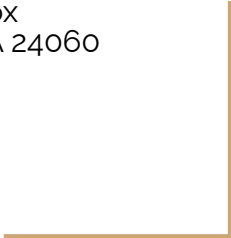# Summarization Evaluation

By Parth Desai, Anish Dhondi, Harshil Goel, Varun Choudhary
CS 4624: Multimedia, Hypertext, and Information Access
Professor Edward A. Fox
Virginia Tech, Blacksburg, VA 24060
April 13th, 2023

Outline

| Project Overview | Team Members | Project Deliverables | Ground Truth Data Set | Website Walkthrough | Challenges | Future Facing |

Team Member Responsibilities

Harshil Goel
Team Lead
Backend Development

Parth Desai
Frontend Development

Varun Choudhary
Research & Development

Anish Dhondi
Frontend Development

Project Overview

Problem

★ Need a way to evaluate AI-generated summaries on ETDs

　○ AI must understand complex human preferences

Solution

★ Users rank summaries

　○ Assessment factors: accuracy, coherence, contextually relevant

　○ Feedback for AI generating summaries

Project Deliverables

The four primary deliverables for this project:

1. **Web User Interface**

   a. Easy to use UI

2. **Populate Data Set**
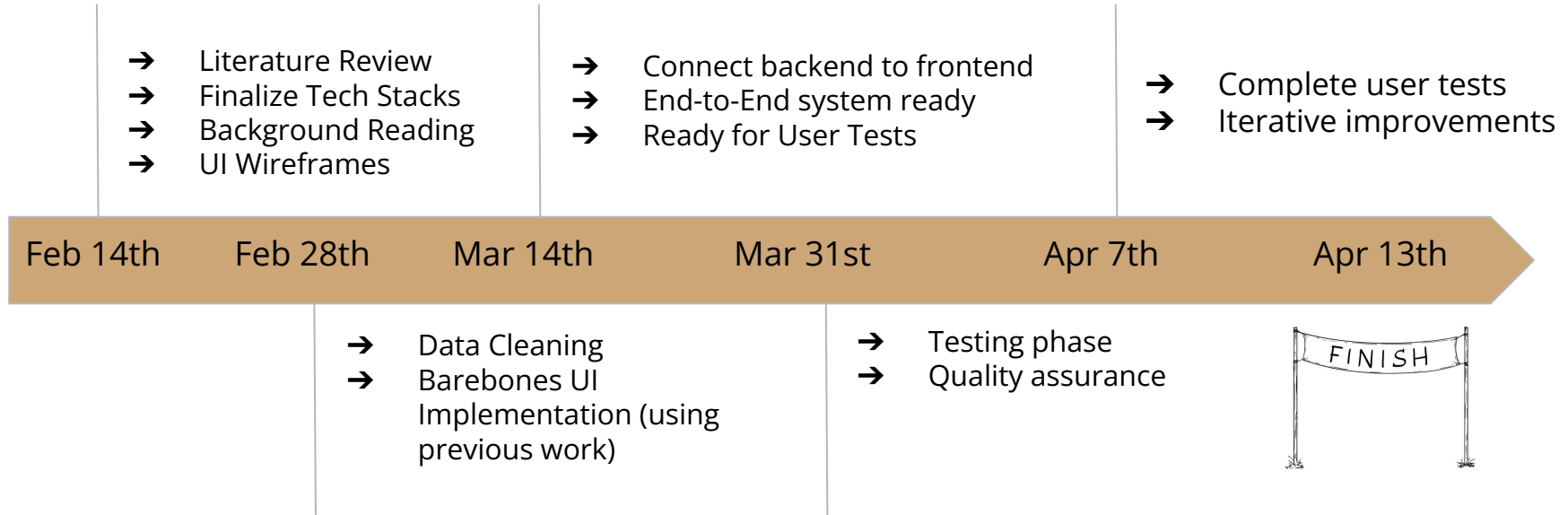
   a. Results from user interaction with webpage

3. **Ranking Summaries**

   a. Method to rank summaries based on fluency, usefulness, efficiency

4. **Feedback Stored**

   a. System to store feedback on ranking method or UI/UX

Milestones

Feb 14th	Feb 28th	Mar 14th	Mar 31st	Apr 7th	Apr 13th

Feb 14th – Feb 28th:
➔ Literature Review
➔ Finalize Tech Stacks
➔ Background Reading
➔ UI Wireframes

Mar 14th – Mar 31st:
➔ Connect backend to frontend
➔ End-to-End system ready
➔ Ready for User Tests

Apr 7th – Apr 13th:
➔ Complete user tests
➔ Iterative improvements

Mar 14th (below):
➔ Data Cleaning
➔ Barebones UI Implementation (using previous work)

Apr 7th (below):
➔ Testing phase
➔ Quality assurance

FINISH

Website Walkthrough

Website Walkthrough

Website Walkthrough

ETD

41890

Chapter 5

ETD METADATA **CHAPTER TEXT** SUMMARY 1 SUMMARY 2 RATE

Chapter Text

CHAPTER 5 CONCLUSION 5.1 Summary of the Dissertation In this dissertation, I explore the role of financial slack in municipal finance. The subject of study is of significant importance and policy relevance because municipal governments are the layer of governments that are closest to citizens. In the past decade, American cities have experienced an economic peak in 2007, an economic recession between late 2007 and 2009, and economic recovery from 2010. During this turbulent economic time, how cities managed their finances directly shape the outcomes of public goods and service provision that matters to people's daily life. In the management literature, organization theorists posit that financial slack increases an organization's capacity in absorbing internal and external shocks. It offers managers more discretion to respond to uncertainty. In the turbulent economic time when government officials face more uncertainty in managing their cities' revenues and expenditures, what roles does financial slack play in municipal financial management? Prior studies on how financial slack affects government management primarily focus on financial slack's expenditure stabilization role in state governments. Findings from these studies have reached a relatively consistent conclusion that financial slack has a counter-cyclical stabilization effect on state expenditures. Studies on financial slack's role in local governments are much scarce. The majority of these studies also focus on financial slack's expenditure stabilization role, but findings from these studies are mixed. Some find that financial slack stabilizes local expenditures (Marlowe 2005; Wang 2015), others do not find such effect (Hendrick 2006; Wang and Hou 2012). Almost all these studies at the local level use samples of cities (or counties) in one state or a particular metropolitan area. Results from these studies have relatively low external validity. This dissertation addresses the limitations in the current research on financial slack in municipal finance. The revenue chapter investigates whether tax revenue volatility contributes to municipal financial slack accumulation. Based on a nationwide sample of cities, I use a dynamic panel analysis approach to conduct the empirical analysis. I find that tax revenue volatility as a risk factor increases a city's financial slack level. In addition to this, other risk factors in a city's fiscal system such as non-discretionary expenditure

Website Walkthrough

ETD

41890 ▼

Chapter 5 ▼

ETD METADATA   CHAPTER TEXT   **SUMMARY 1**   SUMMARY 2   RATE

Chapter 5

In this dissertation, I explore the role of financial slack in municipal finance. The subject of study is of significant importance and policy relevance because municipal governments are the layer of governments that are closest to citizens. In the past decade, American cities have experienced an economic peak in 2007, an economic recession between late 2007 and 2009, and economic recovery from 2010. During this turbulent economic time, how cities managed their finances directly shape the outcomes of public goods and service provision that matters to people's daily life. In the management literature, organization theorists posit that financial slack increases an organization's capacity in absorbing internal and external shocks. It offers managers more discretion to respond to uncertainty. In the turbulent economic time when government officials face more uncertainty in managing their cities' revenues and expenditures, what roles does financial slack play in municipal financial management? Prior studies on how financial slack affects government management primarily focus on financial slack's expenditure stabilization role in state governments. Findings from these studies have reached a relatively consistent conclusion that financial slack has a counter-cyclical stabilization effect on state expenditures. Studies on financial slack's role in local governments are much scarce. The majority of these studies also focus on financial slack's expenditure stabilization role, but findings from these studies are mixed. Some find that financial slack stabilizes local expenditures (Marlowe 2005; Wang 2015), others do not find such effect (Hendrick 2006; Wang and Hou 2012). Almost all these 129 studies at the local level use samples of cities (or counties) in one state or a particular metropolitan area. Results from these studies have relatively low external validity. This dissertation addresses the limitations in the current research on financial slack in municipal finance. The revenue chapter investigates whether tax revenue volatility contributes to municipal financial slack accumulation. Based on a nationwide sample of cities, I use a dynamic panel analysis approach to conduct the empirical analysis. I find that tax revenue volatility as a risk factor increases a city's financial slack level. In addition to this, other risk factors in a city's fiscal system such as non-discretionary expenditure categories also contribute to municipal financial slack accumulation. These

Website Walkthrough

ETD

41890

Chapter 5

ETD METADATA   CHAPTER TEXT   SUMMARY 1   **SUMMARY 2**   RATE

Chapter 5

In the past decade, American cities have experienced an economic peak in 2007, an economic recession between late 2007 and 2009, and economic recovery from 2010. How cities managed their finances directly shape the outcomes of public goods and service provision.Financial slack has counter-cyclical stabilization effect on state expenditures. Studies on financial slack's role in local governments are much scarce. Results from these studies have relatively low external validity.The revenue chapter investigates whether tax revenue volatility contributes to municipal financial slack accumulation. Based on a nationwide sample of cities, I use a dynamic panel analysis approach to conduct the empirical analysis. I find that tax revenuevolatility as a risk factor increases a city's financial slack level.The expenditure chapter examines whether financial slack stabilizes municipal expenditures. Results suggest that financial slack absorbs additional revenues when there is a revenue surplus. Changes in financial slack always counteract changes in municipal expenditures, thus financial slack smooths expenditure fluctuations.This chapter explores whether financial slack reduces municipal short-term borrowing. Based on a sample of California cities, I use a Heckman selection model to examine municipal governments' preference over internal financial resources. Results show that financial slack reduce both the probability municipal governors issue notes and the amount of notes issuance.This dissertation is a comprehensive examination of municipal financial slack. It covers three primary subfields in municipal finance: revenues, expenditures, and securities. The next section discusses the innovations and contributions of this dissertation.This dissertation explores both the determinants of municipal financial slack and the impacts of financial slack on municipal financial performance and decision-making. I obtain information from a variety of sources, including the accounting information from CAFRs, the revenue, expenditure, and debt information from the Census Bureau, and the social economic information from various government agencies. I combine the information of various sources and create a nationwide sample of cities.In each chapter, I carefully choose an appropriate research design and analytical strategy based on the research question and the features of data structures. The choice of appropriate analytical strategies together

Website Walkthrough

41890

Chapter 5

ETD METADATA   CHAPTER TEXT   SUMMARY 1   SUMMARY 2   **RATE**

Rate

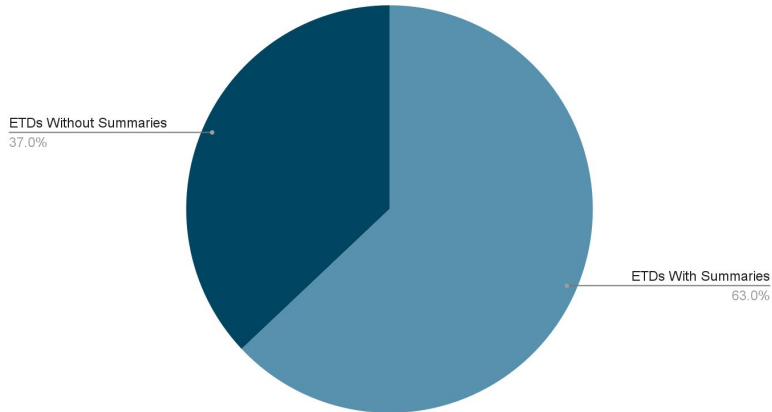| SUMMARY	RANK	FLUENCY	CONTENT COVERAGE	CONSISTENCY	OVERALL RATING	USER COMMENTS
Summary 1	Select Rank ⌄	Select Rate ⌄	Select Rate ⌄	Select Rate ⌄	Select Rate ⌄	
Summary 2	Select Rate ⌄	Select Rate ⌄	Select Rate ⌄	Select Rate ⌄	Select Rate ⌄	

Save

✓ Select Rank
1
2

Form supports data validation so that:
- users do not provide the same rank for two summaries
- each field (except for user comments) is filled out

Rank Summaries

Rate other values on a scale of 1-5
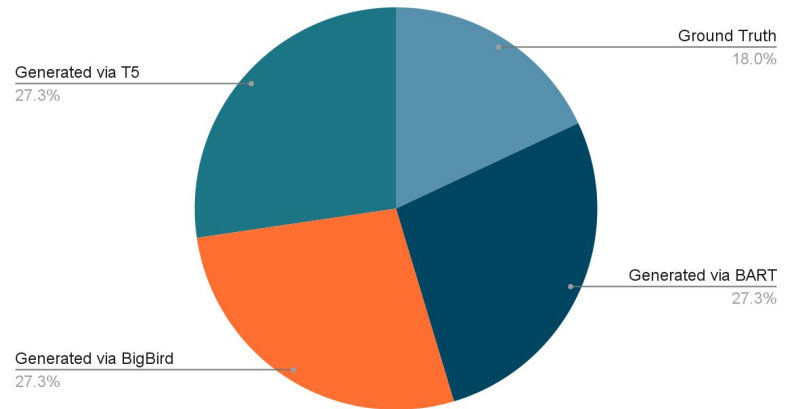
Optional User comments field

Ground Truth Data Set

- Had a dataset of 27 ETDs of which 17 had at least one chapter with a summary
- 64 Ground Truth summaries (Chapters with written summaries)
- 355 total summaries when including generated summaries

ETD Data

ETDs Without Summaries
37.0%

ETDs With Summaries
63.0%

Summary Data

Ground Truth
18.0%

Generated via T5
27.3%

Generated via BART
27.3%

Generated via BigBird
27.3%

Challenges

- Front End Handover
  - Front end template came with numerous uninstalled dependencies
    - Took time to configure developer environment
- Backend Data Extraction (Biggest Setback)
  - Attempted to automate, but inconsistent structure led to having to scrap the idea
  - Text decoding errors
    - Decoding errors are still present in some summaries
    - Unreadable for the user
- Insufficient ETD Summary Data
  - Some ETD chapters and even entire ETDs come without a ground truth
    - Cannot compare generated to ground truth

Future Work

- User Tests & Iterative Improvements
    - The team will complete users tests on
        - 10 subject matter experts in Bipasha's Lab (the intended audience)
        - Classmates in this Capstone Class for feedback on ux

Acknowledgements & Resources

★ Thanks to Bipasha, our client, for the guidance through challenges

★ Other very helpful resources throughout design and development

- ○ Youtube for learning basics

- ○ GeeksforGeeks walk throughs

- ○ ChaptGPT for early development, finding missing dependencies