



Multilingual, Interactive Topic Models

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University of Maryland
UMD

Research Portfolio

Question Answering



Assistive Technology



Machine Translation

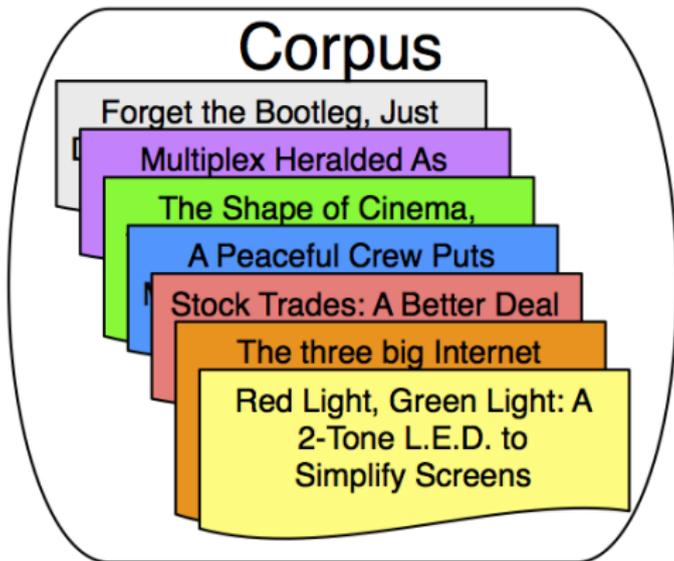


Computational Social Science



Topic Models as a Black Box

From an **input corpus** and number of topics $K \rightarrow$ words to topics



Topic Models as a Black Box

From an input corpus and number of topics $K \rightarrow$ **words to topics**

TOPIC 1

computer,
technology,
system,
service, site,
phone,
internet,
machine

TOPIC 2

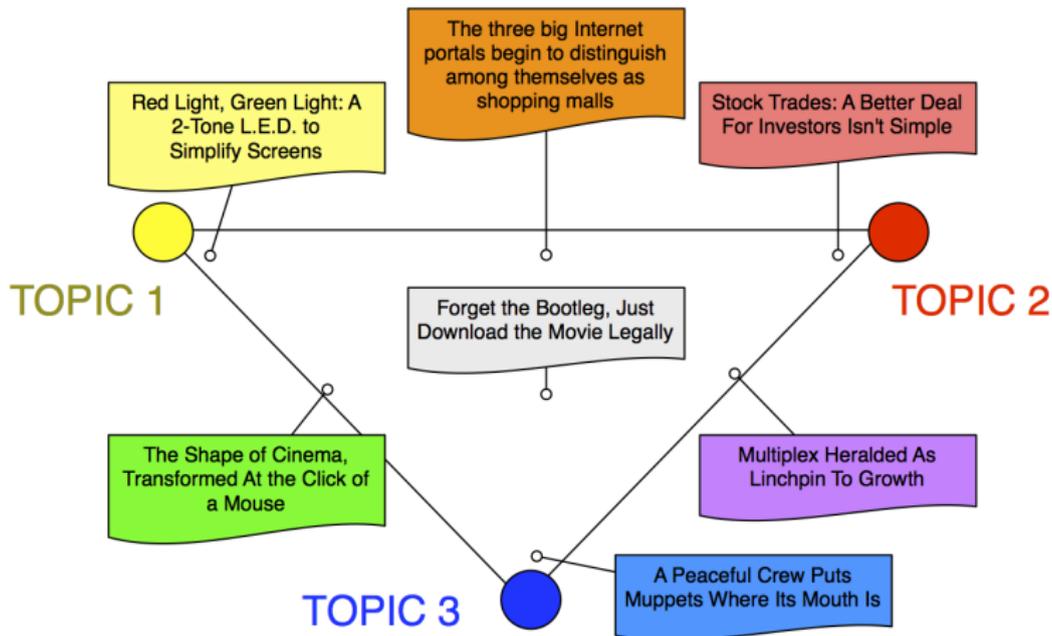
sell, sale,
store, product,
business,
advertising,
market,
consumer

TOPIC 3

play, film,
movie, theater,
production,
star, director,
stage

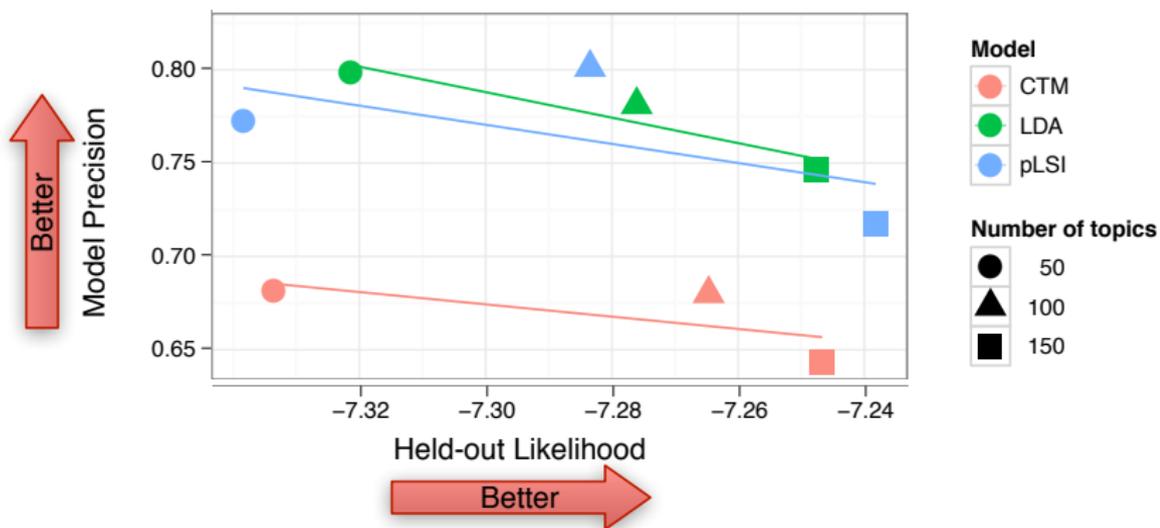
Topic Models as a Black Box

From an input corpus and number of topics $K \rightarrow$ words to topics



Interpretability and Likelihood

Model Precision on New York Times



within a model, higher likelihood \neq higher interpretability

Topic

Before

1

election, yeltsin, russian, political, party, democratic, russia, president, democracy, boris, country, south, years, month, government, vote, since, leader, presidential, military

2

new, york, city, state, mayor, budget, giuliani, council, cuomo, gov, plan, year, rudolph, dinkins, lead, need, governor, legislature, pataki, david

3

nuclear, arms, weapon, defense, treaty, missile, world, unite, yet, soviet, lead, secretary, would, control, korea, intelligence, test, nation, country, testing

4

president, bush, administration, clinton, american, force, reagan, war, unite, lead, economic, iraq, congress, america, iraqi, policy, aid, international, military, see

⋮

20

soviet, lead, gorbachev, union, west, mikhail, reform, change, europe, leaders, poland, communist, know, old, right, human, washington, western, bring, party

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Suggestion

boris, communist, gorbachev, mikhail, russia, russian, soviet, union, yeltsin

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1	election, yeltsin, russian, political, party, democratic, russia, president, democracy, boris, country, south, years, month, government, vote, since, leader, presidential, military	1	election, democratic, south, country, president, party, africa, lead, even, democracy, leader, presidential, week, politics, minister, percent, voter, last, month, years
2	new, york, city, state, mayor, budget, giuliani, council, cuomo, gov, plan, year, rudolph, dinkins, lead, need, governor, legislature, pataki, david	2	new, york, city, state, mayor, budget, council, giuliani, gov, cuomo, year, rudolph, dinkins, legislature, plan, david, governor, pataki, need, cut
3	nuclear, arms, weapon, defense, treaty, missile, world, unite, yet, soviet, lead, secretary, would, control, korea, intelligence, test, nation, country, testing	3	nuclear, arms, weapon, treaty, defense, war, missile, may, come, test, american, world, would, need, lead, get, join, yet, clinton, nation
4	president, bush, administration, clinton, american, force, reagan, war, unite, lead, economic, iraq, congress, america, iraqi, policy, aid, international, military, see	4	president, administration, bush, clinton, war, unite, force, reagan, american, america, make, nation, military, iraq, iraqi, troops, international, country, yesterday, plan
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- evacuation
- safety
- shelter

flood coast marine
 restoration coastal vessel
 fish gulf wildlife species
 pollution council great
 fishery fishing waters
 ecosystem monitoring
 fisheries mitigation

remain
 expended heading
 disaster september
 appropriation transferred
 obligation division unit
 capital acquisition
 inspector purchase funded
 procurement units corps
 repair salaries

Covered Themes Progress:

To provide for payments to certain natural resource trustees to assist in re...

A bill to authorize the Secretary of the Army to carry out activities to man...

A bill to prevent forfeited fishing vessels from being transferred to private ...

To reauthorize various Acts relating to Atlantic Ocean marine fisheries.

To amend the Magnuson-Stevens Fishery Conservation and Managemen...

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A bill to require the Secretary of the Army to study the feasibility of the ty...

Making appropriations for disaster relief requirements for the fiscal year e...

To rescind any unobligated discretionary appropriations returned to the F...

To amend the Robert T. Stafford Disaster Relief and Emergency Assistanc...

Making appropriations for energy and water development and related aga...

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- safety
- shelter

flood coast marine
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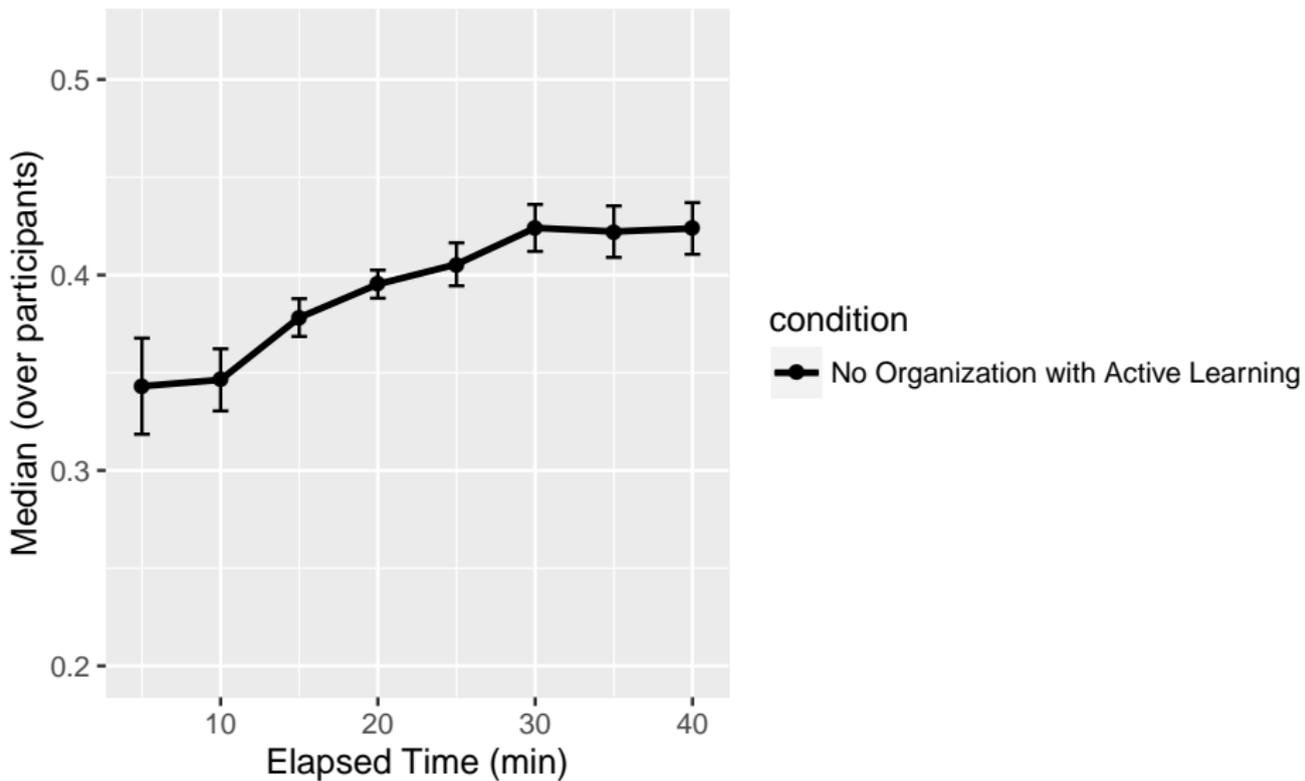
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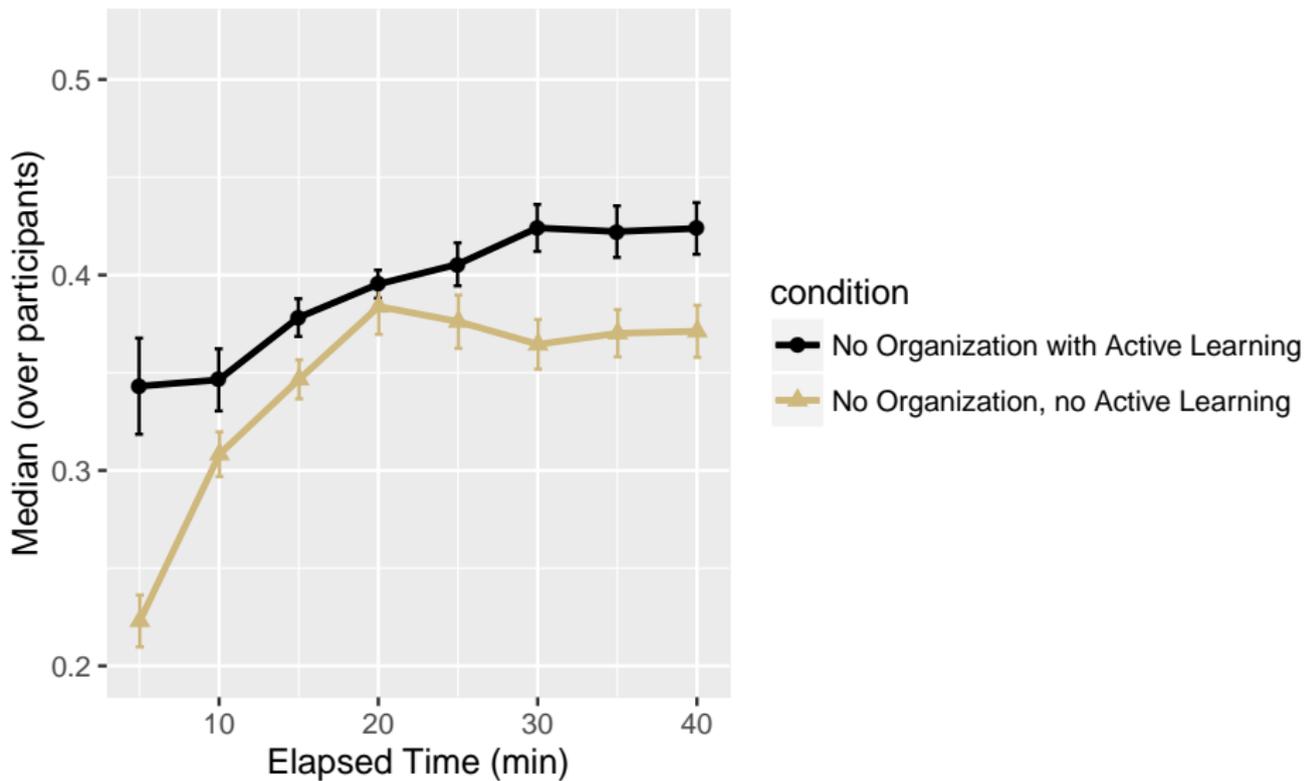
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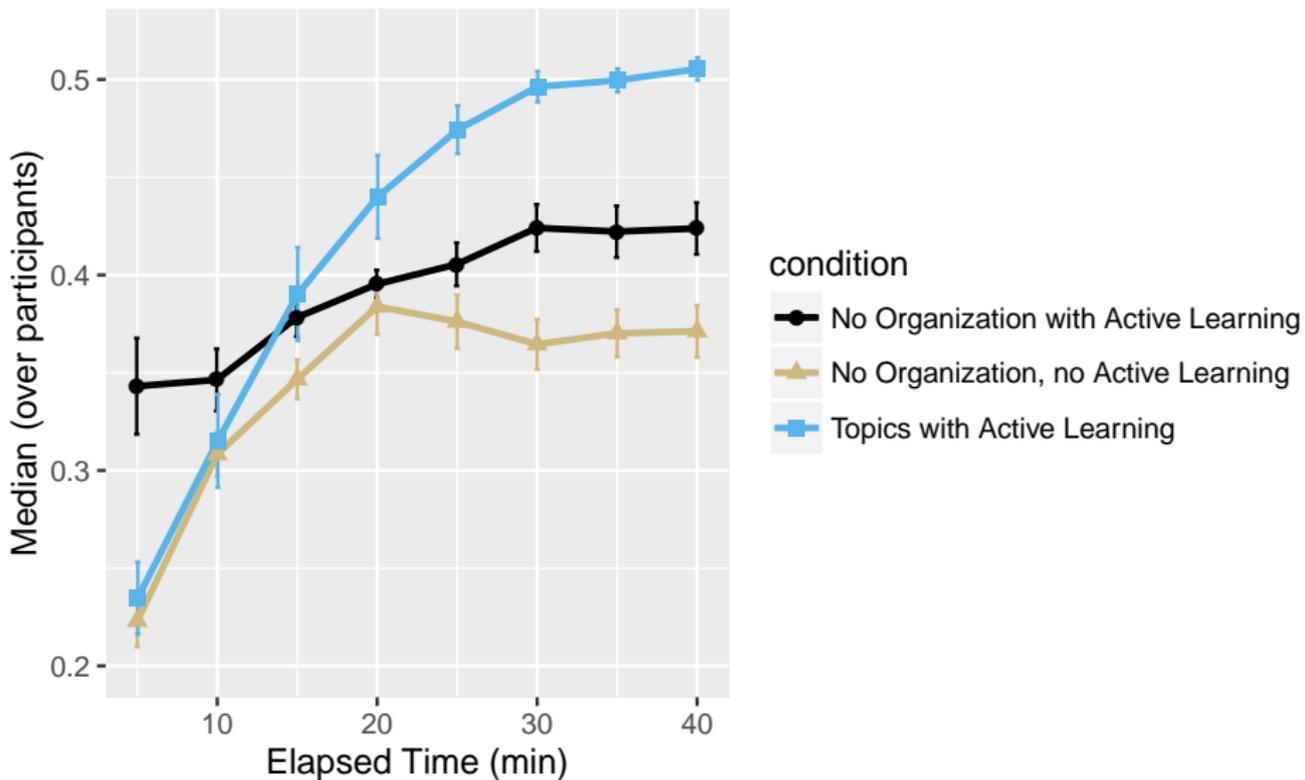
Direct users to document



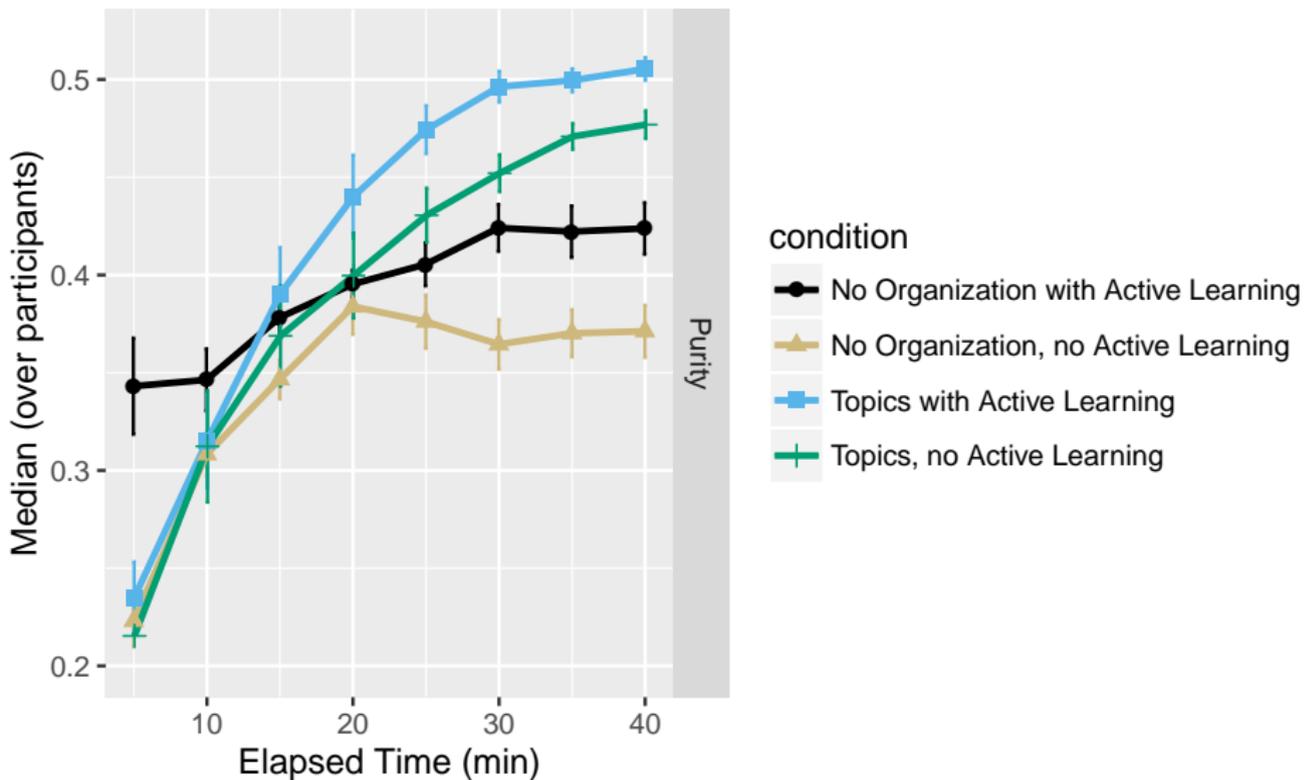
Active learning if time is short



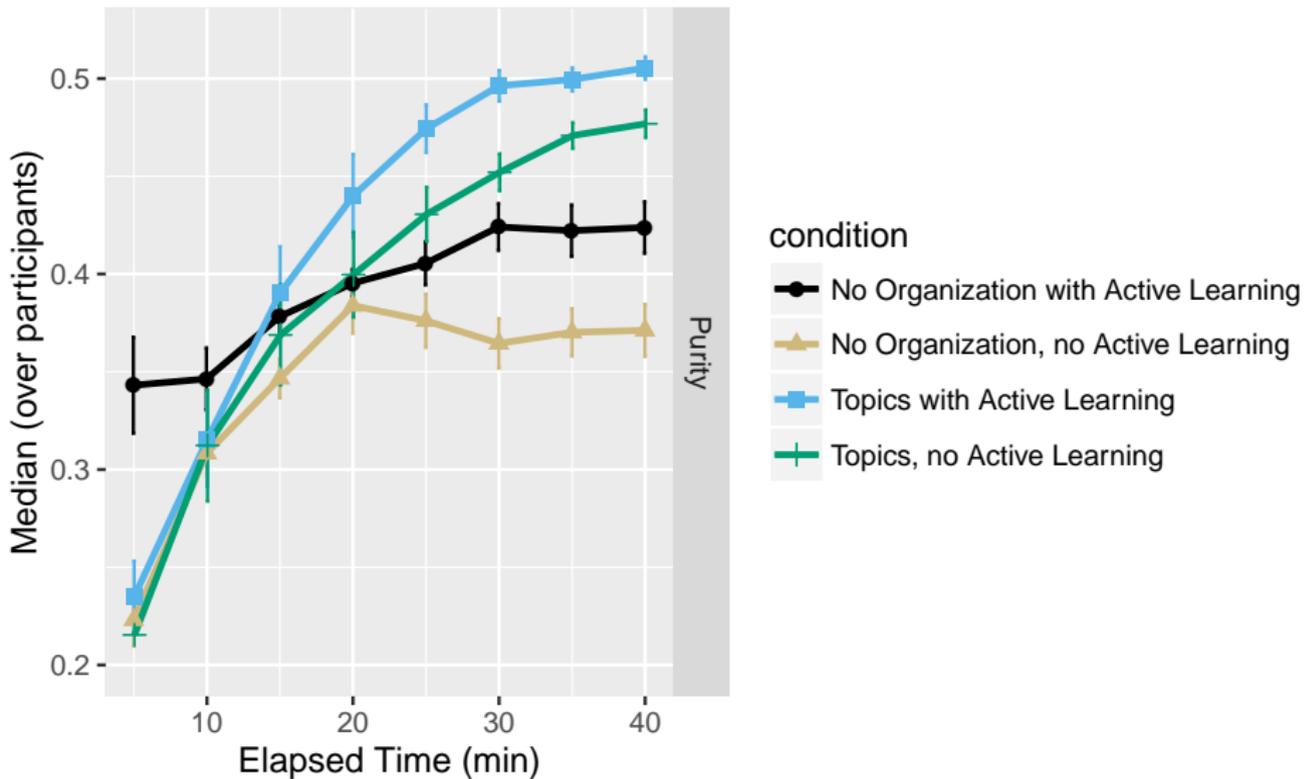
Better than status quo



Active learning can help topic models



Topic models help users understand the collection



Moral: machines and humans together (if you let them)

Goal: Consistent Representations Across Languages

- Learn multilingual topics that can serve as bridges between languages

