

On Instructor intervention in MOOC discussion forums

CS 6101 – Spring, 2016

Muthu Kumar Chandrasekaran

https://www.comp.nus.edu.sg/~kanmy/courses/6101_2016/

Lexical signals for instructor intervention

- Ramesh et al. (2014) [Understanding MOOC Discussion Forums using Seeded LDA](#)
- Ramesh et al. (2015) [Weakly Supervised Models of Aspect-Sentiment for Online Course Discussion Forums](#)
- Chaturvedi et al. (2014) [Predicting Instructor's Intervention in MOOC forums](#)
- Chandrasekaran et al. (2015) [Learning instructor intervention from MOOC forums: Early Results and Issues](#)

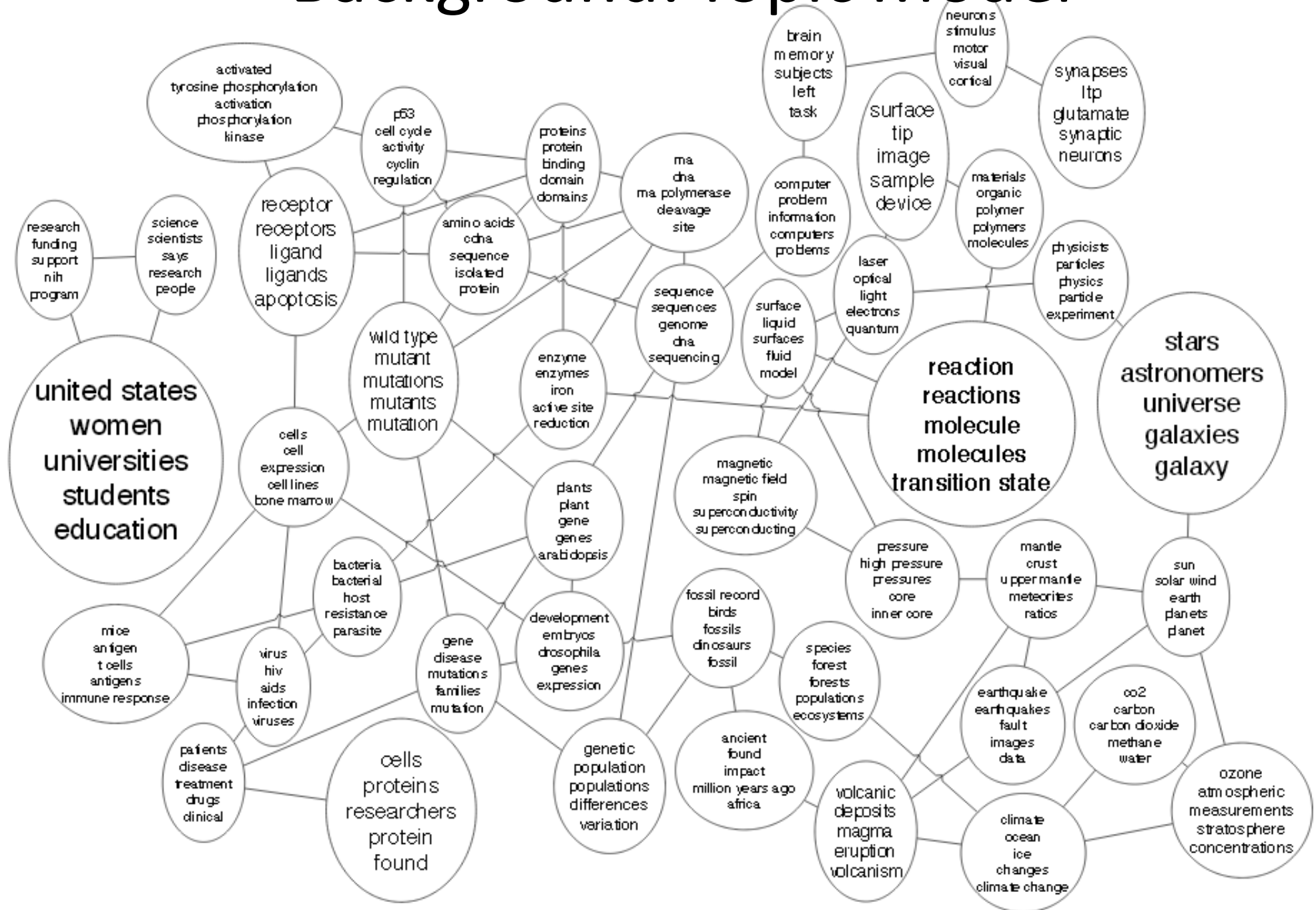
Ramesh et al.: Key questions

- Do 'topics' signal threads for instructor intervention?
- Do instructors prefer intervention on some 'aspects' of a MOOC discussion?

Background: What are topics?

- Topic Models cluster document corpus into soft clusters
- This clustering creating a representative set of words called topics for each cluster

Background: Topic Model



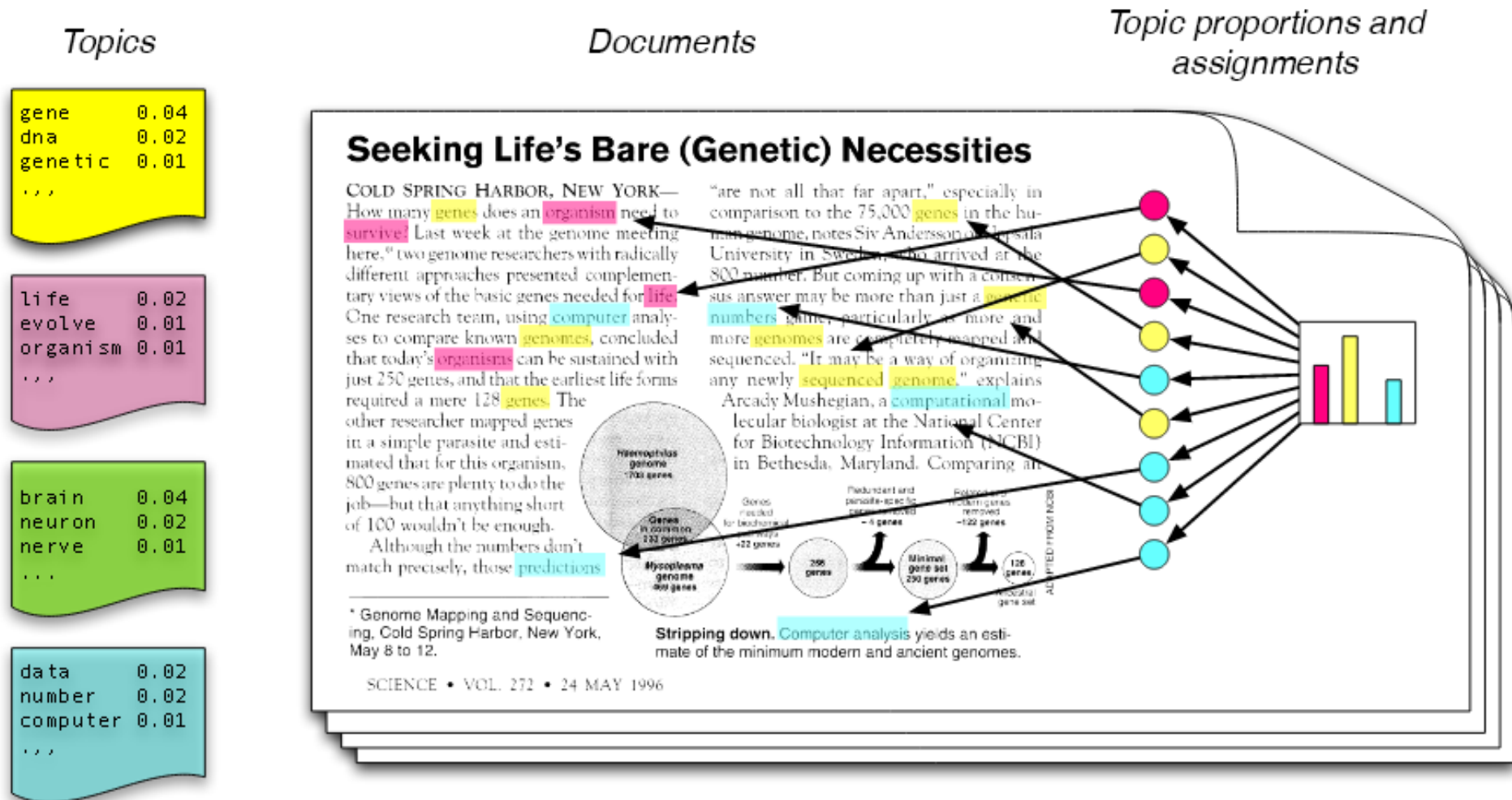
Background: What are topics?

human	evolution	disease	computer
genome	evolutionary	host	models
dna	species	bacteria	information
genetic	organisms	diseases	data
genes	life	resistance	computers
sequence	origin	bacterial	system
gene	biology	new	network
molecular	groups	strains	systems
sequencing	phylogenetic	control	model
map	living	infectious	parallel
information	diversity	malaria	methods
genetics	group	parasite	networks
mapping	new	parasites	software
project	two	united	new
sequences	common	tuberculosis	simulations

Background: LDA Topic Model

Latent Dirichlet Allocation – has emerged as a standard method to model topics over the past decade

Background: LDA Topic Model



Background: What is an aspect?

Consider an *iphone* review such as the foll.

“So glad I got this **phone**, with all the **GPS apps** and **games**, I will never be lost or bored again. I like the great **touch controls**”

Ramesh et al (2015)

Contributions:

- A weakly supervised model for predicting aspect-sentiment in online course: PSL-Joint
- A model (PSL-joint) that allows specification of aspect—sentiment relations
- Address a weakness of seeded LDA where seed words are disconnected

PSL-joint for instructor interventions

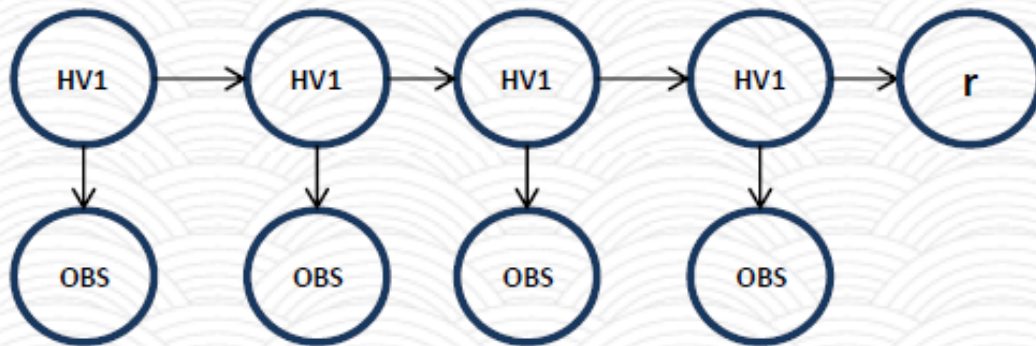
- Of 3275 annotated posts instructor replied to 787 posts
- 699 out of this contain a MOOC aspect
- PSL-joint detects 97.8% with an aspect while predicting the right aspect 46.9% of time
- They propose:
 - using their system, for instructors to **sample from multiple aspect categories**,
 - ensures that all categories of problems receive attention

Chaturvedi et al., 2015

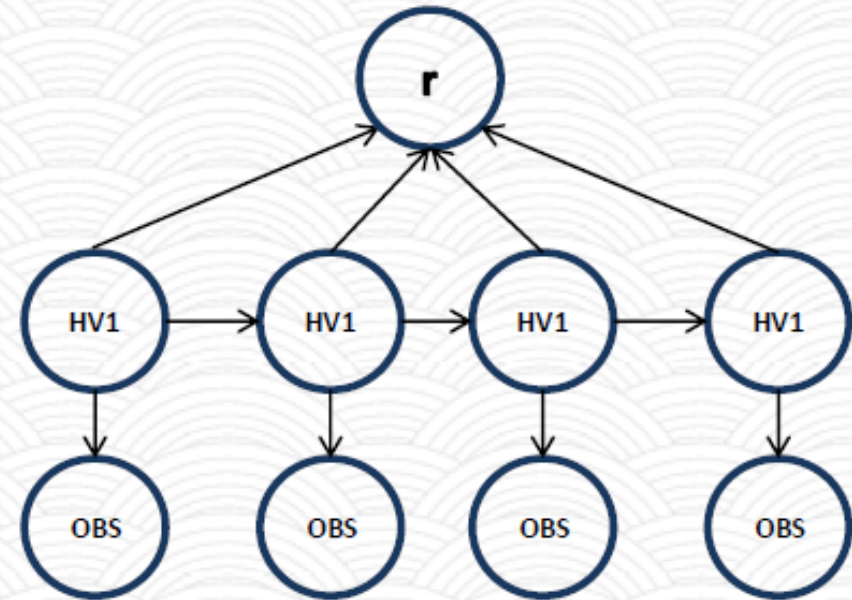
- Introduced problem of “Predicting Instructor’s intervention in MOOC forums”
- Proposed thread discourse structure to signal intervention
- Experiments on two MOOCs
- Low F_1 . Shows problem is difficult.

Chatruvedi et al, 2014 Models

Linear chain Markov model (LCMM)



Global chain model (GCM)



where, \mathbf{r} is intervention
 $\mathbf{HV1}$ is the Post Category
 \mathbf{OBS} is observed post

[Back](#)

Chaturvedi et al, 2014

- Infers 4 post categories that maximizes likelihood of instructor intervention
- Post categories act as hidden variable in their sequence models that predict instructor intervention

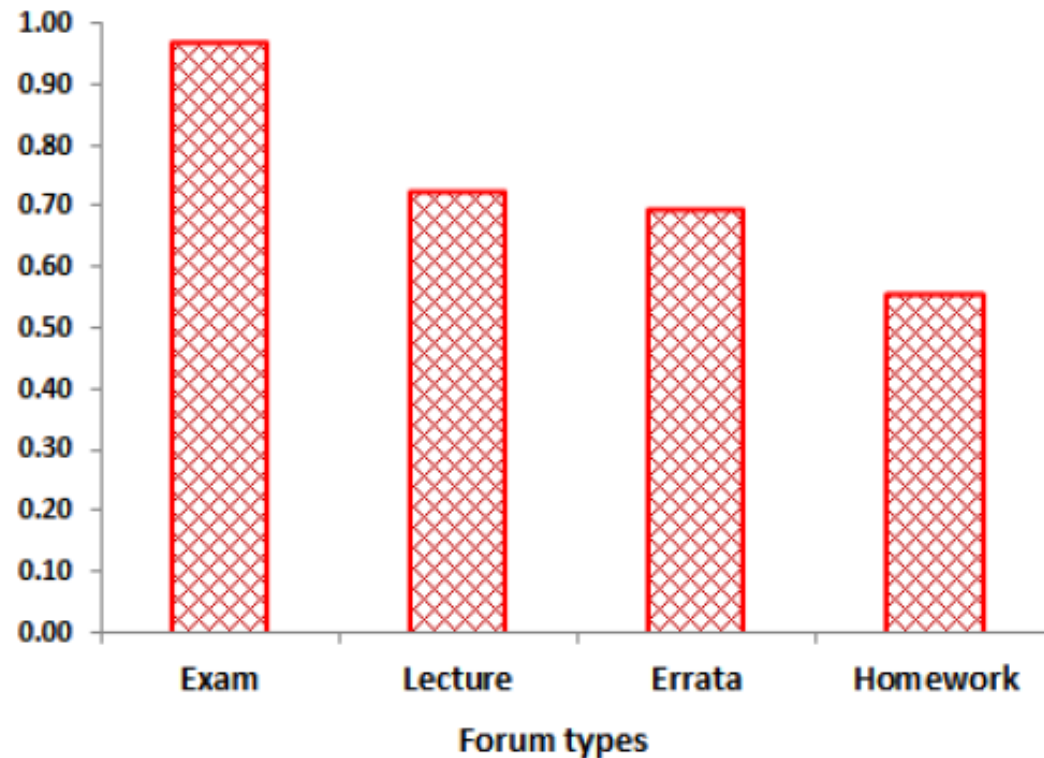
Chandrasekaran et al., 2015

- First study on this problem on a **large corpus** of diverse set of MOOCs from Coursera
- Cannot replicate findings by Chaturvedi et al, 2014 on their scaled up corpus
- Future work: Produce a ranked list of threads ordered by *priority* for intervention by an instructor or TA

<https://speakerdeck.com/cmkuar87/learning-instructor-intervention-from-mooc-forums-early-results-and-issues>

Features that correlate with interventions

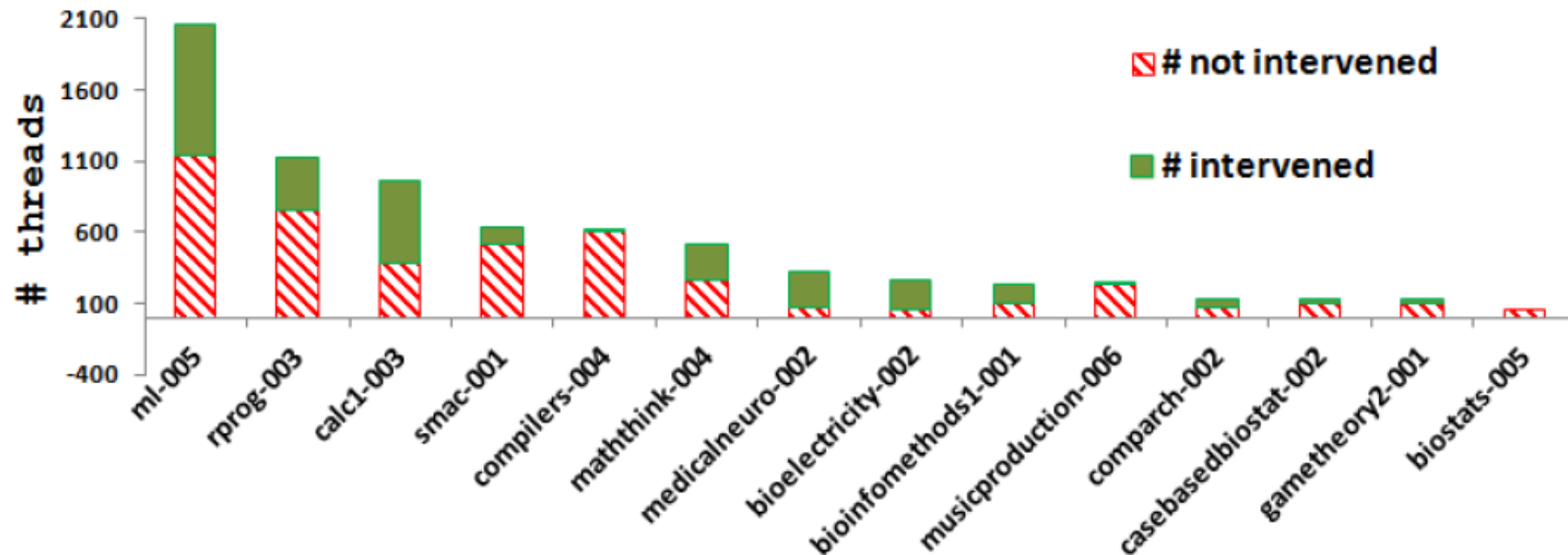
Forum type encodes intervention priority as perceived by the instructor.



Ratio of intervened to non-intervened threads over D14 across 4 forum types

- Discourse cues such as agreements, affirmations, appreciations to original post
- Length of thread
 - # of posts, comments
 - # sentences, words
- Threads with deep discussions indicated by ratio of comments to posts

Variation in # of threads

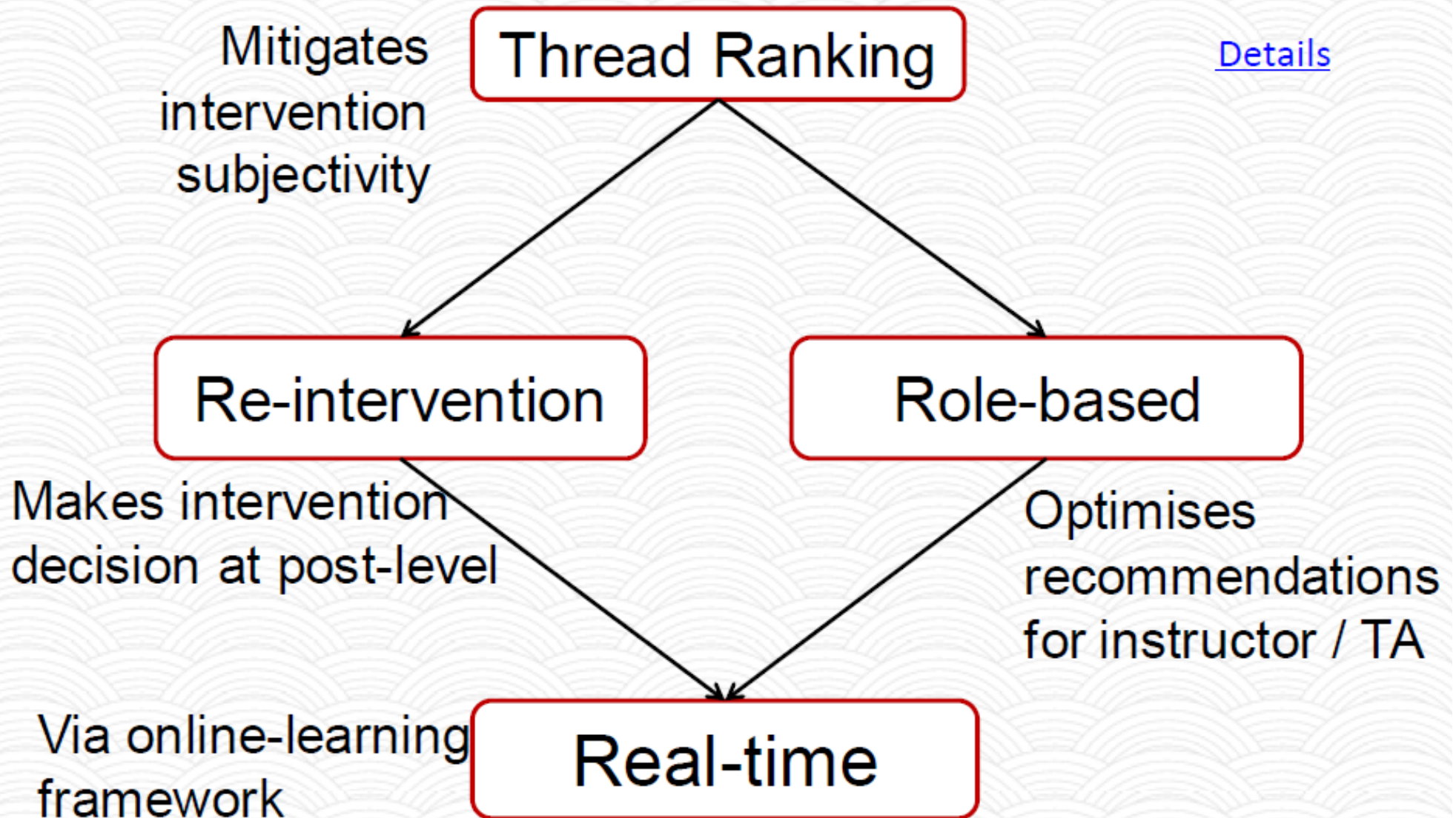


The # of threads and their intervention ratios in forums over 14s courses

Diversity across different courses **in volumes of threads**
as well as **interventions**

<https://speakerdeck.com/cmkuar87/learning-instructor-intervention-from-mooc-forums-early-results-and-issues>

Intervention framework roadmap



Reproducible research in MOOCs

- A pressing issue! Stalling progress on all important MOOC problems.
- A good solution: [MOOC DATA CONSORTIUM](#)
 - Universities running MOOCs can partner, set up a consortium and exchange data.
- A good alternative: [lib4moocdata](#)
 - Universities running MOOCs run code from a shared library and check if everyone gets consistent results.