Assessment of Question Quality using Bloom's Revised Taxonomy

Progress Report (21/1/17)

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Current Status

1. Keyword Extraction - **DONE**
2. Literature Survey *for the paper* - **DONE**
3. APIs for question scraping explored
    - Currently, can only consider Stack Overflow APIs + manually scraping search engine results
4. ***Tentative design*** for question collection
    - Can apply the big data paradigm to this problem

Keyword Extraction

Using the nltk to get the most informative

- Unigrams
- Bigrams
- Trigrams

- Demo

Question Scraper (1)

1. Use keyword extractor module to get keywords in separate text files of bounded size

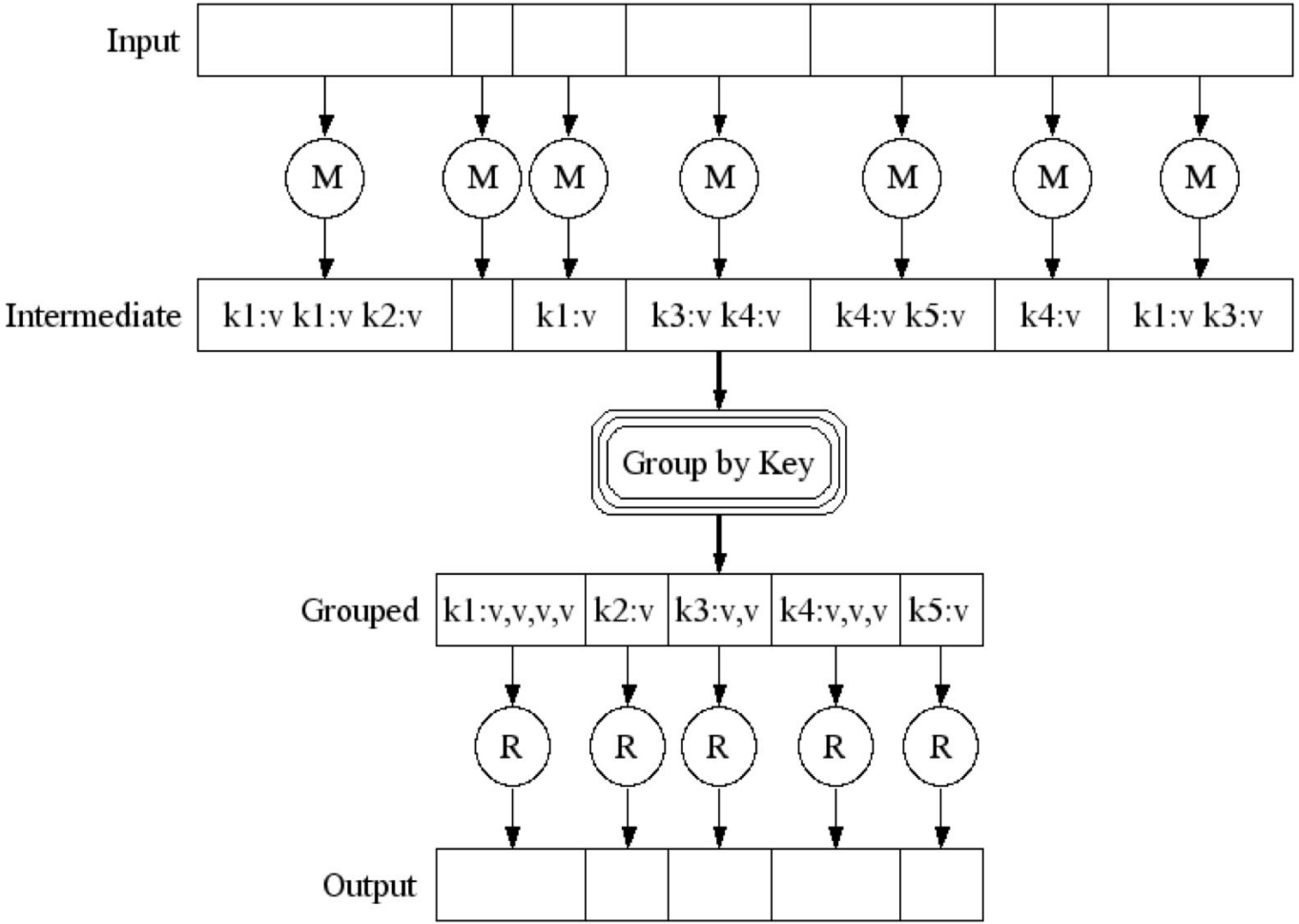
2. Load keywords from the keyword extraction module into hdfs

3. Use mapreduce
   - Mapper - get QID from keyword using SO API
   - Reducer - filters out only unique QIDs; SO API call for question given ID

   Can use either pyspark or Hadoop for this
   (subject to performance constraints)

Question Scraper (2):

How Mapreduce Works



Literature Survey (1) - References

[1] **Exam Questions Classification Based on Bloom's Taxonomy Cognitive Level using Classifiers Combination**
Dhuha Abdulhadi Abdul Jabbar, Nazlia Omar

[2] **Automatic Classification of Questions into Bloom's Cognitive Levels using Support Vector Machines**
Anwar Ali Yahya, Addin Osman

[3] **Automatic Classification of Answers to Discussion Forums According to the Cognitive Domain of Bloom's Taxonomy using Text Mining and a Bayesian Classifier**
Jhonny Pincay, Xavier Ochoa

[4] **Classifications of Exam Questions using Linguistically-Motivated Features: A Case Study Based on Bloom's Taxonomy**
Addin Osman, Anwar Ali Yahya

and other papers...

Literature Survey (1) - Exploring Past Work

All work that we found involved assessment on the cognitive dimension ONLY (R, U, App, An, Eval, Cr).

- *Jabbar and Omar* [Paper 1] have explored different concepts such as SVM, NBC, and K-nearest neighbours with good results - 80-90% accuracy.
- *Yahya and Osman* [Paper 2] have used SVM with good results - 80-90% accuracy.
- *Pincay and Ochoa* [Paper 3] have used NBC, but have not achieved a very high degree of precision.
- *Osman and Yahya* [Paper 4] have used SVM, NBC, Logistic Regression and Decision Trees.

Next Steps

- Implementation with pyspark or Hadoop - get a huge question bank
  - This is a continuous process, will need to be done over a period of few days, because of API limitations
- Literature survey to figure out the best classifier to use
  - Possibilities are NBC, Maxent, RNN, K-nearest neighbours, etc