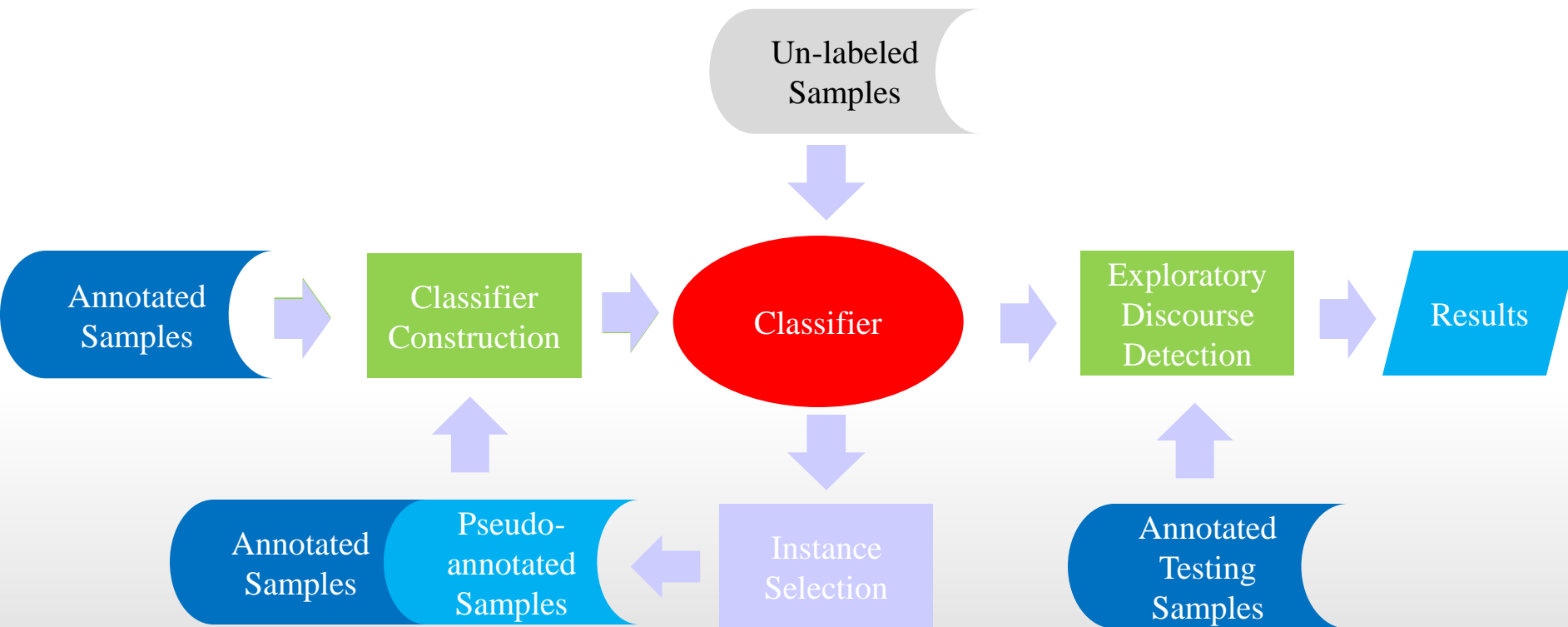
Approach
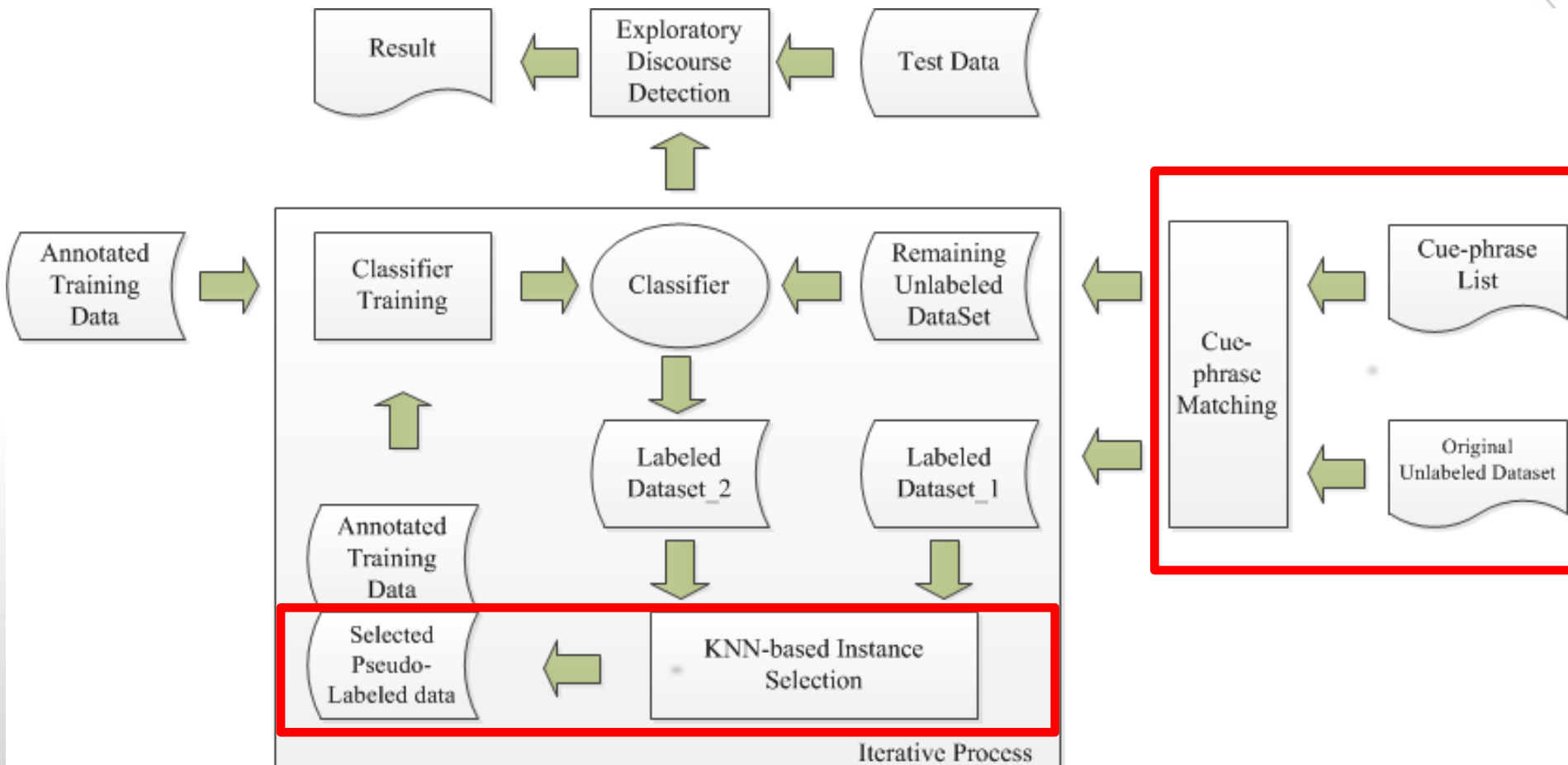
Outline

- Exploratory dialogue analysis
- A self-training framework
- **Dataset and experiment**
- Application

Data source

- **Labeled:** Data in this study taken from a 2 days' Open Univesrity conference in Elluminate & Cloudworks: **http://cloudworks.ac.uk/cloudscape/view/2012**
- **Unlabeled:** Open online course with 14,356 posts

Annotation

- 2 Annotators with one morning training
- Four categories are given.
- Kappa value (binary) is around 0.5978 (moderate).
- Only posts with the same labels are collected

Session	Total#	Exploratory #	Non-Exploratory #
OU_22AM	529	380	149
OU_22PM	661	508	153
OU_23AM	456	310	146
OU_23PM	441	219	222
total	2087	1417	670

Experiment Setup

- **Baseline:**
  - CP: Cue phrase based method
  - GE: Supervised MaxEntGE approach
  - SF: Self-training MaxEntGE approach (He. et al. 2011)

- **Experiment Setup**
  - Use half session as training part, one session as testing part. All the possible combination of training and testing session is tested and average performance is shown.
  - To avoid the bias, pseudo samples are added with the same ratio of exploratory and non-exploratory as training dataset.
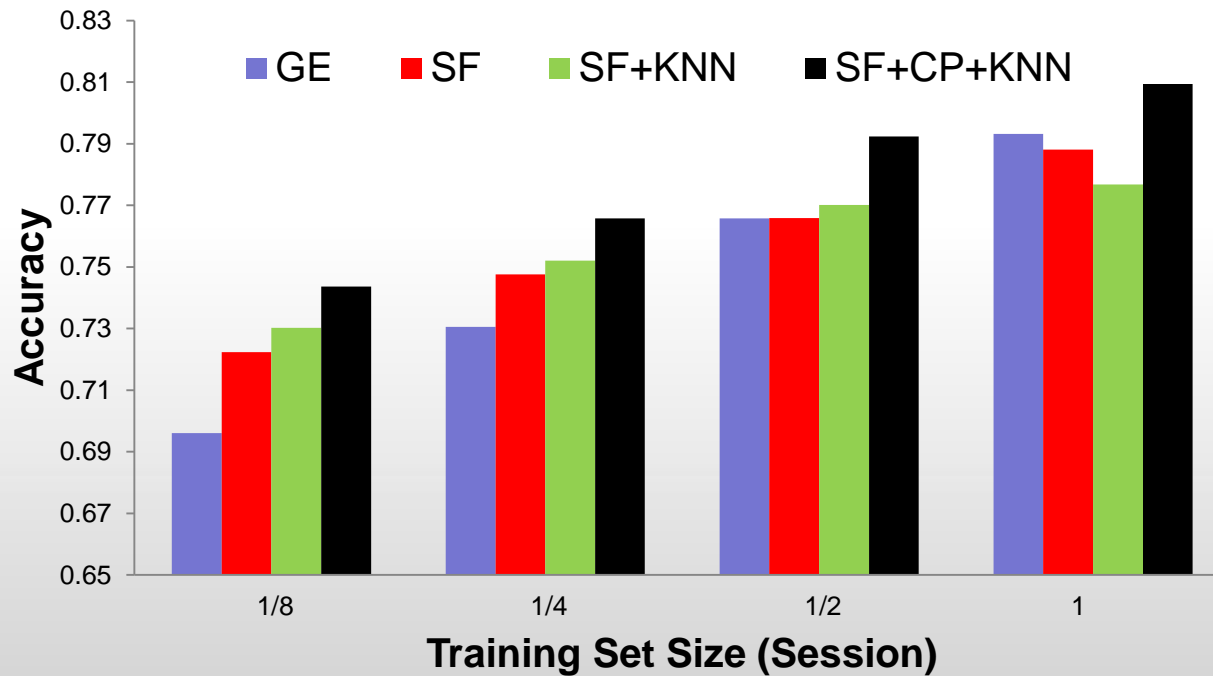
Experiment Result

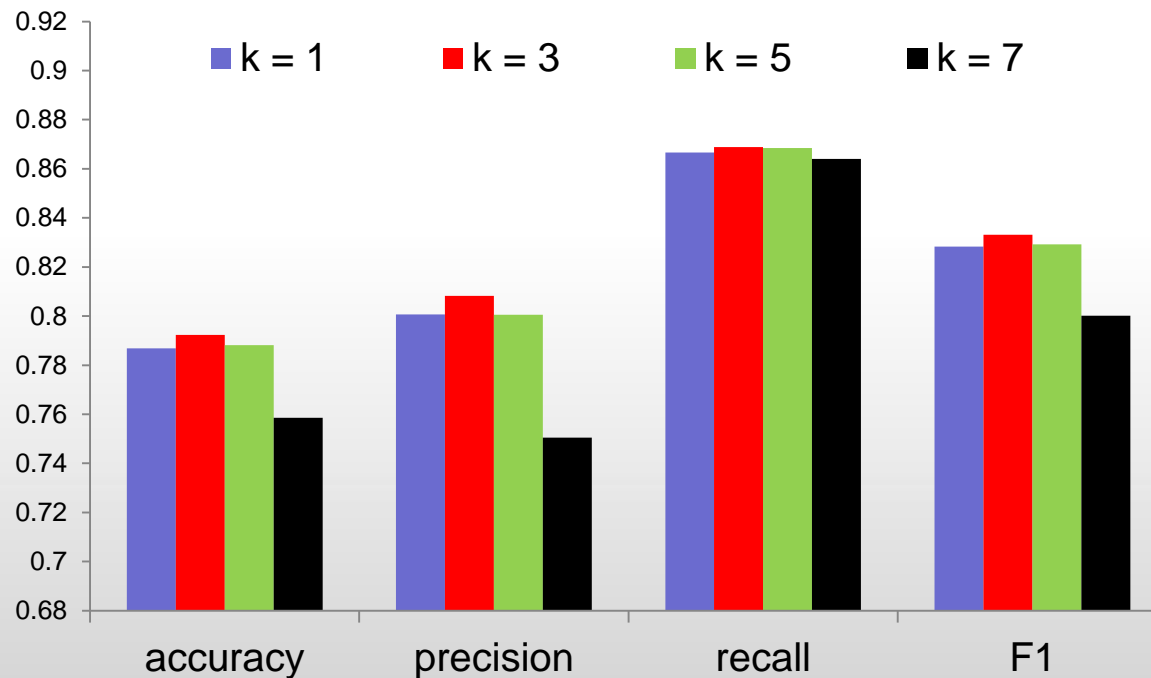| Approach	Accuracy	Precision	Recall	F1
CP	0.5389	**0.9523**	0.4241	0.5865
GE	0.7658	0.7753	**0.8717**	0.8017
SF	0.7659	0.7572	0.8710	0.8062
SF + KNN	0.7701	0.7865	0.8539	0.8148
SF + CP + KNN	**0.7924**	0.8083	0.8688	**0.8331**

Experiment Result

● **Accuracy vs. training set size**

Experiment Result

- **Performance of proposed framework on different k**

Outline

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- Dataset and experiment
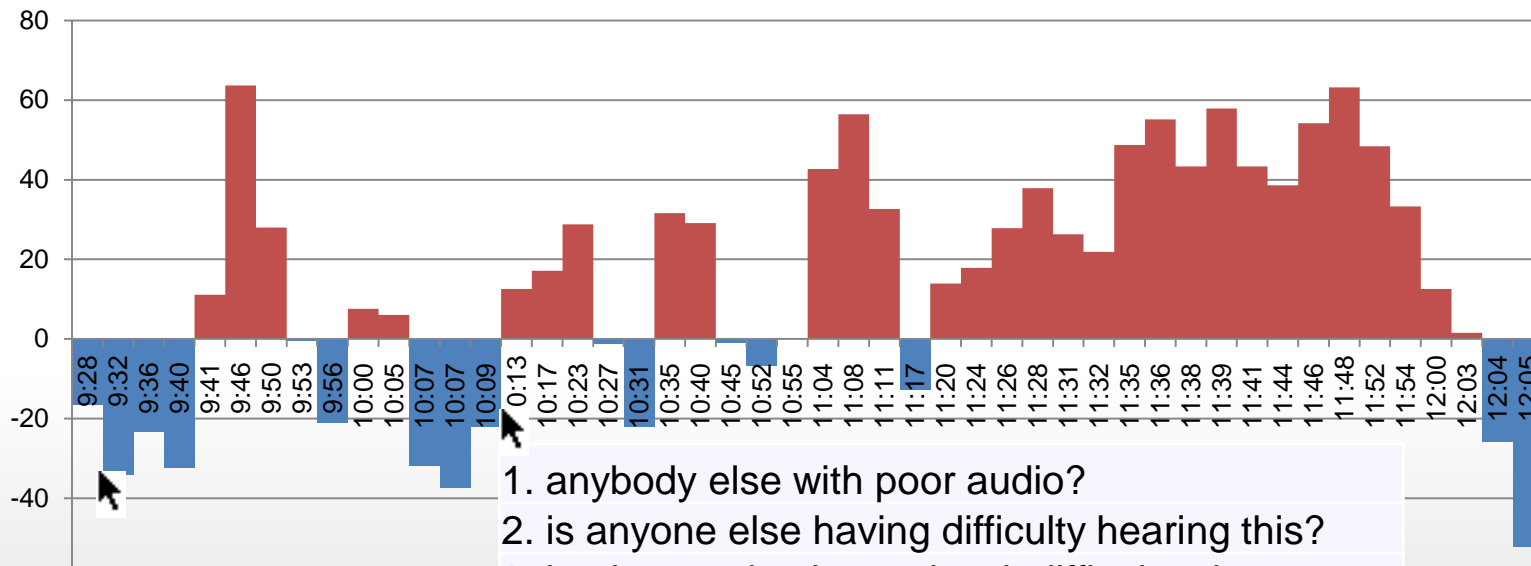- **Application**

Application

- For online learning platform Social Learn of Open University

- Exploratory distribution visualization

- User contribution visualization

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Time line Visualization

1. Sheffield, UK not as sunny as y... still warm
2. Greetings from Hong Kong
3. Morning from Wiltshire, sunny here!

1. anybody else with poor audio?
2. is anyone else having difficulty hearing this?
3. background noise makes it difficult to hear

1. See you!
2. bye for now!
3. bye, and thank you
4. Bye all for now

Time line Visualization

Time	User Id	Content
11:46 AM	User_2	added to which 2M often drops to 10% of that in peak times
11:47 AM	User_3	**I really disagree** - ECDL was the starting point for many many first time users
11:47 AM	User_1	online basics won't load in final third first
11:47 AM	User_1	mobile won't work round her
11:47 AM	User_1	and satlellite costs 40 a month for 1 gig data transfer
11:47 AM	User_4	I think the issue about the skills needed to really embrace technologies is a huge one and with web 2.0 technologies things are becoming more complicated, as I say often you dont just get this stuff by attending a workshop, you have to participate and appropriate them to your interests and context and network of others.
11:47 AM	User_5	We use myguide on mobile broadband for outreach. Works OK, but not great and thats in city centre boardering 3G/GPS.
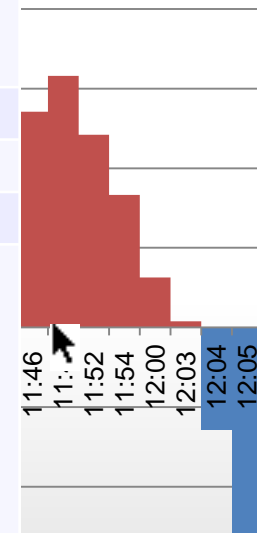
# User Visualization

Contribution Distribution of Users
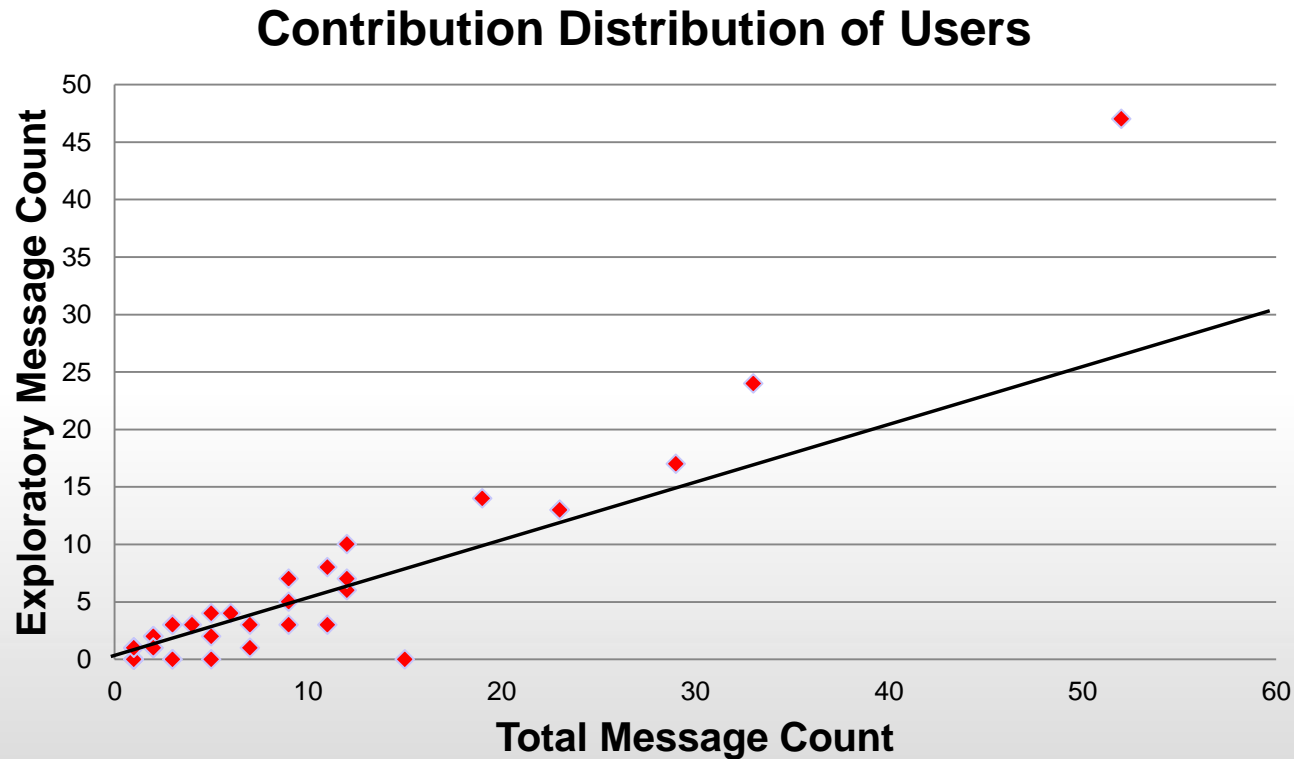
User Visualization

Contribution Distribution of Users

Time	User Id	Content
11:42 AM	User_1	because although some people can get 'online' the feed is so poor that many pages won't load. eg myguide
11:42 AM	User_1	how much time and money was spent getting everyone to use a mobile phone?
11:43 AM	User_1	nothing. because it was perceived to be useful, therefore there is no need to spend time and money on digitalinclusion, until the access to the internet works
11:44 AM	User_1	in order to get a 2meg connection to everyone we need fibre to the final third

User Visualization

Contribution Distribution of Users

Time	User Id	Content
9:51 AM	**User_6**	Hello Im a tutor at Saudi arabia branch
9:51 AM	Moderator	hello Saudi Arabia!
9:51 AM	**User_6**	hi
9:52 AM	Moderator	Welcome Ashawa - did we meet in Kuwait a couple of years ago?
9:52 AM	**User_6**	no actually
9:52 AM	Moderator	@ashawa - maybe next time
9:52 AM	**User_6**	yes I wish

Total Message Count
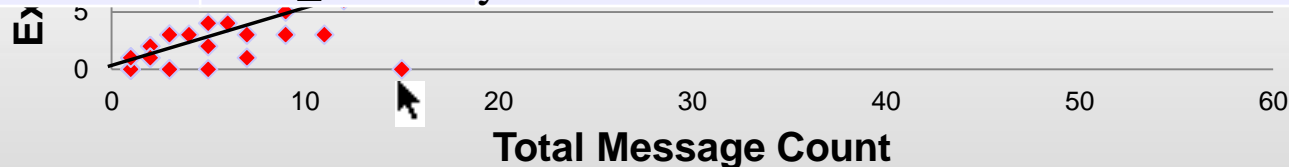
Future Work

- Explore other features for classification, such as the position and contextual information.
    - Position within a session
    - Label of previous dialogue or the one after.
- Explore automatic ways of expanding the cue phrase list.

Questions or Suggestions?

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