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**PROJECT 3-REPORT**

**Notes:**

**Assumptions**

-For project 3 “extract the raw text of each article from the corpus” is extracting all the text in between <TEXT></TEXT> including the text in between sub-tags in <TEXT>

-‘a query consisting of several keywords for BM25’ is assumed as a Boolean AND query

-if you want to run the code for the project uncomment everything in between comments #for project and #\for project. Else if you want to run code for the demo uncomment everything in between comments #for demo and #\for demo. This is because the naïve and spimi indexers are created differently for the demo and project

-it takes about 11 minutes for the whole code to run

**Subproject I: Upgrade your Project 2 Subproject 1 system**

**-** use variable ‘reutersfolderpath’ to set path to reuters folder containing sgm files

-Using beautiful soup, I extracted the ‘text’ defined in my assumptions in each article

- the python list ‘bigger\_tokens\_articleid’ in my code is the same as ‘F’ in the project 2 pdf

- create a list of (term,tokenid) pairs. Then used pandas to group by term and create postings list for each term. This approach was much faster compared to using regular lists

-finally naive indexer is called ‘initial\_indexer’ and index created using the SPIMI method is called ‘spimi\_indexer as separate dictionaries created from the pandas dataframe

- output for part A with time taken in milliseconds:

FOR PROJECT

The time taken for naive indexer is 431.8373203277588

The time taken for spimi indexer is 42.18268394470215

FOR DEMO.SGM FILE

The time taken for naive indexer is 12.963056564331055

The time taken for spimi indexer is 0.9973049163818359

**Subproject II: Convert your indexer into a probabilistic search engine**

-main function to run search engine is ‘search\_engine’ with parameters ranked( if true rank documents using BM25 formula), query\_type(for OR, AND, “ “ for single and multiple terms), and query(the string to be queried)

-split ‘query’ by “ “. For each term find postings list and based on the query type and ‘ranked’ Boolean value output results

**Test queries:**

a single keyword query, to compare with Project 2

FOR PROJECT

single keyword query with naive indexer from project 2

[28, 219, 234, 1416, 1786, 1857, 1895, 1900, 1908, 1999, 2011, 2132, 2140, 2156, 2493, 2507, 3113, 3289, 3551, 3978, 4287, 4396, 4854, 4891, 5160, 5288, 5774, 6079, 7467, 7806, 8413, 9011, 9347, 9688, 9774, 9848, 9944, 10905, 11082, 11456, 11749, 11955, 12326, 12497, 12773, 12961, 12970, 13257, 13260, 13548, 13671, 14419, 14976, 15154, 15369, 15661, 15666, 15799, 16048, 17023, 17350, 17915, 18271, 18328, 18357, 18449, 18597, 18731, 18878, 19102, 19115, 19147, 19525, 19660, 19756, 20780, 20805, 20828, 20860, 20890, 20911, 21508, 21577]

with spimi index

query name: Democrats

query\_type:

BM25? 0

intersect results

83

final results:

['28', '219', '234', '1416', '1786', '1857', '1895', '1900', '1908', '1999', '2011', '2132', '2140', '2156', '2493', '2507', '3113', '3289', '3551', '3978', '4287', '4396', '4854', '4891', '5160', '5288', '5774', '6079', '7467', '7806', '8413', '9011', '9347', '9688', '9774', '9848', '9944', '10905', '11082', '11456', '11749', '11955', '12326', '12497', '12773', '12961', '12970', '13257', '13260', '13548', '13671', '14419', '14976', '15154', '15369', '15661', '15666', '15799', '16048', '17023', '17350', '17915', '18271', '18328', '18357', '18449', '18597', '18731', '18878', '19102', '19115', '19147', '19525', '19660', '19756', '20780', '20805', '20828', '20860', '20890', '20911', '21508', '21577']

FOR DEMO.SGM FILE

single keyword query with naive indexer from project 2

[192, 21001]

with spimi index

query name: Democrats

query\_type:

BM25? 0

intersect results

2

final results:

['21001', '192']

(b) a query consisting of several keywords for BM25

FOR PROJECT

query name: war money control

query\_type:

BM25? 1

intersect results

2

final results:

['11487', '18938']

query name: BankAmerica david

query\_type: AND

BM25? 1

term :david: does not exist in index

intersect results

0

final results:

[]

query name: Pillsbury live

query\_type: OR

BM25? 1

final results:

['10073', '7155', '7154', '13944', '12261', '7341', '14403', '16467', '19', '15927', '6623', '4564', '9060', '12257', '20231', '5896', '13788', '18001', '13781', '13984', '14307', '13778', '11558', '6492', '15761', '2851', '14454', '12859', '10955', '15290', '15260', '11278', '6150', '822', '14356', '17823', '20756', '3278', '16088', '16187', '6829', '11881', '7521', '7626', '12720', '13273', '18973', '10781', '10665', '1994', '309', '10767', '9342', '12709', '17432', '11580', '19511', '8663', '8602', '7163', '10608', '4008', '12381', '11014', '2036', '11472', '17335', '17176', '3560', '4061', '8441', '16958', '4101', '180', '18604', '14199', '6472', '14931', '14770', '15040', '16784', '10779', '10642', '8198', '8080', '18409', '12355', '8563', '16009', '16957', '16935', '10623', '20259', '11178', '13657', '5176', '12002', '5290', '10355', '11215', '10780']

FOR DEMO.SGM FILE

query name: war money control

query\_type:

BM25? 1

intersect results

1

final results:

['21001']

query name: BankAmerica david

query\_type: AND

BM25? 1

intersect results

1

final results:

['27']

query name: Pillsbury live

query\_type: OR

BM25? 1

term :live: does not exist in index

final results:

['27']

(c) a multiple keyword query returning documents containing all the keywords (AND), for unranked Boolean retrieval

FOR PROJECT

query name: credits debt

query\_type: AND

BM25? 0

intersect results

65

final results:

['175', '190', '257', '306', '335', '644', '1210', '1252', '1963', '2242', '2686', '3488', '3593', '4078', '4256', '4426', '4692', '4710', '4788', '4791', '4947', '5179', '5270', '5592', '6047', '6708', '6757', '6866', '7126', '7405', '7811', '8055', '8069', '8107', '8187', '8239', '8483', '8881', '9590', '9655', '10525', '10733', '10799', '11376', '12477', '13042', '13234', '15328', '16680', '17152', '17157', '17409', '17450', '17575', '17593', '17846', '17870', '17874', '17976', '18361', '18787', '18800', '19408', '21115', '21275']

FOR DEMO.SGM FILE

query name: credits debt

query\_type: AND

BM25? 0

term :credits: does not exist in index

term :debt: does not exist in index

intersect results

0

final results:

[]

(d) a multiple keywords query returning documents containing at least one keyword (OR), where documents are ordered by how many keywords they contain), for unranked Boolean retrieval

FOR PROJECT

query name: Pillsbury Stearns

query\_type: OR

BM25? 0

final results:

['15927', '8512', '25', '16467', '1473', '9047', '889', '14561', '8441', '3431', '15742', '6845', '11267', '19111', '955', '3161', '9487', '14857', '20541', '10073', '6623', '2510', '10420', '9009', '1911', '7155', '18973', '21', '12709', '1836', '10425', '7341', '5347', '11517', '7927', '5516', '2269', '3535', '20867', '16354', '10480', '5069', '10979', '223', '7629', '12720', '7665', '9986', '11186', '15239', '15857', '10595', '3238', '4877', '20667', '12261', '18886', '10931', '7750', '17146', '4591', '19', '20744', '7645']

FOR DEMO.SGM FILE

query name: Pillsbury Stearns

query\_type: OR

BM25? 0

final results:

['27']

**Comments:** the results are as expected. When the query involves possible stopwords the final results are very long

**3. well documented sample runs for your queries on the information needs:**

**Democrats’ welfare and healthcare reform policies**

FOR PROJECT

query name: Democrats’ welfare and healthcare reform policies

query\_type:

BM25? 1

term :Democrats’: does not exist in index

intersect results

0

final results:

[]

query name: Democrats’ welfare and healthcare reform policies

query\_type: AND

BM25? 0

term :Democrats’: does not exist in index

intersect results

0

final results:

[]

query name: Democrats’ welfare and healthcare reform policies

query\_type: OR

BM25? 0

term :Democrats’: does not exist in index

final results:

['7892', '2417', '1895', '7375', '8072', '16544', '4006', '2132', '10355', '5868', '15382', '8310', '10230', '12598', '12750', '6606', '7219', '11204', '16226', '20462', '862', '17185', '7493', '17940', '6940', '9055', '12552', '17070', '14874', '672', '12879', '16092', '16168', '17402', '12806', '17277', '8135', '14766', '18328', '16937', '17477', '8662', '9673', '6052', '6392', '2223', '11327', '7651', '3364', '16827', '13046', '10664', '2190', '11820', '16200', '3928', '20756', '11387', '54', '11463', '16759', '17368', '18941', '209', '226', '14749', '20449', '17420', '9704', '4603', '8743', '19604', '18271', '7019', '12025', '6127', '3502', '17305', '181', '3366', '236', '942', '9442', '12438', '19017', '3030', '18776', '19285', '308', '21391', '11163', '12602', '17443', '11600', '15552', '10212', '4727', '9307', '742', '8203', '15364', '18148', '6108', '16784', '12471', '55', '20094', '20461', '10125', '16103', '2913', '17216', '13869', '15456', '1954', '3670', '8390', '7537', 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FOR DEMO.SGM FILE

query name: Drug company bankruptcies

query\_type:

BM25? 1

term :bankruptcies: does not exist in index

intersect results

0

final results:

[]

query name: Drug company bankruptcies

query\_type: AND

BM25? 0

term :bankruptcies: does not exist in index

intersect results

0

final results:

[]

query name: Drug company bankruptcies

query\_type: OR

BM25? 0

term :bankruptcies: does not exist in index

final results:

['192']

**George Bush**

FOR PROJECT

query name: George Bus

query\_type:

BM25? 1

intersect results

0

final results:

[]

query name: George Bus

query\_type: AND

BM25? 0

intersect results

0

final results:

[]

query name: George Bus

query\_type: OR

BM25? 0

final results:

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FOR DEMO.SGM FILE

query name: George Bus

query\_type:

BM25? 1

intersect results

2

final results:

['21001', '192']

query name: George Bus

query\_type: AND

BM25? 0

intersect results

2

final results:

['21001', '192']

query name: George Bus

query\_type: OR

BM25? 0

final results:

['21001', '192']

**Comments:** the results are as expected. When the query involves possible stopwords the final results are very long