Biblical Theme
Searcher

Ben Liang
Department of Electrical and Computer Engineering
University of Illinois at Urbana-Champaign
bpliang3@illinois.edu

Tim John
Department of Electrical and Computer Engineering
University of Illinois at Urbana-Champaign
tjohn21@illinois.edu
Motivation

- Create a tool to aid people studying the Bible
- Improve upon current search tools by offering a more specified solution

Practical Use

- Most of all, end up with a functional end user product
Initial Idea

- Create a search engine from scratch that takes a chapter as input and produces a list of similar chapters

John 2

Magic Box

1. John 3
2. Matthew 1
3. Matthew 2
Impractical

- Search Engine from scratch
  - Out of our league

- Difficult - Multiple themes in a single chapter
  - How do we compare chapters?
  - What theme to choose to compare?

- Original goal
  - Most useful to user
  - Thematic organization of the Bible
Reformulated Idea

- Given a term, like “love”, produce a list of references related to it.
- We deemed this to be more realistic and useful.
- This would serve as a practical tool for finding references.
- We decided to base our project on the Lucene toolkit code used in MP3.

1. John 3:1-3
2. Matthew 1:4-5
3. Matthew 2:5-10
Current Systems

- Bible Gateway
- BibleStudyTools.com
High Level Overview

- Acquire a copy of the bible as text files
- Create a program to perform the search operation
- Mold our text files to interface with the program
- Evaluate the results
Data Set

- 66 separate text documents, one for each book
- We decided to split each book into its chapters
- We exploited the formatting of the documents and created a parser to do this for us
```c
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <string.h>

int main()
{
    FILE *fp;
    fp = fopen("data/raw/Psalms.txt", "r");
    char text[512];
    // Parse through initial garbage
    int i;
    for(i = 0; i<10; i++)
    {
        fgets(text, sizeof(text), fp);
        // Check for start of chapter
        int result = strncmp(text, "CHAPTER", 7);
        if(result == 0)
            break;
    }
    // Creates new files for each chapter
    FILE *fp2;
    int eof = 0;
    while(!eof){
        char filename[255];
        strcpy(filename, "data/output/Psalms/Psalms ");
        strcat(filename, text, sizeof(text));
        strcat(filename, ".txt", 4);
        fp2 = fopen(filename, "w");
        fputs(text, fp2);
        fputs("\n", fp2);
        // Copies one line at a time
        fgets(text, sizeof(text), fp);
        do
        {
            fputs(text, fp2);
            if(eof(fp))
                eof = 1;
            fgets(text, sizeof(text), fp);
        }while(strncmp(text, "CHAPTER", 7) != 0 || eof);
    }
    fclose(fp2);
    fclose(fp);
    return 0;
}
```
The BOOK OF PSAIHS

PSALM 1
1 Blessed (is) the man that walketh not in the counsel of the ungodly, nor sitteth in the seat of the scornful.
2 But his delight [is] in the law of the LORD; and in his law doth he meditate day and night.
3 And he shall be like a tree planted by the rivers of water, that bringeth forth his fruit in his seasons; his leaf also shall not wither; and whatsoever he doeth shall prosper.
4 The ungodly (are) not so: but [are] like the chaff which the wind driveth away.
5 Therefore the ungodly shall not stand in the judgment; nor sinner in the congregation of the righteous.
6 For the LORD knoweth the way of the righteous: but the way of the ungodly shall perish.

PSALM 2
1 Why do the heathen rage, and the people imagine a vain thing?
2 The kings of the earth set themselves, and the rulers take counsel together, against the LORD, and against his anointed, [saying],
3 Let us break their bands asunder, and cast away their cords from us.
4 He set a, and shall be in his, and to have a, in his, and in his, and in his.
5 Then shall he speak unto them in his wrath, and vex them in his sore displeasure.
6 Yet have I set my king upon my holy hill of Zion.
7 I will declare the decree: the LORD hath said unto me, Thou [art] my Son; this day have I begotten thee.
8 Ask of me, and I shall give thee the heathen for thine inheritance, and the uttermost parts of the earth [for] thy possession.
9 Thou shalt break them with a rod of iron; thou shalt dash them in pieces like a potter’s vessel.
10 All the people of the earth shall fear: and rejoice with trembling.
11 Rise the Son, lest he be angry, and ye perish (from) the way, when his wrath is kindled but a little. Blessed (are) all they that put their trust in him.

PSALM 3
1 A Psalm of David, when he fled from Absalom his son.
2 LORD, how are they increased that trouble me many (are) they that rise up against me.
3 But thou, O LORD, [art] a shield for me; my glory, and the lifter up of mine head.
4 I cried unto the LORD with my voice, and he heard me out of his holy hill. Selah.
5 I laid me down and slept; I awaked: for the LORD sustained me.
6 I will not be afraid of ten thousands of people, that have set themselves against me round about.
7 Arise, O LORD, save me, O my God: for thou hast smitten all mine enemies upon the cheek bones; thou hast broken the teeth of the ungodly.
8 Salvation [belongeth] unto the LORD: thy blessing (is) upon thy people. Selah.

PSALM 4
1 To the chief Musician on Betheloth, A Psalm of David.
2 Hear me when I call, O God of my righteousness: thou hast enlarged me [when I was] in distress; have mercy upon me, and hear my prayer.
3 2 Ye sons of men, how long [will ye turn] my glory into shame? [how long] will ye love vanity, and seek after lies? Selah.
4 But know that the LORD hath set apart him that is godly for himself: the LORD will hear when I call unto him.
5 Stand in awe, and sin not together with your own heart upon your bed, and be still. Selah.
6 The LORD shall hear the just when he crieth: the LORD is a refuge for the upright.
Using Lucene

- Working from MP3 (MOOC Search Engine) template
- Requires specific data format
  - Data file repository
  - Title Names file
- Code Modification
  - Indexer
  - Searcher
  - Runner
Tests

Scoring documents with Vector Space

1. John CHAPTER 13_15

... 9 As the Father hath loved me, so have I loved you: continue ye in my love...
10 These things have I spoken unto you, that my joy might remain in you, and your... 13 Greater...

2. Galatians CHAPTER 1_1

... , for the love of thy good comforters and thy, heavenly things which God hath brought me into his chambers: we will be glad and rejoice in thee, we will remember thy love...

3. SongerSolomon CHAPTER 2_15

... so is my love among the daughters. 3 As the apple tree among the trees of the wood, so is my love among all the daughters. 4 How fair is thy love, my sister, my sister...

4. John CHAPTER 14_2

... In the Son: ... If ye shall ask any thing in my name, I will do it. 15 If ye love me, keep my commandments, and I will pray the Father, and he shall give you another Comforter, that he may abide with you forever... 23 Jesus answered and said unto him, If a man love me, he will keep my words...

5. Ephesians CHAPTER 5_1

... 7 Even as Christ loved the church, and gave himself for it; 8 That he might sanctify unto himself a chosen generation, a metrical royal priesthood, an holy nation, ...
More Tests

> How much wood could a woodchuck chuck if a woodchuck could chuck wood

Scoring documents with Vector Space

1. Exodus CHAPTER 37 .txt

... 1 And Bezaleel made the ark of shittim wood*** two cubits and a half [was] the length ... 6 And he made the table of shittim wood*** two cubits [was] the length thereof, and a cubit ...

2. Genesis CHAPTER 22 .txt

...; and he took the fire, and said, My father: and he said, Here am I, my son. And he said, Behold ... in order, and bound Isaac ... 3. Leviticus CHAPTER 1 .txt

... it into his pieces. 7 And the sons of Aaron the priest shall put fire upon the altar, and lay the d his legs shall ... with his head and his fat: and the priest shall lay them in order on the wood an offering made by fire ...

4. Exodus CHAPTER 25 .txt

... and shittim wood***, 6 Oil for the Light, spices for anointing oil, and for sweet incense, 7 ... And thou shalt make staves of shittim wood***, and overlay them with gold. 14 And they shall be ... two ...

5. Skings CHAPTER 18 .txt

... for themselves, and cut it in pieces, and lay [it] on wood***, and put no fire [under]: and I measured of seed. 33 And he put the wood*** in order, and cut the bullock in pieces, and laid [him] g*** ...

6. 1Samuel CHAPTER 23 .txt

... And David saw that Saul was come out to seek his life: and David [was] in the wilderness of Ziph: and David and Jonathan were gathern...

7. Exodus CHAPTER 26 .txt

... skins. 35 And thou shalt make boards for the tabernacle of shittim wood*** standing up.
Flaws

- Difficulty with multiple word queries
  - Searched each term individually
  - Combined list

- No feedback
Future Work

• Better Search Function
• Smarter Search Query Analysis
• Phone Application (?)