University of Regina
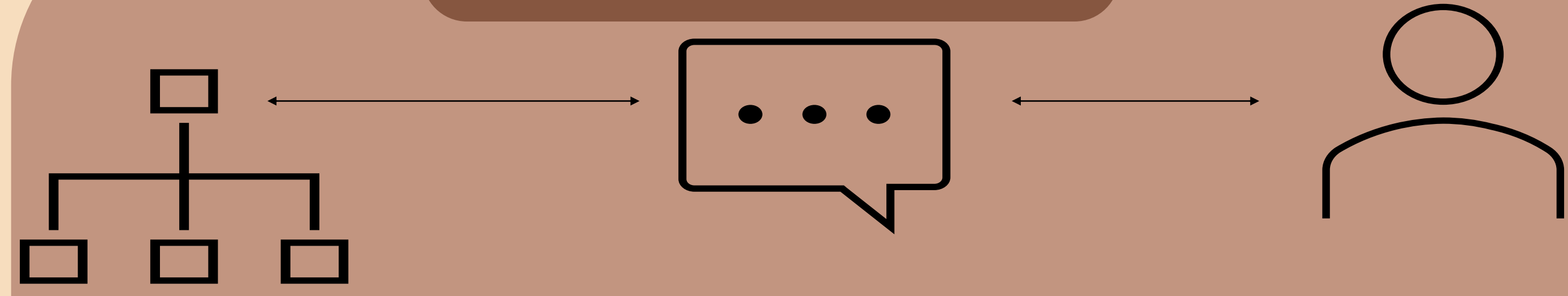
"Manipulating Task Determinability For Evaluating Alternative Arrangements Of User Interfaces"

Introduction

1) An end user communicates with IR system by typing query in the search box
2) IR interface fetches documents and communicates relevance of a document to the user

Problem Statement

- This representation of "relevance" of documents imposes a challenge for the IR system interface design to assist the user in completing a search task especially if user is unknown about set of documents required and the user must traverse multiple pages to seek the relevant information.
- The main purpose of this research is to evaluate how much an experimental interface can assist users in completing complex tasks compared to baseline interface .

Research Questions & Hypothesis

RQ1: What is the effect of task determinability on user interaction with experimental interface compared to baseline interface?

Independent Variable: Task Determinability: Defined based on degree of uncertainty associated with outcomes of task and the search process involved in completing the tasks. Measurement in two levels, Specified Task and Unspecified Task

Dependent Variable :User Interaction: Defined as activities and processes that subject undergoes in order to complete the search tasks. Factors of measurement include like number of queries, time required to task completion, number of documents saved etc.

Hypothesis: If task is specified null hypothesis and if task is unspecified alternative hypothesis was assumed to be true

RQ2: What is the effect of task determinability on user engagement with experimental interface compared to baseline interface?

Independent Variable: Task Determinability

Dependent Variable : User engagement. O'Brien's User engagement scale (SF) was used for measurement. A slight modification of adding Search Effectiveness instead of Endurability was done.

Hypothesis: If task is specified null hypothesis and if task is unspecified alternative hypothesis was assumed to be true

Design Methods

- Experimental Interface (Klink) is derived from Baseline (IEEE) Interface
- 2 X 2 Factorial Design
- Task Determinability (within-subject) design
- Interface (within-subject) design
- Graeco Latin Square is used for counterbalancing the effect.

Participant Tasks

- Tutorials
- Pre-task Questionnaire includes User search Experience questionnaire
- Post-task Questionnaire includes O'Brien's User engagement Scale

Data Analysis

- There are significant differences observed in user engagement levels on both the interfaces independent of search tasks
- But, search task levels have significant effects on some of factors of user interaction like query, time etc.

Statistical Methods

- Shapiro-Wilk test for Normality
- Wilcoxon signed rank test for within subject study design) if data is not normal
- Repeated Measures Anova for within subject study design) if distribution of data is normal
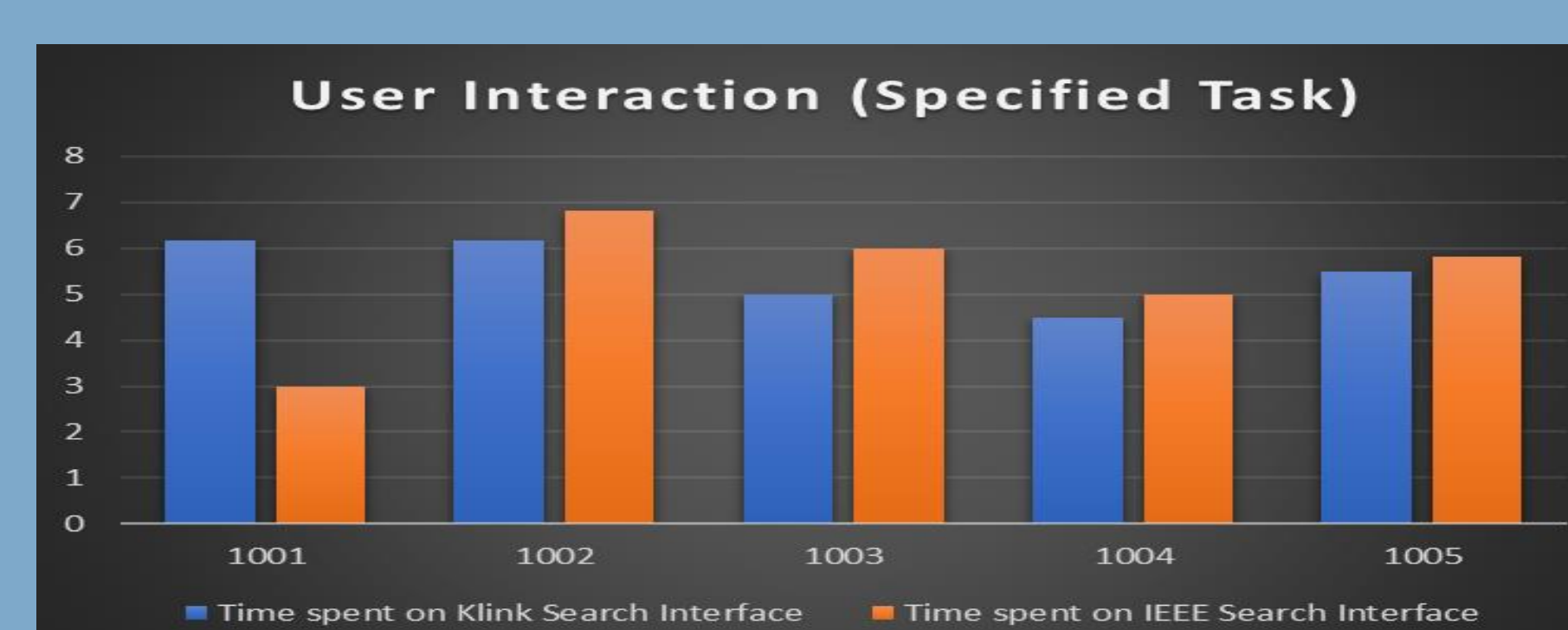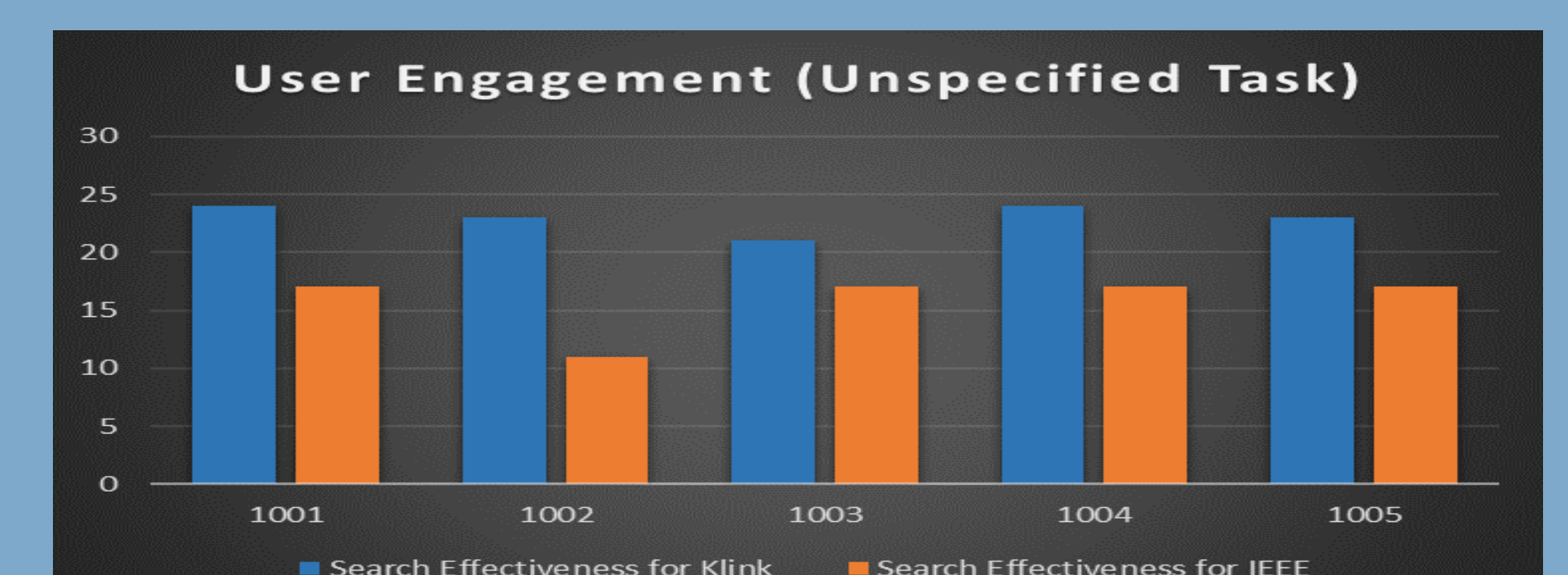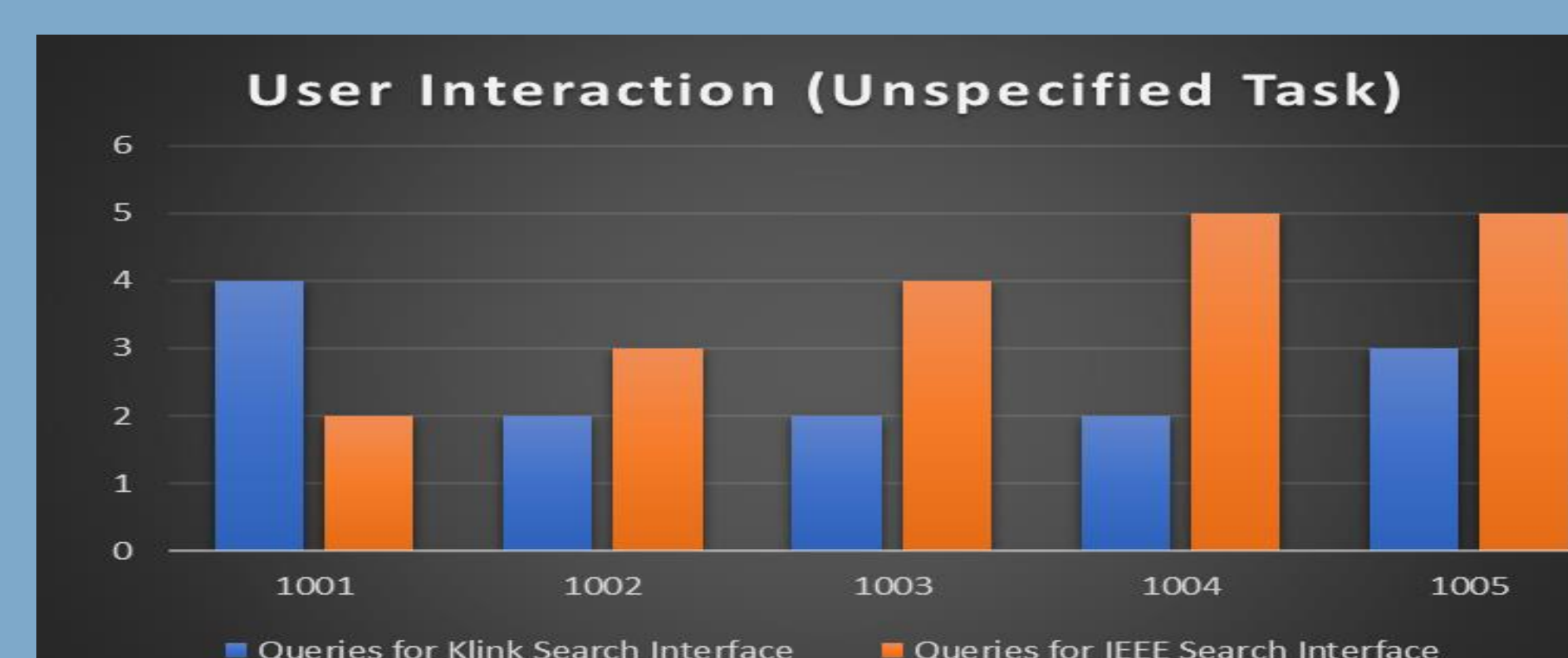
Conclusion

- The main purpose of this study was to manipulate task determinability to evaluate alternative arrangements of user interface, hence we can evaluate how much an interface arrangement can assist users to perform differing levels of search task activities.
- Experimental results shows that user engagement levels for klink search interface are better than IEEE search interfaces independent of search task activity.
- Given a search task activities, number of queries required to complete search task at IEEE search interface is higher than Klink Search interface. None of other differences were observed in user interacting with experimental interface compared to baseline interface
- Our experimental results also have implications for considering user interface designs to communicate "relevancy" of system suggested documents to the user.

Research by: Jay Joshi (Student, Dept of Computer Science)
Supervised by: Orland Hoeber (Associate Head, Dept of Computer Science)