



# Designing a NoSQL Database with a user-friendly interface for easy retrieval of unstructured data

**Kenny Kei Yun Sum**

**University ID : 230215740**

**A research report submitted as part of the dissertation module for the programme  
MSc Computer Science, Engineering and Applied Science, Aston University**

# Contents

## Table of Contents

<b>Declaration</b> .....	<b>5</b>
<b>Glossary</b> .....	<b>6</b>
<b>Abstract</b> .....	<b>7</b>
<b>1 Introduction</b> .....	<b>8</b>
<b>2 Background</b> .....	<b>9</b>
<b>3 Methodology</b> .....	<b>10</b>
3.1 Selection Criteria .....	10
3.2 Search Strategy .....	10
3.3 Data Extraction and Examination .....	10
<b>4 Literature Review</b> .....	<b>11</b>
4.1 Unstructured Data and Databases.....	11
4.2 Types of NoSQL Databases .....	11
4.2.1 Key-value Stored Database.....	12
4.2.2 Document Stored Database .....	12
4.2.3 Column Stored Database .....	12
4.2.4 Graph Stored Database .....	12
4.3 Issues with NoSQL Databases .....	12
4.4 The Use of Natural Language Processing for Querying .....	13
4.5 Various Types of Natural Language Processing Tools.....	13
4.5.1 BERT (Bidirectional Encoder Representations from Transformers).....	13
4.5.2 SpaCy.....	14
4.5.3 NLTK (Natural Language Toolkit).....	14
4.5.4 Stanza .....	14
4.5.5 Gensim .....	14
4.5.6 Stanford CoreNLP .....	14
<b>5 Project Specification</b> .....	<b>15</b>
5.1 Functional Requirements .....	15
5.2 Non-functional Requirements .....	15
5.3 Software Tools & Programming Languages .....	17
5.4 Libraries and Packages (python) .....	17

<b>6 Project Plan and Timetable .....</b>	<b>18</b>
6.1 Project Plan .....	18
6.2 Timetable .....	19
6.2.1 Project Timetable .....	19
<b>7 Project Design .....</b>	<b>21</b>
7.1 HTML Site Map .....	21
7.2 Tool Diagram .....	22
7.2.1 Search NLP .....	22
7.2.2 Keyword Search .....	23
7.3 Use Case Diagram .....	24
7.3.1 Search NLP .....	24
7.3.2 Keyword Search .....	25
7.3.3 Upload .....	26
<b>8 Implementation .....</b>	<b>27</b>
8.1 Basic Implementations (Functional Requirements) .....	27
8.1.1 BERT Function.....	27
8.1.2 Stop Word Removal Function .....	28
8.1.3 Lemmatisation .....	28
8.1.4 Keyword Search Function .....	28
8.1.5 Similarity Score Function .....	28
8.1.6 Ranking Function .....	28
8.1.7 Upload Function .....	28
8.1.8 Filter Function.....	28
8.1.9 Edit Function .....	29
8.2 Enhancement (Non-functional Requirements) .....	29
8.2.1 Performance .....	29
8.2.2 Security .....	29
8.2.3 Usability .....	29
8.2.4 Reliability.....	30
8.3 Coding Convention .....	30
8.4 Comment Code .....	30
<b>9 Software Testing .....</b>	<b>31</b>
9.1 Functional Requirement Testing .....	31
9.1.1 BERT Function Testing .....	31

9.1.2 Semantic Analysis Testing .....	32
9.1.3 Keyword Search Function Testing .....	34
9.1.4 Filter Function Testing .....	35
9.1.5 Upload Function Testing .....	36
9.1.6 Ranking Function Testing .....	36
9.2 Non-functional Requirement Testing .....	37
9.2.1 Performance Testing.....	37
9.2.2 Security Testing .....	37
9.2.3 Compatibility Testing .....	37
<b>10 Evaluation .....</b>	<b>38</b>
10.1 Functional Requirement .....	38
10.1.1 BERT Function & Semantic Analysis .....	38
10.1.2 Keyword Search Analysis .....	39
10.1.3 Filter Function Analysis .....	39
10.1.4 Upload Function Analysis .....	39
10.1.5 Ranking Function Analysis .....	39
10.2 Non-functional Requirement Analysis.....	40
<b>11 Reflection on Software Project .....</b>	<b>41</b>
11.1 What Went Well .....	41
11.2 Challenged Faced .....	41
11.3 Experience Learnt .....	41
11.4 Areas of Improvement .....	41
<b>12 Conclusion .....</b>	<b>42</b>
<b>13 Future Work .....</b>	<b>43</b>
<b>14 Reference .....</b>	<b>44</b>
<b>15 Appendix .....</b>	<b>46</b>

# **Declaration**

*Declaration:*

*I declare that I have personally prepared this assignment. The work is my own, carried out personally by me unless otherwise stated and has not been generated using paid for assessment writing services or Artificial Intelligence tools unless specified as a clearly stated approved component of the assessment brief. All sources of information, including quotations, are acknowledged by means of the appropriate citations and references. I declare that this work has not gained credit previously for another module at this or another University, save for permitted elements which formed part of an associated proposal linked directly to this submission.*

*I understand that plagiarism, collusion, copying another student and commissioning (which for the avoidance of doubt includes the use of essay mills and other paid for assessment writing services, as well as unattributed use of work generated by Artificial Intelligence tools) are regarded as offences against the University's Assessment Regulations and may result in formal disciplinary proceedings.*

*I understand that by submitting this assessment, I declare myself fit to be able to undertake the assessment and accept the outcome of the assessment as valid.*

*Student signature:*

A handwritten signature in black ink, appearing to read "Kenny Sun".

*Date: 29/09/24*

# **Glossary**

NoSQL database – NoSQL databases are non-relational databases that stores data in a non-table formant.

Natural language processing (NLP) – NLP is a sub field of artificial intelligence which provides the computer the ability to interpret, manipulate and comprehend human language,

Unstructured data – Datasets that are not stored in a structured database format.

Information retrieval – The process of tracing and recovering information from stored data.

Querying – Requesting access to data from a database to retrieve it or manipulate it.

# **Abstract**

In the modern era, there has been a development of NoSQL databases to handle large amounts of data due to the exponential increase of unstructured data. However, many NoSQL databases have a low level of querying or no querying at all. The purpose of this project is to develop an application capable of easily retrieving unstructured data from a NoSQL database with the use of natural language processing. This software project is built using the flask framework for the backend, MongoDB for data storage, HTML and CSS for frontend. The application provides features such as information retrieval using natural language processing and keyword search and the use of storing, managing and editing documents. The use of MongoDB enables efficient data management, while Flask offers a lightweight and flexible development environment. HTML provides the structure of the application, while CSS defines the style and layout. The application was tested using black box testing. The results indicate a need for improvement in information retrieval. Future works will focus on improving the natural language processing tool and applying additional features to enhance the application. This paper provides an overview of the development of the application and the features used in information retrieval for unstructured data.

# 1 Introduction

The purpose of this paper is to discuss the design and implementation of a NoSQL database with a user-friendly interface for easy retrieval of unstructured data.

Recently, there has been a rapid growth in unstructured data. Among them are texts, images, audio, emails and documents. Due to this exponential growth, traditional relational databases do not have the scalability to store such data. As a result of this, there has been a demand for NoSQL databases that contain high performance and scalability features which can store such data. However, many NoSQL databases have low-level querying functions or no querying functions. In addition, unstructured data is not organised in a predefined manner, and is often stored in NoSQL databases which are difficult to search and retrieve and require advanced levels of processing and querying. Due to this, there is a need for methods to locate and retrieve desired information within unstructured data.

The aim and objective of this topic is to create a search engine capable of easily retrieving unstructured data from a NoSQL database. This is done by implementing methods such as a language model that interprets information within text and retrieves it by query and search through natural language processing and simple keyword search.

This paper will provide information on how other research implemented natural language processing in their search, the reasons for using NoSQL databases including their advantages and disadvantages, and what natural language processing methods they use. In addition, the paper reveals a general overview of the project created to query for unstructured information. This includes the features the project contains, software and tools used, how the project was designed and implemented, the testing and evaluation done, the conclusion and future works.

## 2 Background

In today's age, there has been an exponential rise in data which may be complex, unstructured or semi-structured. This is due to the various real-time applications creating massive amounts of data (Hassan, 2021). These transactions include users generating emails, videos, audio, images, logs, post search queries etc (Haseeb and Pattun, 2017).

Traditional Relational Database Management Systems (RDBMS) that have been used for data storage for decades have presented consequential challenges in the era of big data (Sirisha and Reddy, 2017). The huge amount of data being produced by the various real time applications makes it impossible for RDBMS to work on these types of unstructured data. Additionally, typical relational databases contain scalability issues and degrade overall performance as data volume increases. As a result, RDBMS is not suitable to support modern applications such as handling large amounts of unstructured data or allowing flexible scalability (Hassan, 2021). Due to the nature of big data and its massive volume and diverse range of data types, there has been a demand for a solution that can effectively accommodate these features. As a result, a new type of database known as NoSQL databases is being used to do so (Haseeb and Pattun, 2017).

The way unstructured data is stored within NoSQL databases is very different to how structured data is stored within relational databases. NoSQL databases can store large amounts of data and can contain a diverse storage format of unstructured data (Zhang et al., 2019). These types of data are a diverse collection of textual information such as documents, emails, images, videos and audio files. Structured data is organised formally, which is easy to access, query and analyse. However, unstructured data is a free form of text which makes it scattered and dispersed. As a result, it is difficult to access and query and requires additional preprocessing to analyse. In addition, according to IDC, 90% of the amount of data available is estimated to be unstructured. This emphasises a need to develop an efficient, robust method of analysing and comprehending information with unstructured data (Sirisha and Reddy, 2017).

In terms of extracting information within unstructured data, document search plays a key role. A standard tool for information retrieval is the search engine on a web browser. Various methods within search engines have been used to extract information. This includes keyword-based searching, context-based searching, and natural language processing (Sirisha and Reddy, 2017).

The purpose of this study is to understand what is already known, develop an information retrieval system capable of easily querying and obtaining information within unstructured data.

### **3 Methodology**

To research the current objective, an assessment on previous literature has been conducted to precisely analysis the existing knowledge of the topic at hand. In order to do so, various methods have been used to narrow down the search and find literature that is related to the subject.

#### **3.1 Selection Criteria**

- Relevance of topic: The topic of papers and studies must be related to NoSQL databases, user-friendly interface, unstructured data, information retrieval or natural language processing.
- Date of publication: The papers and articles must be within ten years (2014 – 2024), to ensure studies are up to date, capture recent developments and are still relevant.
- Peer-reviewed source: Majority of papers and articles that are selected for examination will be peer-reviewed to ensure reliability of studies.
- Inclusion of NoSQL databases and unstructured data: Most of the studies will include the integration of NoSQL databases and unstructured data.

#### **3.2 Search Strategy**

A search has been conducted on academic databases such as Google Scholar and IEEE Explorer, to find articles and papers related to the subject. Keywords such as “NoSQL database”, “user-friendly interface”, “unstructured data”, “information retrieval”, “natural language processing”, “Querying”, “search engine”, “query processing”, “big data processing”, and “easy retrieval”. In addition, Boolean values such as “AND” and “OR” will be used.

#### **3.3 Data Extraction and Examination**

Data collection: The literature of the papers and articles will be reviewed and extracted for information that is related to the subject. Data includes title, name of author, date of publication, research conducted, main findings and contribution to the field.

Quality examination: Examination of papers and articles will be conducted to see the value of evidence provided and research completed.

# **4 Literature Review**

## **4.1 Unstructured Data and Databases**

Relational databases have been the dominant database management system since it was first established in 1970. It has been the main data management system for storing, manipulating, and retrieving data within the information technology industry ever since (Hassan, 2021). At the present time, many applications generate a large abundance of data for users from online, such as transactions, emails, videos, audio, images or other applications. This ranges from unstructured or semi – structured. These data types are typically stored within databases, which present problems such as how they are captured, stored, managed, shared, analysed via whether structured or unstructured (Haseeb and Pattun, 2017). In addition, data volume was expected to increase by 40% per year and eventually up to 44 times between 2009 and 2020. Much of this data is unstructured in nature (Bhogal and Choksi, 2015).

Due to the exponential growth rate of data, traditional relational databases have proved to be incapable of managing them. In addition, relational databases contain scalability issues, as their performance degrades expeditiously as data volume increases. Furthermore, relational databases contain an inflexible schema in which all the specifications that define the characteristics of an attribute are uniformed for all elements, which are known as tables. They also do not allow null values. As a result, traditional relational databases are not sufficient in handling essential requirements of modern applications (Kunda and Phiri, 2017).

As a result, there has been a keen interest in the use of NoSQL database technology. This was due to their simplicity in design, flexibility, horizontal scaling and finer control over availability. It was capable of handling large amounts of data from modern applications and unlike relational databases, it does not contain a row-column-table format as a storage structure. This allowed a flexible approach to data management. It was therefore considered as a superior alternative to relational database due to containing better methods of handling large volumes of structured, semi-structured and unstructured data and their simple and straight-forward data model (Malik et al., 2020).

## **4.2 Types of NoSQL Databases**

There are four commonly used types of NoSQL structures that are used for storing unstructured data. These types of NoSQL databases include Key-valued stored database, Document stored database, Column stored database and Graph stored database (Sirisha and Reddy, 2017)

### **4.2.1 Key-value Stored Database**

A key-valued stored database includes two main attributes, the key and the value. It is based on a hash table where the key is a unique identifier and is directed to the value

where the data can be retrieved. It is simple but provides an efficient and powerful model. The database allows the data to be any primitive type or object and can contain various structured and unstructured data. It supports scalability and can handle a large amount of data in exchange for consistency. In addition, it provides growth at an expeditious speed (Haseeb and Pattun, 2017).

#### **4.2.2 Document Stored Database**

A document stored database, also known as a Document Oriented database, stores data in the form of documents, which consists of two main attributes a key and a document. They are similar to key-value databases but offer more complexity and flexibility in comparison. The collections within documents can contain any number of documents of any type. In addition, the structure of the document does not require to be formally identified by the user when adding documents to the collection. Furthermore, some document databases have added features not found in other NoSQL databases, such as an SQL-like querying processing system (Haseeb and Pattun, 2017).

#### **4.2.3 Column Stored Database**

A column stored database is a type of database management system that stored data in a column-oriented table rather than by row. Rows within columnar databases each contains a unique key which are used to identify a record with a specific value, similar to primary keys in relational databases. When querying is executed, only columns that are required are read, reducing the amount of data needed to be loaded into memory (Haseeb and Pattun, 2017).

#### **4.2.4 Graph Stored Database**

A graph stored databases store data in the form of graphs in a schemaless manner. These databases are a collection of nodes and edges, where each node represents an object, and each edge represents the relationship between nodes. Unlike most NoSQL stored databases, graph databases follow ACID constraints and offer support which allows the consistency of information (Haseeb and Pattun, 2017).

### **4.3 Issues with NoSQL Databases**

Switching from relational databases to NoSQL, despite the previously mentioned benefits, does present some challenges. In order for NoSQL to achieve scalability, flexibility and speed for better performance, sacrifices were made towards robustness and complex querying. As NoSQL is relatively new and is still in development, they lack uniformity, maturity, structure and complex querying in comparison to their parent counterpart, relational databases (Kunda and Phiri, 2017).

NoSQL does not contain a universal querying language like SQL, each NoSQL product is unique and has a different way of querying. For NoSQL to achieve scalability, sacrifices were made towards the mathematical support that SQL must gain for the freedom for writing complex queries. The lack of join operations and SQL language further makes it difficult for complex querying and extractions within NoSQL databases (Chandra, 2015; Bozic, 2022).

## **4.4 The Use of Natural Language Processing for Querying**

Due to the nature of NoSQL databases and unstructured data, specifically them being very difficult to maintain, store and extract the required information, there have been various approaches to storing, retrieving and analysing unstructured data. One approach is natural language processing (NLP) which involves the communication and interaction between humans and computers, in which machines are programmed to understand human languages. This allows the retrieval of relevant information from natural language input in which NLP integrates multiple methods to retrieve context and semantics from data and is then analysed by machines to understand hidden meanings behind the text. Other common alternatives include keyword-based searching and context-based searching. However, unlike NLP they do not grasp the meaning behind words (Baker and Price, 2021).

Most natural language processing tools can be broken down into sequential steps. These steps are known as tokenisation, stop word removal, stemming, lemmatization, part of speech and named entity recognition.

1. Tokenisation – Tokenisation is the process of separating large strings of written language into smaller parts, known as tokens.
2. Stop word removal - This process involves the removal of words that occur commonly across text data. These words typically have no significance in NLP tasks and are not very discriminative.
3. Stemming/Lemmatization – Stemming involves the process of removing inflected forms of words and transforming them into their base or root form. Example of the form: “ing”, “s”, “ly” or “ed”. Lemmatization is similar to stemming with minor differences. It involves the process of reducing a word to its root form. An example of this involves: stemming the word “caring” into “care” instead of “car”.
4. Part of Speech (POS) - POS assigns a tag to each word according to its syntactic functions. This process is needed to identify if the given word is a “noun”, “verb”, “adjective”, “preposition”, “conjunction” or “interjection” etc.
5. Named entity Recognition (NER) – NER is a technique which identifies various named entities within the textual data and assigns them within a unique category. These entities can be a person, time, locations, events, products, themes etc. (Wang et al., 2024).

## **4.5 Various Types of Natural Language Processing Tools**

### **4.5.1 BERT (Bidirectional Encoder Representations from Transformers)**

BERT is a natural language processing model designed to comprehend the context of words within a sentence, by using a bidirectional approach to capture the full context of a word based on all of its surroundings (Wang et al., 2024).

#### **4.5.2 SpaCy**

SpaCy is an advanced natural language processing tool within Python. It provides a range of features for text processing, understanding and analysis. These features include tokenisation, NER, sentence segmentation, PoS tagging, dependency parsing, and numerous pre-trained word vectors (Sharma et al., 2022)

#### **4.5.3 NLTK (Natural Language Toolkit)**

A versatile and comprehensive toolkit within python for natural language processing. It provides a easy-to-use interface along with text processing libraries for tokenisation, classification, stemming, tagging, parsing, and semantic reasoning (Lauriola et al., 2022).

#### **4.5.4 Stanza**

Stanza is an open-source python library toolkit used for natural language processing. It is designed to handle a wide range of linguistic tasks of various languages. It contains pre-trained models of over 70 different languages. The toolkit includes text processing features, such as tokenisation, part-of-speech, tagging, named entity recognition, and more (Lauriola et al., 2022).

#### **4.5.5 Gensim**

Gensim is an open-source Python library designed for unsupervised topic modelling, document indexing and natural language processing. It is suited for the handling and retrieval of large text corpora and provides efficient algorithms for document similarity, topic modelling, and word embedding generation (Lauriola et al., 2022).

#### **4.5.6 Stanford CoreNLP**

CoreNLP is a comprehensive natural language processing library developed by the Stanford NLP Group, designed for a variation of linguistic tasks. The toolkit contains functions that enable the processing, analysing, and extraction of information from text. These features include tokenisation, PoS tagging, parsing, named entity recognition, and sentiment analysis (Lauriola et al., 2022).

# 5 Project Specification

## 5.1 Functional Requirements

The functional requirements in a software application identify the specific behaviours, functions, and features of the software system. These requirements state what the software system should do, how the user interacts with it, and how the system responds to the multiple and various inputs and conditions. The functional requirements serve as the foundation for the application.

- Upload System – Enables the user to upload the XML file onto the MongoDB database.
- BERT System – The BERT or Bidirectional Encoder Representation from Transformers, is a neural-network-based technique used in natural language processing, which assists the computer in understanding the meaning of text by analysing the context of words in sentences. This feature allows the user to find relevant information they are looking for.
- Keyword search system – A simple method for finding relevant information by using keyword searches within a database. Based on the word, the system will find any text that contains such keywords.
- Ranking System – A ranking system is used to find and place the most relevant information first in descending order according to the query input.
- Similarity score system – Embedding is done to both query input and each text and compared to find how similar both contexts are. A similarity score is then calculated and used within the ranking system to judge which information is most relevant.
- Filter search system – The filter search system allows users to filter their search within their required category.
- Search bar – Allows users to input their query to find information.
- Search interface – An interface which displays information to users in descending order from the most relevant.
- Edit system – Allows the user to edit information within a database by changing wording.
- Stop word removal - The process of filtering out common words that have little to no meaningful information.
- Lemmatisation – The process of transforming words to their base or root form by using linguistic knowledge to map a word to its canonical form.

## 5.2 Non-functional Requirements

Non-functional requirements are required due to their crucial role in the software application. These requirements specify how the system should perform and ensures that the software is user-friendly, reliable, and ensures the system meets expectations

beyond just the functionality. The requirements mentioned below, ensure that the application functions within high standards and meets users' expectations.

#### Performance:

- Response time – The response time is the time taken for the system to respond to a user's action and request. Having a low response time is essential for a good user experience when using the application.
- Traffic Handling – The application should be able to handle traffic from the system's client. This also applies during peak times.
- Throughput – The throughput is the amount of data passing through the system. The application should be capable of handling a large amount of data in a given time frame.
- Scalability – Refers to the software applications' ability to handle increased workloads, user traffic and large volumes of data without sacrificing performance and efficiency.

#### Security:

- Confidentiality – Having high levels ensures the system allows sensitive data to only be accessible to authorised users. The application should be capable of preventing data breaches and unauthorised access.
- Integrity – Prevents data within the application from being altered or tempered without proper authorisation.
- Availability – Ensures that the system is available and accessible to authorised users. The implementation of data backups ensures that even if the system is compromised, the impact is minimised, and data can be restored.

#### Usability:

- Learnability – The application should provide ease to new users, allowing learning of the application to be without much difficulty. Allowing users to quickly become familiar with the system's features and functionality.
- Memorability – The application should implement features that allow users to remember how to navigate and use system without relearning it each time.
- Efficiency – Once users have become familiar with the application, it should allow them to perform tasks quickly, with minimal effort and without difficulty.

#### Compatibility:

- Platform Compatibility – Ensures the application can run on various operating systems such as Windows, macOS or Linux.
- Browser Compatibility – Ensures that the web application can work correctly across different web browsers such as Chrome, Firefox, Safari, Edge, etc.
- Hardware Compatibility – Ensures that the application works with different types of devices and hardware. This includes PCs, tablets, smartphones, etc.

#### Reliability:

- Fault Tolerance – The ability for the application to continue operating correctly in the event of a system failure and unexpected circumstances.
- Consistency - The application should be able to consistently perform its functions and produce accurate results after repeated uses and different conditions.
- Error Handling – A Reliable Application is able to anticipate possible errors and handle them correctly, while also providing feedback to users.

### **5.3 Software Tools & Programming Languages**

- HTML (HyperText Markup Language) – A standard markup language for Web pages. It is a scripting language used to render pages. The HyperText allows users to click on a link and be redirected to a new page by that link.
- CSS (Cascading Style Sheets) – A language used to style, laying out and structure HTML documents.
- Flask (python) – Flask is a micro-web framework written in python for building web applications.
- MongoDB – A NOSQL document database with high levels of scalability and flexibility for storing and retrieving information.
- XML – A metalanguage which contains its own customized markup language, used to display documents.

### **5.4 Libraries and Packages (python)**

Various libraries and packages were used to gain access to in-built functions and pre-written code to perform specific tasks and to make the web application and search querying functional. The lists of libraries and packages include:

- Render\_template – Enables the creation of dynamic HTML content based on provided data.
- Request – Allows an object that contains all the data to be sent to the server.
- Redirect – Used to send user to a specific URL and assign a status code.
- URL\_for – Enables the generation of URLs on the Flask application.
- Beautiful soup – A python package used for parsing HTML AND XML documents. It allows the creation of a parse tree for parsed web pages based on a particular criteria which is used for extraction, navigation, searching and modification of data from HTML.
- BertTokenizer – An application within the flask app that uses BERT model.
- Torch – Allows the creation of multiple files and updates of the modified time if a file exists.
- Cosine\_similairty – Allows the implementation of cosine similarity, which measures the similarity of documents.

# 6 Project Plan and Timetable

## 6.1 Project Plan

An agile software development approach was used during the development of the project. This is due to its numerous beneficial features, such as flexibility, reduction in unnecessary processes, implementation of continuous improvement and enhancement of overall efficiency and productivity. The workload was organised into five days a week with eight hours spent on each working day. This allows the project to be broken down into manageable units for focused development and regular progress assessment. Meetings with supervisors were organised every two weeks, ensuring the project was up-to-date and essential feedback was provided. These approaches facilitate the adaptation of change when necessary and ensure segments of the project are completed.

For frontend, HTML, CSS and Flask were chosen. HTML is a standard markup language which ensures structural consistency and accessibility within the platform. CSS facilitates style and layout web pages through pre-defined utility classes. Flask enables dynamic and interactive web pages by integrating specific libraries and components, allowing greater control over the project structure and design.

For Backend, MongoDB and XML were utilised. MongoDB allows structured and unstructured data to be stored in a NoSQL document database. XML allows customisation of markup languages for the display of documents.

Trello was used as a primary tracking tool for progress. This offers a visual representation for organising tasks and setting deadlines. Trello was organised into three sections: To-do-list, Ongoing and Completed. Each segment of task (also known as cards in Trello) was placed within these categories, ensuring the project's goals were known and done within a selected deadline. The Trello board was critical in providing an overview of the project's progress and organisation. The cards also provide in-depth information on the task, presenting further reminders of what needs to be completed.

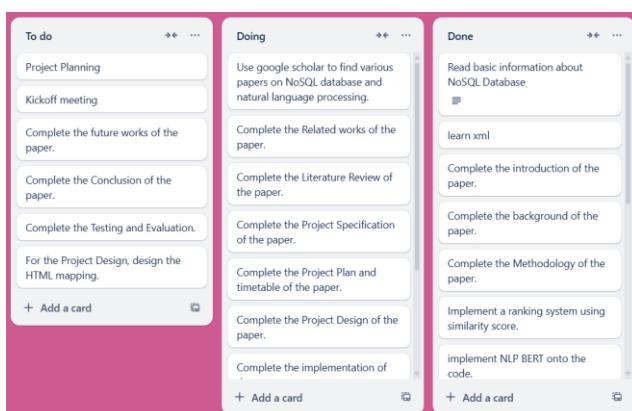


Figure 1 – Example of Trello in use

During development of code, progression was saved as new features were implemented, which resulted in several coding files. If there are issues with implementation on the code, the new file can be deleted and reverted to the previous file.

## 6.2 Timetable

Milestones were set within a project timetable to divide the development of the project and the report into several steps to complete. The table below describes the project plan and timeline for each inclement step and is divided into three sections. Each row is broken down week-by-week, each week showing a measure of progress.

### 6.2.1 Project Timetable

	<b>Description</b>	<b>Date</b>
1.	Understanding the basic concept of NoSQL, Natural Language Processing and Information Retrieval.	31 May 24
2.	Understand the basic concept of MongoDB and learn of to use it to query data.	30 June 24
3.	Use Figma to design a visual representation of the project website.	5 <sup>th</sup> July 24
4.	Construct the website using frontend website using HTML and CSS.	12 <sup>th</sup> July 24
5.	Establish NoSQL database on MongoDB to retrieve data and connect to the website.	12 <sup>th</sup> July 24
6.	Create an upload interface which selects XML file and implements into MongoDB database.	19 <sup>th</sup> July 24
7.	Create various pages using HTML, including search data and view data.	19 <sup>th</sup> July 24
8.	Establish a page where data can be modified.	19 <sup>th</sup> July 24
9.	Implement BERT search system and Keyword search system into the project.	25 <sup>th</sup> July 24
10.	Implement similarity score system and ranking system onto project.	3 <sup>rd</sup> August 24
11.	Format Project Report and research previous literature of NoSQL and Natural Language Processing.	23 <sup>rd</sup> August 24
12.	Establish Introduction and background of Report.	30 <sup>th</sup> August 24
13.	Establish the Literature Review section of the report.	30 <sup>th</sup> August 24
14.	Establish Project Specification, Project Plan and Timetable, and Project Design sections of the report.	6 <sup>th</sup> September 24
15.	Establish Implementation and Testing and Evaluation sections of the report.	13 <sup>th</sup> September 24
16.	Establish Conclusion and Future Work sections of the report.	20 <sup>th</sup> September

17.	Review Project and Report and continue with improvements.	29 <sup>th</sup> September 24
18.	Submit Project and Report.	29 <sup>th</sup> September 24

Table 1 – Project timetable

It can also be noted that even though a deadline was set for a specific task, it does not mean the milestone was fully completed. Only most of that section was done due to the nature of applying an agile development cycle. Further refinement of the section was completed on a different date which allows room for further improvement if ideas were developed on a section later.

Further analysis of the timetable shows that during the development of the project, the work can be divided into four sections within the five months of work. The learning and research phase, construction and code writing phase, implementation of code phase, and writing phase. During May and June, most of the time spent was done learning the basic concepts of Natural language processing, Information Retrieval, NoSQL, and MongoDB, as well as using Trello to organise tasks and Figma to initially design the website. During July, construction of the website, establishing the connection of database and website was done, and the writing of various codes. During August, implementation of various functions such as BERT function, Ranking function, keyword function and similarity score function was implemented. The formatting of the report was also being developed during this time. During September, all efforts were focused on the report due to the majority of the software project being finished.

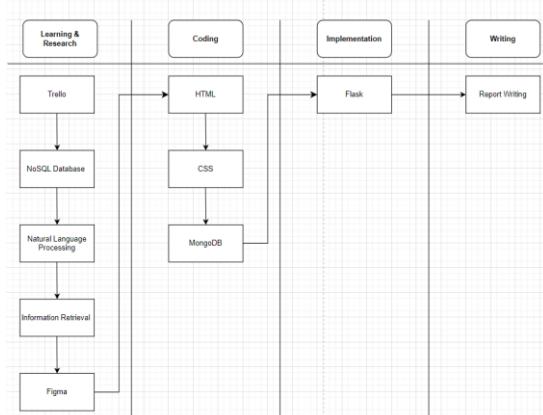


Figure 2 – diagram showing project development

# 7 Project Design

Throughout the development of the project, Figma was an essential tool for creating and refining the design of the project due to its ease of use and flexibility when designing. The tool allows the creation of an initial visual representation of the project before it was initiated onto the web page using HTML and CSS. By utilising Figma, it promotes the prospect of enhancing usability features, brainstorming ideas, evaluation of design, and allows the approach of iterative design processing.

## 7.1 HTML Site Map

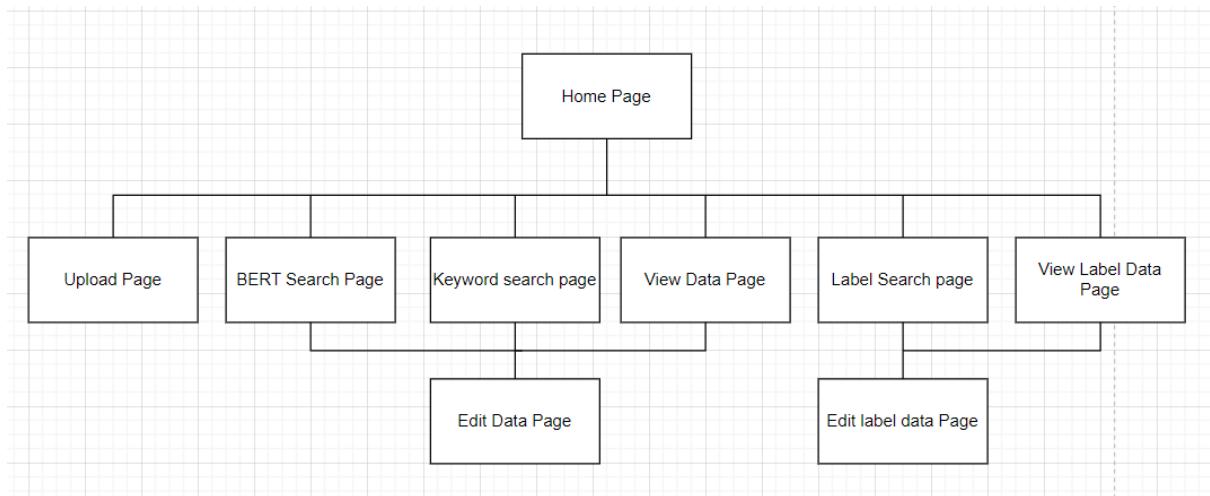


Figure 3 – HTML site map of website

The HTML site map represents a straightforward navigation schema, which contains sections such as Upload page, BERT search page, keyword search page, View data page, Label search page, and view label data page. This allows users to easily explore the website and gain an insight into how it is structured. The website also contains a secondary division, showing the edit pages (edit data page & edit label data page). The edit data page can only be accessed through the Bert search page, keyword search page, and view data page. The edit label data page can only be accessed through the label search page and the view label data page. The website displays can be shown in figure 3 to 9.

Figure 4 – Home page

# NoSQL Database

---

[Home Page](#)   [Upload Page](#)   [BERT Search](#)   [Keyword Search](#)   [Label Search](#)   [View Stats](#)   [View Label Data](#)

Figure 5 – Upload page

NoSQL Database

---

Upload Page

---

[Home Page](#) [Upload Page](#) [BERT Search](#) [Keyword Search](#) [Label Search](#) [View Data](#) [View Label Data](#)

Figure 6 – BERT search page

Search Label Database using Keyword Search	
Home Page	Logout Page
<a href="#">Label Search</a>	<a href="#">View Data</a>
<a href="#">View Label Data</a>	
Search Field <input type="text" value="Search Query..."/>	<input type="button" value="Search"/>

Figure 7 – Keyword search page

Figure 8 – label search page

Figure 9 – view data page

Figure 10 – view label data page

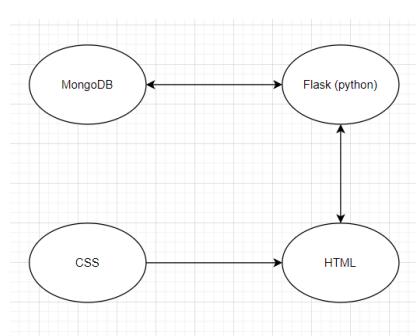


Figure 11 – diagram of the software used in the project.

The tool diagram represents the software used to construct and operate the project and the relationships with each other. The four main software used were flask, MongoDB, HTML and CSS.

#### MongoDB – Flask

The MongoDB and Flask software used allows the construction of web applications with Mongo as the NoSQL backend database. Flask provides the functions necessary to search, modify, and upload data into the MongoDB database.

#### Flask – HTML

The integration of Flask and HTML allows the construction of a dynamic, web-based application where HTML provides the structure and presentation of the user interface. HTML provides the visual display functions from Flask, allowing the user to view and manipulate data within the database.

#### HTML – CSS

HTML and CSS are two fundamental technologies used for creating and designing web pages. HTML provides the structure and content of the webpages. CSS is used to manipulate the appearance and layout of that structure.

### 7.2.2 Internal workings of the system

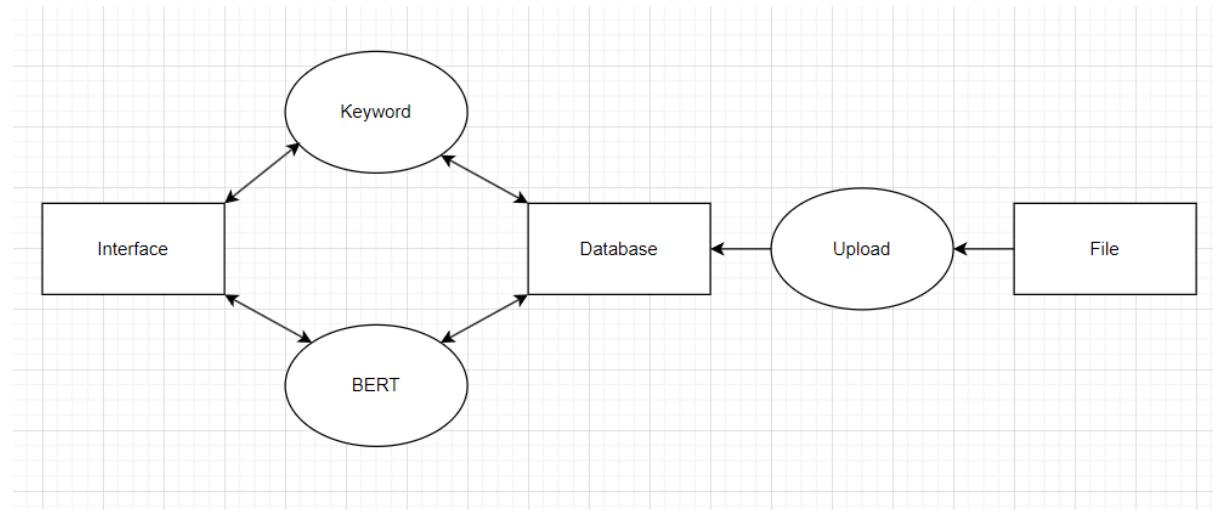


Figure 12 – Tool diagram of system

The tool diagram shows how the system works internally and how the tools and functions work with each other. Initially, a file is uploaded onto the database using the upload function. Once data is stored, it can be retrieved using the keyword search function or the BERT search function. Afterwards, data is then displayed within the interface.

## 7.3 Use Case Diagram

### 7.3.1 Search NLP

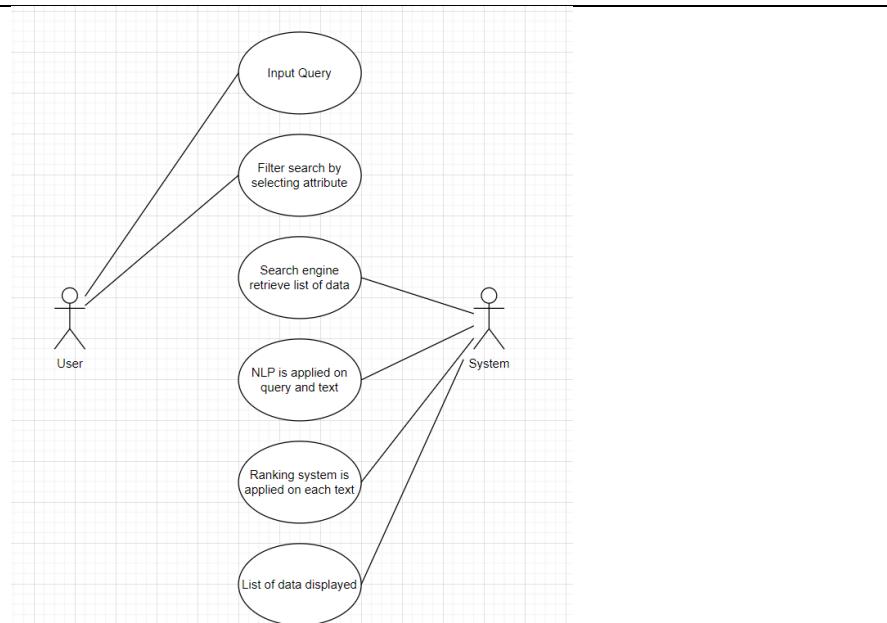


Figure 13 – search NLP use case diagram

Use Case ID: 1

Brief description: Searching database using NLP

Actors: User and System

Basic Flow:

1. The user input a query.
2. The user can filter search by selecting attribute.
3. The user clicks on search button.
4. The system searches database for text containing semantic similarity to the input query.
5. Ranking system ranks similarity score of text in descending order.
6. Text containing similarity score above threshold are displayed within descending order of score.

### 7.3.2 Keyword Search

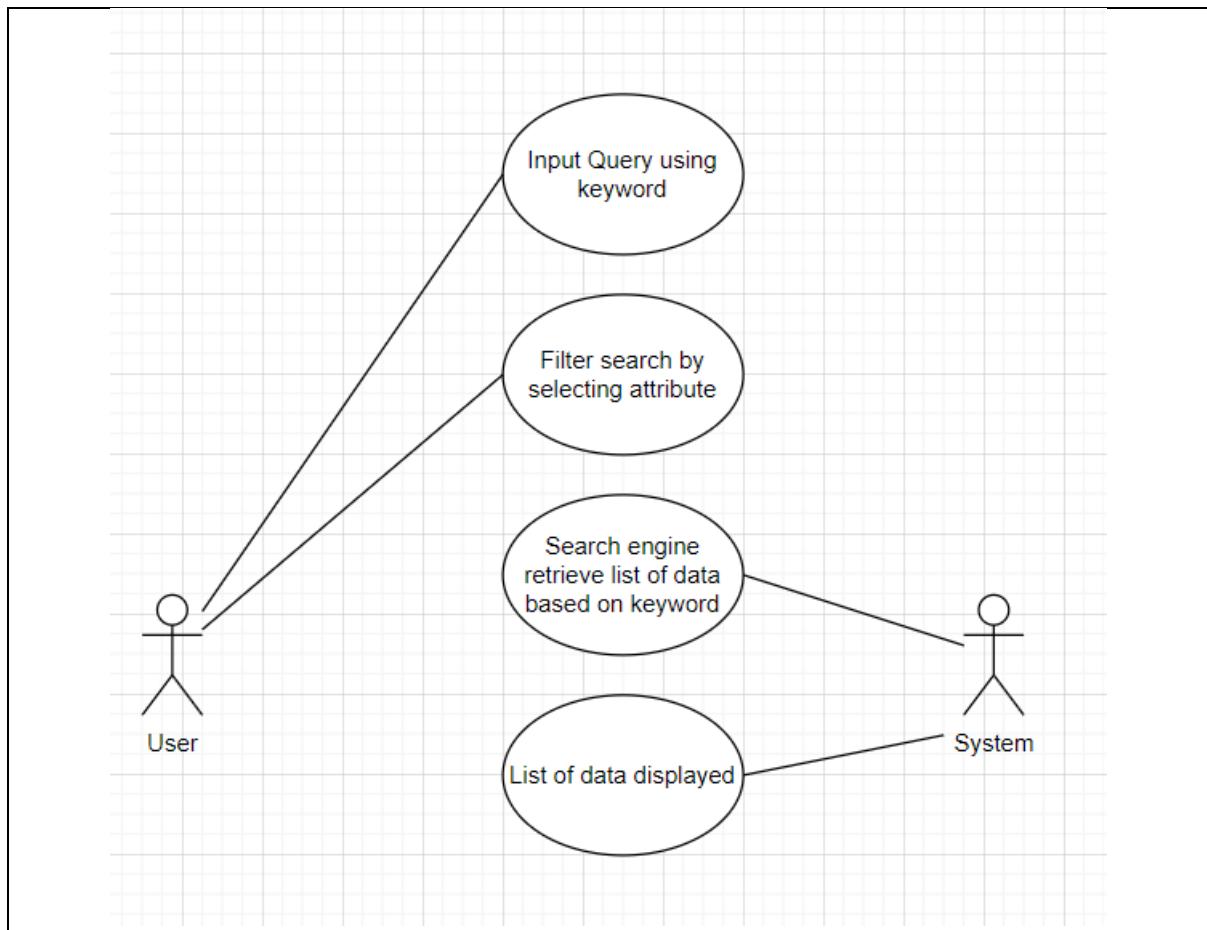


Figure 14 – keyword search use case diagram

Use Case ID: 2

Brief description: Searching database using keyword

Actors: User and System

Basic Flow:

1. The user input a query.
2. The user can filter search by selecting an attribute.
3. The user clicks on search button.
4. The system searches database for text containing keywords that are the same as input.
5. Text containing keyword from input are displayed on interface.

### 7.3.3 Upload

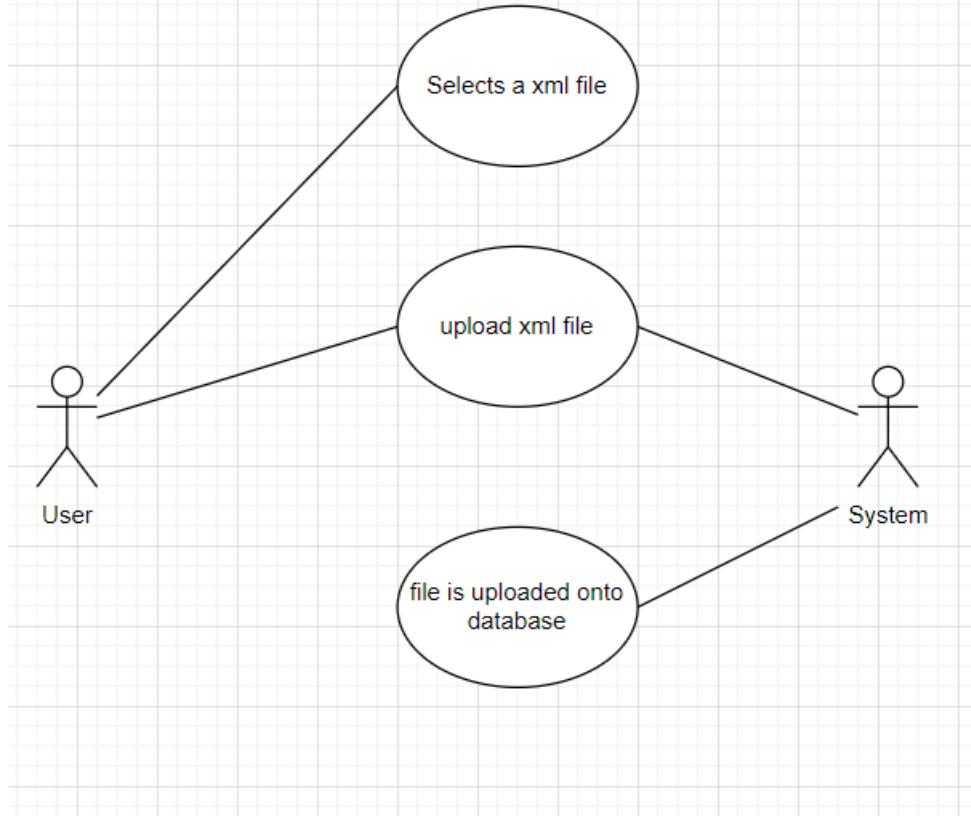


Figure 15 – upload use case diagram

Use Case ID: 3

Brief description: Upload file onto database

Actors: User and System

Basic Flow:

1. The user selects file to upload.
2. The user clicks upload to upload file onto MongoDB database.
3. The System uploads the file onto the database.

# **8 Implementation**

The implementation section of the software application refers to the process of converting the design, functional requirements and non-functional requirements into a functional software product. Various features are implemented in the project for the system to function. These include different language models, search systems and features which assist in the operation of the project.

## **8.1 Basic Implementations (Functional Requirements)**

### **8.1.1 BERT Function**

The BERT system, also known as Bidirectional Encoder Representations from Transformers, is a language model used for natural language processing. The BERT system is designed to comprehend the context of words in a sentence by considering both their left and right contexts. One of its main features is its bidirectional nature, which reads entire sentences in both directions. This allows it to understand the full context of the words by analysing the words before and after them. In addition, the system includes a self-attention component, which considers the importance of each word in a sentence relative to the other words, regardless of their position.

To fully understand how the BERT system works, it can be broken down into several incremental steps:

1. The user's input and text from the database are analysed using BERT.
2. Tokenization – The paragraph and sentences of both input and text are split into smaller units, where each word is converted into a token and placed between special tokens like [CLS] and [SEP].
3. Encoding sentences – The tokens are converted into IDs, showing the numerical representation of tokens in the form of a vector.
4. Transformer Encoder – BERT then processes the tokens relying on the self-attention mechanism and its bidirectional feature to comprehend the contextual relationship between words.
5. BERT embeddings – The module converts the sequence of tokens into an array of real valued vectors representing the tokens.
6. Similarity score – The vectors from both the user input and the text are compared, which reveals a similarity score showing how similar the sentences are in terms of semantics.

The system identifies documents that have the highest similarity score, displays them within the interface in ranking descending order. In addition, the interface only shows documents that have a similarity score of 40 percentage or higher.

### **8.1.2 Stop Word Removal Function**

Stop and Lemmatisation are both text preprocessing techniques used in natural language processing. They are used together to clean and filter textual data for a more precise, accurate, and efficient analysis.

Stop word removal is a process in natural language processing which filters out common words that contain little to no meaningful information during analysing of text. These words, known as stop words, include frequently used words such as “the”, “and”, “on”, “in”, “at”, etc. Stop words are generally essential for constructing sentences and for readers to understand the meaning of that sentence. However, they do not contribute to the context of a document during sentiment analysis and information retrieval.

### **8.1.3 Lemmatisation Function**

Lemmatisation is the process of transforming words to their base form in natural language processing. It uses linguistic knowledge to accurately convert a word to its base form (lemmas) based on its meaning and part of speech.

### **8.1.4 Keyword Search Function**

The Keyword search system is a software tool implemented within the project to retrieve relevant information or documents based on keywords of input from users. For example, when a user submits a query (a set of keywords), the search system processes it and identify documents within the database that contains that same keyword. Those documents are then displayed within the interface.

### **8.1.5 Similarity Score Function**

A similarity score is estimated and assigned to each document within a database based on an algorithm which compares both the query input and text within a document semantically. The similarity score gives a percentage score between 0 – 100, showing how semantically similar the query input and text from documents are.

### **8.1.6 Ranking Function**

The search ranking function is another tool used within the project which is implemented within the BERT system. It ranks the documents in descending order using the similarity score placed within each document, which is then displayed on the interface.

### **8.1.7 Upload Function**

The upload system allows users to upload XML files onto the MongoDB database.

### **8.1.8 Filter Function**

The filter system allows users to narrow down their search by applying restrictions based on their preferred attribute. It enhances the user experience by making it easier to locate specific information within a large set of search results. The data contains several attributes such as post\_id, date, title and text. The user can filter these attributes and find text within a specific attribute they chose. This improves the precision of search and reduces the time spent sorting through irrelevant text.

### **8.1.9 Edit Function**

The Edit System enables users to modify, update, or delete content within data. Each row of data contains an edit feature which allows users to modify text. This includes rearranging text, deleting irrelevant information, or correcting context within documents.

## **8.2 Enhancements (Non-functional Requirements)**

### **8.2.1 Performance**

- Response time – To achieve a lower response time, an embedding vector was stored within each document based on its text in the NoSQL database. The vectors were then used to match the query input embedding vector to find a similarity score. This was done to replace the method of repeatedly finding the embedding vector of the documents every time a query was used. In addition, the MongoDB database generally has a response time for querying data.
- Traffic Handling – The application uses a MongoDB database, which has a scale-out architecture feature. This feature enables the application to handle spikes in traffic which occur at peak hours.
- Throughput – The MongoDB database used in the application is generally capable of handling large volumes of transaction efficiently.
- Scalability - The database uses a NoSQL database which scales horizontally. As a result, the database can contain a large volume of data without sacrificing performance.

### **8.2.2 Security**

- Confidentiality - The system presents only post id and user numbers to protect user identity. This prevents private information from being exposed to other users.

### **8.2.3 Usability**

- Learnability – The user interface was designed to ensure that the user can easily and quickly learn how to use the software effectively. It was designed to match the user's mental model and expectations. Consideration was made towards the user's preferences, expectations and cognitive processes.
- Memorability – The application was designed in such a way that the users can easily regain proficiency in interacting with the software system, even during a period of not using it. This was done by maintaining a consistent layout and having a similar design pattern to other applications. These features allow users to leverage experiences with other applications and promote recognition.
- Efficiency – The design of the application was done like other often used apps, allowing users to recall certain features and promote efficiency of use.

#### **8.2.4 Reliability**

- Consistency – The pages within the website contain a similar design element and structure in terms of colour scheme, typography, layout and navigation menu. This allows a sense of consistency within the website. In addition, documents are displayed within an organised table-format, allowing users to access, find, and identify information quickly and easily.
- Error Handling - Documents within NoSQL database each contain a unique key and post\_ID. When inserting data that contains the same post\_id as the one in the document, an error message will show. This prevents documents from being duplicated.

#### **8.3 Coding Convention**

The code was written within a set of guidelines which allows the code to be consistent, readable, and maintainable. Adopting these guidelines will effectively assist the programmer in debugging, enhancing, and reading the code used within the software application. These sets of guidelines include:

- Naming functions – Naming the functions allows a programmer to better understand how a function operates and how it works together with other function.
- Code formatting – Formatting the code allows it to be more readable and understandable.
- Consistence code structure – Organising code into structures ensures the functions are not too complex.

#### **8.4 Comment on Code**

Commenting on code has been implemented on flask to assist in making the code more readable, maintainable and simpler to understand for others and for the coder in the future. Comments provide a purpose, logic, and functionality of the code without overwhelming the reader. The comments are kept concise and informative.

# 9 Software Testing

To test the functionality and to verify whether the system operates according to specific requirements, a type of software testing known as black box testing was used. The software testing method evaluates the functionality of the software without any prior knowledge of the internal works and structure of the code. This type of testing focuses on the behaviour of the system's functions and extensions using specific inputs and analysing the outputs. The primary goal of this test is to ensure the application behaves as expected, which is done by testing each of the functional requirements and non-functional requirements and fixing any errors that may occur.

Functionality testing can be broken down into several incremental steps:

1. Identifying the functional requirements that need to be tested.
2. Designing the test cases and test environment.
3. Executing test cases.
4. Record any defects.
5. Re-test and regression testing.
6. Evaluate test coverage.

## 9.1 Functional Requirement Testing

The functional requirements that are being tested are the BERT system, Keyword Search system, Filter system, Upload system, Ranking/Similarity Score system. Each of these functional requirements will be tested separately within test cases and will have unique testing environments and inputs to accommodate for its differences. This is also done to ensure the best results and to gain a clearer understanding of each of the systems' functionality.

### 9.1.1 BERT System

To test the BERT system, several pre-conditions were made to ensure testing was functional and optimal. The BERT page was selected and used, including its search query. In addition, six single keywords and three sentences were used as inputs for testing to evaluate how adaptive the search query is. The result is then analysed to find if there are similarities between the input and text.

Case ID	Test Description	Input	Expected Result	Actual Results
1	Test functionality of BERT system with single keyword.	frustrating	Documents relating to frustrating are shown on display.	Appendix 1
2	Test functionality of BERT system	slow	Documents relating to slow are	Appendix 2

	with single keyword.		shown on display.	
3	Test functionality of BERT system with single keyword.	speed	Documents relating to speed are shown on display.	Appendix 3
4	Test functionality of BERT system with single keyword.	complain	Documents relating to court are shown on display.	Appendix 4
5	Test functionality of BERT system with single keyword.	tea	Documents relating to tea are shown on display.	Appendix 5
6	Test functionality of BERT system with sentence.	water	Documents relating to water the sentence are shown on display.	Appendix 6
7	Test functionality of BERT system with sentence.	frustrating response time	Documents relating to the sentence are shown on display.	Appendix 7
8	Test functionality of BERT system with sentence.	Report issues	Documents relating to the sentence are shown on display.	Appendix 8
9	Test functionality of BERT system with sentence.	How to make a pie	Documents relating to the sentence are shown on display.	Appendix 9

### 9.1.2 Semantic Analysis Testing

Semantic analysis was done on the query input and texts from documents to judge how similar the context is with each other semantically. To achieve this, the BERT system page was used, including the natural language processing BERT. Two types of testing were done, the first includes keyword testing which only includes a single keyword. The second includes sentence testing, which includes using sentences within the input query. Furthermore, to gain further insight of the results, the similarity score threshold was removed to see the similarity score of all the text within documents to judge how accurate the similarity scores are.

<b>Case ID</b>	<b>Test Description</b>	<b>Input</b>	<b>Expected Results</b>	<b>Actual Results</b>
10	Testing the functionality of similarity score system by using semantic analyse between query and texts.	adoption	Documents displayed with texts that are semantically connected to query input.	Appendix 10
11	Testing the functionality of similarity score system by using semantic analyse between query and texts.	complaint	Documents displayed with texts that are semantically connected to query input.	Appendix 11
12	Testing the functionality of similarity score system by using semantic analyse between query and texts.	speed	Documents displayed with texts that are semantically connected to query input.	Appendix 12
13	Testing the functionality of similarity score system by using semantic analyse between query and texts.	water	Documents displayed with texts that are semantically connected to query input.	Appendix 5
14	Testing the functionality of similarity score system by using semantic analyse between query and texts.	Frustration with social worker	Documents displayed with texts that are semantically connected to query input.	Appendix 6
15	Testing the functionality of similarity score system by using	Complaints about response time	Documents displayed with texts that are semantically	Appendix 7

	semantic analyse between query and texts.		connected to query input.	
16	Testing the functionality of similarity score system by using semantic analyse between query and texts.	How to make a pie	Documents displayed with texts that are semantically connected to query input.	Appendix 9

### 9.1.3 Keyword Search System

To test the keyword search system, several pre-conditions were made to ensure testing was functional and optimal. The keyword search system page was selected and used, including its filter system and search query. Furthermore, a filter was selected for text1 to ensure the search system applies only to the text attribute. In addition, seven single keywords were used as inputs for testing.

CASE ID	Test Description	Input	Expected Results	Actual Results
17	Test functionality of Keyword search system with a word.	complain	documents containing keyword complain to show on display.	Appendix 13
18	Test functionality of Keyword search system with a word.	social	documents containing keyword social to show on display.	Appendix 14
19	Test functionality of Keyword search system with a word.	and	documents containing keyword and to show on display.	Appendix 15
20	Test functionality of Keyword search system with a word.	work	documents containing keyword work to show on display.	Appendix 16
21	Test functionality of Keyword search system with a word.	people	documents containing keyword people to show on display.	Appendix 17
22	Test functionality of	car	documents containing	Appendix 18

	Keyword search system with a word.		keyword car to show on display.	
23	Test functionality of Keyword search system with a word.	alien	documents containing keyword alien to show on display.	Appendix 19

#### 9.1.4 Filter System Testing

To test the filter system, several pre-conditions were made to ensure testing was functional and optimal. The keyword search system page was selected and used, including its filter feature and search query. Testing was done on each attribute info1, post\_id, main\_post, post\_num, date, user, title and text1.

Case ID	Test Description	Input	Expected Results	Actual Results
24	Test functionality of filter system with info1 attribute	5 to 9	Document containing '5 to 9' keyword on info1 attribute.	Appendix 20
25	Test functionality of filter system with post_id attribute	3123	Document containing '3123' keyword on post_id attribute.	Appendix 21
26	Test functionality of filter system with main_post attribute	0	Document containing '0' keyword on main_post attribute.	Appendix 22
27	Test functionality of filter system with post_num attribute	1	Document containing '1' keyword on post_num attribute.	Appendix 23
28	Test functionality of filter system with date attribute	09/01/2015	Document containing date '09/01/2015' keyword on date attribute.	Appendix 24
29	Test functionality of filter system with user attribute	user1	Document containing 'user1' keyword on user attribute.	Appendix 25

30	Test functionality of filter system with title attribute	Step parent	Document containing 'Step parent' keyword on title attribute.	Appendix 26
31	Test functionality of filter system with text1 attribute	Adoption	Document containing 'Adoption' keyword on text1 attribute.	Appendix 27
32	Test functionality of filter system with post_id attribute that does not contain keyword from query input.	0101	No documents shown on display because no documents contain 0101 keyword.	Appendix 28

#### 9.1.5 Upload System Testing

To test the upload system, the upload page was selected. The file chosen can only be XML, preventing users from selecting non-XML files.

Case ID	Test Description	Input	Expected Results	Actual Results
33	Test functionality of upload system by upload xml file.	Example_file	Documents uploaded on MongoDB and shown on display.	Appendix 29
34	Test functionality of upload system by upload a different xml file.	Example_file2	Documents uploaded on MongoDB and shown on display.	Appendix 30

#### 9.1.6 Ranking System Testing

To test the ranking/similarity score system, several pre-conditions were made to ensure testing was functional and optimal. The BERT search page was selected, since only the BERT system uses the ranking and similarity score system. Inputs that were chosen are queries that are most related to the text. This was done to display documents that have a higher similarity score than the threshold for comparison.

Case ID	Test Description	Input	Expected Results	Actual Results
35	Test functionality of the similarity score system	speed	Documents displayed with similarity score ranked in	Appendix 3

	and the ranking system inputting a querying.		descending order highest to lowest.	
36	Test functionality of the similarity score system and the ranking system inputting a querying.	frustration	Documents displayed with similarity score ranked in descending order highest to lowest.	Appendix 1
37	Test functionality of the similarity score system and the ranking system inputting a querying.	slow	Documents displayed with similarity score ranked in descending order highest to lowest.	Appendix 2

## 9.2 Non-functional Requirement Testing

### 9.2.1 Performance Testing

Performance testing was done on the application by measuring the response time when switching between pages, using the NLP BERT search function, and using the keyword search function. In addition, throughput testing, and scalability testing was completed by inserting large volumes of data onto the MongoDB database through file upload and querying using both search functions. Results show that there is little change in file upload time from uploading single documents of data. In addition, the response time of search also shows negligible difference.

### 9.2.2 Security Testing

Security testing was conducted through a penetration test to assess how difficult it is to edit data without authentication.

### 9.2.3 Compatibility Testing

Compatibility testing was completed on the application through platform compatibility testing and browser compatibility testing.

# **10 Evaluation**

Evaluation will be done on all the functional requirements and non – functional requirements that have been tested. The process will include analysing the results of testing and assessing the function's effectiveness, efficiency, and overall performance.

## **10.1 Function Requirement**

A more thorough evaluation will be conducted on the BERT search function ad the keyword search function. This is since both functions are the most complexed and essential compared to the other functions. The filter function, ranking function, and upload function will undergo a different type of detailed evaluation. This is also due to the filter function and ranking function being subsections of BERT search and keyword search functions. In addition, the upload function is much simpler than the others.

Evaluation will be done on the function's functionality, performance, usability, reliability and precision.

### **10.1.1 BERT Function & Semantic Analysis**

To test the BERT function of the search system, multiple query inputs were used, each varying in semantic value and complexity. During testing of the BERT function, a lot of inconsistencies were shown. Some query inputs show that the function does retrieve documents relating to query input and others do not. For example, when inputting the query 'frustration', many of the documents from the database that are semantically related to the word have been retrieved with high similarity scores (appendix 1).

However, when inputting the query 'complain', only a few documents are retrieved containing a somewhat low similarity score, even though many documents within the database are semantically related to the word complain (appendix 4). Further inconsistency shows with the query input of both 'speed' and 'slow'. When inputting the query 'speed', many documents are retrieved that are semantically related to speed have a high similarity score. However, when inputted the query 'slow', there are many documents that are retrieved but do not contain as high of a similarity score as when inputted the word 'speed'. When analysing the text from the documents that is both retrieved from inputting 'speed' and 'slow', we can see that some of the text from documents are more related to the query slow then speed, but those documents when retrieved using the query 'speed' have a higher similarity score than using the query 'slow' (appendix 2 & 3).

Testing was also done with queries that were unrelated to the text within the documents. As most of the documents are text related to complaining, frustration and adoption, the query input 'tea' and 'water' were used. The results show that no or few documents are retrieved, and those that are retrieved contain a very low similarity score (appendix 5 & 6).

To further test the BERT search function, complex query inputs were also used. When inputting the query 'frustrating response time', documents semantically relating to the

query have been retrieved but do not have a high similarity score as expected, even though through manual analysis, text within those documents is semantically connected to the input query (appendix 7). Further inconsistencies occurred when inputting the query ‘how to make a pie’. This query had no semantic connection to any of the documents, since none of them are related to making a pie. However, some documents were retrieved when a query has been inputted and contain a moderate level of similarity score to the query (appendix 9). Moderate level of similarity score has also been shown when inputting the query ‘Report issues’. Again, multiple documents have been retrieved with medium similarity score levels (appendix 8).

### **10.1.2 Keyword Search Analysis**

To test the keyword search function, single keywords were used. When inputted the words ‘complain’, ‘social’, ‘and’, ‘work’ and ‘people’, the results show that the only documents retrieved are those that have text that contains such keywords (appendix 17, 18, 19, 20 & 21). This shows that the keyword search function does not do any semantic searches like the BERT function, and only searches for texts that contains those keywords used from user input. For example, documents semantically related to work will not be retrieved if text from those documents does not contain the word ‘work’ when using keyword searches.

Further testing shows that words inputted don’t have to be completed or be a word to retrieve documents by text. For example, when inputting the query car, the documents that are retrieved contain the word care. As the word car is a subsection of the word care, documents are still retrieved (appendix 22).

Testing was also done by inputting the keywords ‘alien’ into the query. This word has no semantic connection to any of the documents and contains no such word. No documents have been retrieved (appendix 23).

### **10.1.3 Filter Function Analysis**

Testing was done on all the attributes on the database. The filter function only applies to the keyword search function and the filter must be applied first for users to select which attribute they want to search for. Keyword search can then be used. No errors were encountered showing the function works consistently and effectively (appendix 24 -32).

### **10.1.4 Upload Function Analysis**

Upload function testing shows that the function works but can only select and upload files that are XML. Non–XML will cause an error and will not be uploaded onto the database (appendix 29 and 30).

### **10.1.5 Ranking Function Analysis**

Testing of the ranking function shows that documents retrieved are ranked within descending order of similarity score (appendix 35, 36 & 37). Each test reveals that the function operates as intended, revealing no errors.

## **10.2 Non – functional Requirements Analysis**

The application shows a high level of performance and compatibility. This is due to its low response time and efficiency in uploading and handling large volumes of data without sacrificing performance. A response time shows a value of under 100 milliseconds when switching between pages and using keyword search and a value of around 300 milliseconds when using the BERT search.

Furthermore, the app shows itself to be compatible with various platforms and browsers. As results show that websites can be accessed through Windows, Linux, and macOS. In addition, the application can be accessed through chrome, Firefox, Safari and Microsoft Edge.

The application, however, does lack in terms of security as the system offers negligible protection against unauthorised access and data corruption. As results show, data can be edited with little resistance. In addition, deletion and modification of data shows that there is no backup data in the case of unauthorised access or corruption of data.

Moreover, the application has a decent quality of usability, since the display layout was designed to promote learnability, memorability and efficiency of use. This was done by designing the website where pages on the application show a similar format, promoting a sense of familiarity. Even though usability testing was not conducted due to limited time, resources and other users.

# 11 Reflection on Software Project

## 11.1 What Went Well

One of the main successes of the application was the integration of its search function. The implementation of the BERT search function and keyword search function resulted in a smooth retrieval of information from documents using input queries. Additionally, the functionality of the upload system, filter system, and ranking system have proven to operate smoothly without any faults. In terms of enhancements, the system shows a high quality in user-friendliness, efficiency, and flexibility, which is due to its excellent levels of performance, compatibility, and usability.

Furthermore, how the project was planned proved to be quite effective with the use of an agile software approach. This ensures sections of the project are broken down into manageable chunks and reviewed and modified effectively.

## 11.2 Challenged Faced

Even though the project proved to be successful, significant challenges were faced during the development of the application. Retrieval of data proved to be initially inconsistent due to a mismatch of semantic value between text and input queries. In addition, because of a lack of time and resources, implementation of code and testing can only be done on the most essential aspects of the software project. Otherwise, the application would have performed and functioned at a higher quality.

## 11.3 Learning Experience

During the development process of the project, there is a great deal of knowledge that can be collected. Lessons learnt include the development, debugging, and formatting of code, establishing connections between software to make the application operational, the testing and evaluation of software functions, and presentation of applications through report writing.

## 11.4 Areas of Improvement

Despite the project's success, there are several areas which require improvement. One section would include more effective planning, especially in terms of time management and focusing on specific tasks that are more essential. During the final stages of the project, certain aspects of the project were rushed due to more time spent on areas that were less important, such as on the coding section rather than the testing section. On future projects, more time will be allocated for testing and planning to ensure a smoother launch.

## 12 Conclusion

The aim for the development of the software project is to provide a system capable of easily retrieving unstructured data from NoSQL databases. This is due to the issues of modern relational databases and their problems with scalability, and NoSQL databases and its limitations with querying.

In conclusion, the software project was capable of addressing the need of retrieving unstructured data from NoSQL databases. With main features such as the BERT function and the keyword search function providing the methods of retrieving such data. In addition, the filter function, ranking function and upload function improve the efficiency of search and provide more tools for the project.

Throughout the development process, challenges such as inconsistency in semantic matching between query and text from documents have been identified. To correct these issues, improvements to the search function was made with the use of stop words and lemmatisation, which makes the function more proficient in retrieving information, asking the software project more robust and efficient. However, inconsistencies still show when inputting queries as some documents retrieved are not always semantically related to the text. This shows that the natural language processing system BERT is still immature and requires additional training to more accurately retrieve data through queries.

Even with these problems, users when utilising the software search function can expect to retrieve wanted information and data through queries, which can be done by using the natural language processing system BERT and the keyword search function, which searches for text by keywords. This enables multiple options for users to easily retrieve data/information depending on their preference. In addition, since the software product uses NoSQL databases, it allows for scalability and the containing of huge amounts of data without sacrificing performance.

In conclusion, the software project accomplishes its goal of retrieving unstructured data from NoSQL databases. Despite the setback, the software project does offer significant value to users and will continue to evolve and adapt in the future through planned enhancements and developments.

## 13 Future work

While the software project successfully achieves its goal of retrieving unstructured data from NoSQL databases with relative ease, there are areas which require improvement to enhance its retrieval accuracy, user experience and performance. For example, implementing a more efficient search system or applying more features to enhance the overall user experience.

Additional features and functionalities can be implemented in the future. These features and functionalities were not applied due to lack of time and resources. For example, inserting an export system which allows users to export a chosen document into another file, and providing a user account system that allows users to access the website by using a username and password.

Furthermore, multiple functions do require improvement to provide a more accurate and effective search. This can be done by enhancing the natural language processing BERT system and keyword search system for a more effective search. This can be done by using a BERT system that has more training data than the current one and by improving the keyword search system by incorporating Boolean search, stemming and lemmatisation.

In addition, performance and security enhancements can also be provided. Allowing only qualified users to edit texts in data and provide a backup database in case the current database becomes corrupted.

Moreover, testing of the software application can be done with other users which provides feedback and additional information which may be overlooked by just using black box testing. Exploration of more literature can also be conducted by reviewing other natural language processing tools.

Overall, future research and implementation will potentially create an innovative and effective system capable of retrieving unstructured data efficiently from NoSQL database.

## 14 Reference

Hassan, M. (2021). ‘Relational and NoSQL Databases: The Appropriate Database Model Choice’. International Arab Conference on Information Technology (ACIT). Muscat, Oman, 21-23 December.

Haseeb, A., and Pattun, G. (2017). ‘A review on NoSQL: Applications and Challenges’. International Journal of Advanced Research in Computer Science, 62(1), pp. 203-207.

Bhogal, J., Choksi, I. (2015). ‘Handling Big Data Using NoSQL’. International Conference on Advanced Information Networking and Applications Workshops. Gwangju, Korea (South), 24-27 March.

Malik, A., Burney, A., and Ahmed F. (2020). ‘A Comparative Study of Unstructured Data with SQL and NO-SQL Database Management System’. Journal of Computer and Communications, 8(4), pp. 59-71.

Kunda, B., and Phiri, H. (2017). ‘A Comparative Study of NoSQL and Relational Database’. Zambia Information Communication Technology (ICT) Journal, 1(1), pp. 1-4.

Chandra, D. (2015). ‘BASE analysis of NoSQL database’. Future Generation Computer Systems, 52, pp. 13-21.

Bozic, R. (2022). ‘Advantages of Challenges of NoSQL Compared to SQL Databases – A Systematic Literature Review’. Zbornik Radova Ekonomskog Fakulteta Brcko, 16, pp. 11-20.

Sirisha, J., and Reddy, M. (2017). ‘Unstructured Data: Various approaches for Storage, Extraction and Analysis’. International Journal of Computer Science and Information Security, 15(7), pp. 101-106.

Baker, H., and Price, E. (2021). ‘NoSQL Databases and Big Data Query Processing: Comparative Analysis’. Internation Journal of Network and Communication Research, 6(1), pp. 25-34.

Zhang, W., Wang, W., Zhu, L.,Zheng, R., and Liu X. (2019). ‘Python-Based Unstructured Data Retrieval System’. International Conference on Smart Grid and Electrical Automation. Xiangtan, China, 10-11 August.

Sharma, R., Agarwal, P., and Arya, A. (2022), ‘Natural Language Processing and Big Data: A Strapping Combination’. New Trends and Applications in Internet of Things (IoT) and Big Data Analytics, 221, pp. 255-271.

Wang, J., Huang, J., Tu, X., Wang, J., Huang, A., Laskar, T., and Bhuiyan, A. (2024), ‘Utilizing BERT for Information Retrieval: Survey, Applications, Resources, and Challenges’, ACM Computers Surveys, 56(7), pp.1 – 33.

Lauriola, I., Lavelli, A., and Aiolfi, F. (2022), ‘An introduction to Deep Learning in Natural Language Processing: Models, techniques, and tools’. Neurocomputing, 470, pp. 443-456.

# 15 Appendix

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1	similarity_score		
5 to 9	%do you know%	178	3127	0	5	09/01/2015 17:29:28	user1	Step parent - not getting anywhere with social worker	It's just frustrating why for other things one can apply to court direct with solicitor but for adoption you have to deal with local authority and they are so slow and not efficient	0.771618664264679	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3124	0	2	09/01/2015 16:36:00	user2	Step parent - not getting anywhere with social worker	"Can apply direct too court , need too write too your LA of your intent, go on line too Family Court Adoption. (Adoption for Guidance). We did our own , though social services etc still have too do their input and searches on referee's , etc. Think it cost us around £170 was some years ago (6). Cost too LA around £9000 and Agency's charge anything from £16000 upwards. Court will send you relevant paperwork. Would speak too family court for advice and guidance thing's may have changed. Coram Legal will also give you advice."	0.6820033192634583	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3127	0	5	09/01/2015 17:29:28	user1	Step parent - not getting anywhere with social worker	The local authority is so slow. Is there anyway to speed it up?	0.5017321109771729	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3126	0	4	09/01/2015 17:18:45	user1	Step parent - not getting anywhere with social worker	Thanks for your message. We have sent letter of intention 2 years ago and waited all this time for social worker to do her job. She is supposed to send the application with her report and our documents but as i said keeps making mistakes and nothing gets done.	0.48384588956832886	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3124	0	2	09/01/2015 16:36:00	user2	Step parent - not getting anywhere with social worker	Why an not getting any response? This is taking too long.	0.4815632104873657	<a href="#">Edit</a>	<a href="#">Export file</a>

Appendix 1 – BERT results of inputting frustrating

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1	similarity_score		
5 to 9	%do you know%	178	3127	0	5	09/01/2015 17:29:28	user1	Step parent - not getting anywhere with social worker	It's just frustrating why for other things one can apply to court direct with solicitor but for adoption you have to deal with local authority and they are so slow and not efficient	0.5748131275177002	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3127	0	5	09/01/2015 17:29:28	user1	Step parent - not getting anywhere with social worker	The local authority is so slow. Is there anyway to speed it up?	0.5503062605857849	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3125	0	3	09/01/2015 17:10:13	user3	Step parent - not getting anywhere with social worker	Can I please complain to the local authority?	0.5416221618652344	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3124	0	2	09/01/2015 16:36:00	user2	Step parent - not getting anywhere with social worker	Why an not getting any response? This is taking too long.	0.5056332945823669	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3126	0	4	09/01/2015 17:18:45	user1	Step parent - not getting anywhere with social worker	Thanks for your message. We have sent letter of intention 2 years ago and waited all this time for social worker to do her job. She is supposed to send the application with her report and our documents but as i said keeps making mistakes and nothing gets done.	0.44455647468566895	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	130	3114	2	7	08/03/2017 12:23:23	user7	Social worker - concerns with parent	Parenthood has played a huge part in a child's life and after reviewing my latest one I can conclude she acceptable for adoption.	0.43398764729499817	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	170	2414	2	7	24/03/2017 14:30:00	user7	Social worker - concerns with parent	I do not think my recent contact is prepared for adoption. When i visited her home she was very disorganised and wore unprofessionally when I visited.	0.4174914062023163	<a href="#">Edit</a>	<a href="#">Export file</a>

Appendix 2 - BERT results of inputting slow

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1	similarity_score		
5 to 9	%do you know%	178	3127	0	5	09/01/2015 17:29:28	user1	Step parent - not getting anywhere with social worker	It's just frustrating why for other things one can apply to court direct with solicitor but for adoption you have to deal with local authority and they are so slow and not efficient	0.73209547996521	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3124	0	2	09/01/2015 16:36:00	user2	Step parent - not getting anywhere with social worker	"Can apply direct to court , need to write to your LA of your intent, go online to Family Court Adoption. (Adoption for Guidance). We did our own , though social services etc still have too do their input and searches on referee's , etc. Think it cost us around £170 was some years ago (6). Cost to LA around £9000 and Agency's charge anything from £16000 upwards. Court will send you relevant paperwork. Would speak to family court for advice and guidance things may have changed. Coram Legal will also give you advice."	0.5944005250930786	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3125	0	3	09/01/2015 17:10:13	user3	Step parent - not getting anywhere with social worker	Can I please complain to the local authority?	0.5182273983955383	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3124	0	2	09/01/2015 16:36:00	user2	Step parent - not getting anywhere with social worker	Why am not getting any response? This is taking too long.	0.466628760099411	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	130	3114	2	7	08/03/2017 12:23:23	user7	Social worker - concerns with parent	Parenthood has played a huge part in a child's life and after reviewing my latest one I can conclude she acceptable for adoption.	0.46170029044151306	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3127	0	5	09/01/2015 17:29:28	user1	Step parent - not getting anywhere with social worker	The local authority is so slow. Is there anyway to speed it up?	0.4603396952152252	<a href="#">Edit</a>	<a href="#">Export file</a>

### Appendix 3 - BERT results of inputting speed

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1	similarity_score		
5 to 9	%do you know%	178	3127	0	5	09/01/2015 17:29:28	user1	Step parent - not getting anywhere with social worker	It's just frustrating why for other things one can apply to court direct with solicitor but for adoption you have to deal with local authority and they are so slow and not efficient	0.43521177768707275	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	130	3114	2	7	08/03/2017 12:23:23	user7	Social worker - concerns with parent	Parenthood has played a huge part in a child's life and after reviewing my latest one I can conclude she acceptable for adoption.	0.4037904441356659	<a href="#">Edit</a>	<a href="#">Export file</a>

### Appendix 4 - BERT results of inputting complain

Search Query:

### Appendix 5 - BERT results of inputting tea

Search Query:

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1	similarity_score		
5 to 9	%do you know%	178	3125	0	3	09/01/2015 17:10:13	user3	Step parent - not getting anywhere with social worker	"Complain to supervising social worker /director of social care if that doesn't get you anywhere. Seems particularly poor, especially losing your documents"	0.41782647371292114	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3125	0	3	09/01/2015 17:10:13	user3	Step parent - not getting anywhere with social worker	Can I please complain to the local authority?	0.40591752529144287	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3127	0	5	09/01/2015 17:29:28	user1	Step parent - not getting anywhere with social worker	The local authority is so slow. Is there anyway to speed it up?	0.4033835530281067	<a href="#">Edit</a>	<a href="#">Export file</a>

### Appendix 6 - BERT results of inputting water

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1	similarity_score		
5 to 9	%do you know%	178	3125	0	3	09/01/2015 17:10:13	user3	Step parent - not getting anywhere with social worker	Can I please complain to the local authority?	0.5185697674751282	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3127	0	5	09/01/2015 17:29:28	user1	Step parent - not getting anywhere with social worker	The local authority is so slow. Is there anyway to speed it up?	0.44261521100997925	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3127	0	5	09/01/2015 17:29:28	user1	Step parent - not getting anywhere with social worker	It's just frustrating why for other things one can apply to court direct with solicitor but for adoption you have to deal with local authority and they are so slow and not efficient	0.4159166216850281	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3124	0	2	09/01/2015 16:36:00	user2	Step parent - not getting anywhere with social worker	Why an not getting any response? This is taking too long.	0.4071483612060547	<a href="#">Edit</a>	<a href="#">Export file</a>

## Appendix 7 - BERT results of inputting frustrating response time

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1	similarity_score		
5 to 9	%do you know%	178	3127	0	5	09/01/2015 17:29:28	user1	Step parent - not getting anywhere with social worker	It's just frustrating why for other things one can apply to court direct with solicitor but for adoption you have to deal with local authority and they are so slow and not efficient	0.504067063331604	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	130	3114	2	7	08/03/2017 12:23:23	user7	Social worker - concerns with parent	Parenthood has played a huge part in a child's life and after reviewing my latest one I can conclude she acceptable for adoption.	0.4756924510002136	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3125	0	3	09/01/2015 17:10:13	user3	Step parent - not getting anywhere with social worker	Can I please complain to the local authority?	0.45395904779434204	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3127	0	5	09/01/2015 17:29:28	user1	Step parent - not getting anywhere with social worker	The local authority is so slow. Is there anyway to speed it up?	0.42643535137176514	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3125	0	3	09/01/2015 17:10:13	user3	Step parent - not getting anywhere with social worker	"Complain to supervising social worker /director of social care if that doesn't get Get you anywhere. Seems particularly poor, especially losing your documents"	0.40991443395614624	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3124	0	2	09/01/2015 16:36:00	user2	Step parent - not getting anywhere with social worker	Why an not getting any response? This is taking too long.	0.40591830015182495	<a href="#">Edit</a>	<a href="#">Export file</a>

## Appendix 8 - BERT results of inputting report issues

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1	similarity_score		
5 to 9	%do you know%	178	3127	0	5	09/01/2015 17:29:28	user1	Step parent - not getting anywhere with social worker	It's just frustrating why for other things one can apply to court direct with solicitor but for adoption you have to deal with local authority and they are so slow and not efficient	0.41464489698410034	<a href="#">Edit</a>	<a href="#">Export file</a>

## Appendix 9 - BERT results of inputting how to make a pie

Search Query:

## Appendix 10 - BERT results of inputting adoption

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1	similarity_score		
5 to 9	%do you know%	178	3125	0	3	09/01/2015 17:10:13	user3	Step parent - not getting anywhere with social worker	Can I please complain to the local authority?	0.4457750916481018	<a href="#">Edit</a>	<a href="#">Export file</a>

## Appendix 11 - BERT results of inputting complaint

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1	similarity_score		
5 to 9	%do you know%	178	3127	0	5	09/01/2015 17:29:28	user1	Step parent - not getting anywhere with social worker	It's just frustrating why for other things one can apply to court direct with solicitor but for adoption you have to deal with local authority and they are so slow and not efficient	0.6127499341964722	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3124	0	2	09/01/2015 16:36:00	user2	Step parent - not getting anywhere with social worker	"Can apply direct too court , need too write too your LA of your intent, go on line too Family Court Adoption. (Adoption for Guidance). We did our own , though social services etc still have too do their input and searches on referee's , etc. Think it cost us around £170 was some years ago (6). Cost too LA around £9000 and Agency's charge anything from £16000 upwards. Court will send you relevant paperwork. Would speak too family court for advice and guidance thing's may have changed. Coram Legal will also give you advice."	0.5518159866333008	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3125	0	3	09/01/2015 17:10:13	user3	Step parent - not getting anywhere with social worker	Can I please complain to the local authority?	0.5502440929412842	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3124	0	2	09/01/2015 16:36:00	user2	Step parent - not getting anywhere with social worker	Why an not getting any response? This is taking too long.	0.4546290636062622	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3126	0	4	09/01/2015 17:18:45	user1	Step parent - not getting anywhere with social worker	Thanks for your message. We have sent letter of intention 2 years ago and waited all this time for social worker to do her job. She is supposed to send the application with her report and our documents but as i said keeps making mistakes and nothing gets done.	0.44547292590141296	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3125	0	3	09/01/2015 17:10:13	user3	Step parent - not getting anywhere with social worker	"Complain to supervising social worker /director of social care if that doesn't get Get you anywhere. Seems particularly poor, especially losing your documents"	0.4194067120552063	<a href="#">Edit</a>	<a href="#">Export file</a>

## Appendix 12 - BERT results of inputting speed

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1		
5 to 9	%do you know%	178	3125	0	3	09/01/2015 17:10:13	user3	Step parent - not getting anywhere with social worker	"Complain to supervising social worker /director of social care if that doesn't get Get you anywhere. Seems particularly poor, especially losing your documents"	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3125	0	3	09/01/2015 17:10:13	user3	Step parent - not getting anywhere with social worker	Can I please complain to the local authority?	<a href="#">Edit</a>	<a href="#">Export file</a>

## Appendix 13 - keyword search results of inputting complain

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1		
5 to 9	%do you know%	178	3123	1	1	09/01/2015 14:17:13	user1	Step parent - not getting anywhere with social worker	Hi there I need some advice from anyone going through step parent adoption or any solicitors. My single husband applied to adopt my DD in 2015 to the local authority. It took them 1 year to allocate a social worker. We have been dealing with this social worker now for over a year and my patience is running thin. She took 1 year to interview everyone and prepare a report and we got to the stage to finally submit everything to local court but she made a mistake with dates and all got returned and all documents lost in post . She made numerous mistakes and there is constant delay. She is very nice but very inefficient and I really don't know where to take this now. It's been 2 years since we applied and application is not even in court yet. Do you know if possible for us to apply directly to court with our own statement or maybe instruct a solicitor?	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3124	0	2	09/01/2015 16:36:00	user2	Step parent - not getting anywhere with social worker	"Can apply direct too court , need too write too your LA of your intent, go on line too Family Court Adoption. (Adoption for Guidance). We did our own , though social services etc still have too do their input and searches on referee's , etc. Think it cost us around £170 was some years ago (6). Cost too LA around £9000 and Agency's charge anything from £16000 upwards. Court will send you relevant paperwork. Would speak too family court for advice and guidance thing's may have changed. Coram Legal will also give you advice."	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3125	0	3	09/01/2015 17:10:13	user3	Step parent - not getting anywhere with social worker	"Complain to supervising social worker /director of social care if that doesn't get Get you anywhere. Seems particularly poor, especially losing your documents"	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3126	0	4	09/01/2015 17:18:45	user1	Step parent - not getting anywhere with social worker	Thanks for your message. We have sent letter of intention 2 years ago and waited all this time for social worker to do her job. She is supposed to send the application with her report and our documents but as i said keeps making mistakes and nothing gets done.	<a href="#">Edit</a>	<a href="#">Export file</a>

## Appendix 14 - keyword search results of inputting social

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1		
5 to 9	%do you know%	178	3123	1	1	09/01/2015 14:17:13	user1	Step parent - not getting anywhere with social worker	Hi there I need some advice from anyone going through step parent adoption or any solicitors. My single husband applied to adopt my DD in 2015 to the local authority. It took them 1 year to allocate a social worker. We have been dealing with this social worker now for over a year and my patience is running thin. She took 1 year to interview everyone and prepare a report and we got to the stage to finally submit everything to local court but she made a mistake with dates and all got returned and all documents lost in post . She made numerous mistakes and there is constant delay. She is very nice but very inefficient and I really don't know where to take this now. It's been 2 years since we applied and application is not even in court yet. Do you know if possible for us to apply directly to court with our own statement or maybe instruct a solicitor?	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3124	0	2	09/01/2015 16:36:00	user2	Step parent - not getting anywhere with social worker	"Can apply direct too court , need too write too your LA of your intent, go on line too Family Court Adoption. (Adoption for Guidance). We did our own , though social services etc still have too do their input and searches on referee's , etc. Think it cost us around £170 was some years ago (6). Cost too LA around £9000 and Agency's charge anything from £16000 upwards. Court will send you relevant paperwork. Would speak too family court for advice and guidance thing's may have changed. Coram Legal will also give you advice."	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3126	0	4	09/01/2015 17:18:45	user1	Step parent - not getting anywhere with social worker	Thanks for your message. We have sent letter of intention 2 years ago and waited all this time for social worker to do her job. She is supposed to send the application with her report and our documents but as i said keeps making mistakes and nothing gets done.	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3127	0	5	09/01/2015 17:29:28	user1	Step parent - not getting anywhere with social worker	It's just frustrating why for other things one can apply to court direct with solicitor but for adoption you have to deal with local authority and they are so slow and not efficient	<a href="#">Edit</a>	<a href="#">Export file</a>

## Appendix 15 - keyword search results of inputting and

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1		
5 to 9	%do you know%	178	3123	1	1	09/01/2015 14:17:13	user1	Step parent - not getting anywhere with social worker	Hi there I need some advice from anyone going through step parent adoption or any solicitors. My single husband applied to adopt my DD in 2015 to the local authority. It took them 1 year to allocate a social worker. We have been dealing with this social worker now for over a year and my patience is running thin. She took 1 year to interview everyone and prepare a report and we got to the stage to finally submit everything to local court but she made a mistake with dates and all got returned and all documents lost in post . She made numerous mistakes and there is constant delay. She is very nice but very inefficient and I really don't know where to take this now. It's been 2 years since we applied and application is not even in court yet. Do you know if possible for us to apply directly to court with our own statement or maybe instruct a solicitor?	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3124	0	2	09/01/2015 16:36:00	user2	Step parent - not getting anywhere with social worker	"Can apply direct too court , need too write too your LA of your intent, go on line too Family Court Adoption. (Adoption for Guidance). We did our own , though social services etc still have too do their input and searches on referee's , etc. Think it cost us around £170 was some years ago (6). Cost too LA around £9000 and Agency's charge anything from £16000 upwards. Court will send you relevant paperwork. Would speak too family court for advice and guidance thing's may have changed. Coram Legal will also give you advice."	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3125	0	3	09/01/2015 17:10:13	user3	Step parent - not getting anywhere with social worker	"Complain to supervising social worker /director of social care if that doesn't get Get you anywhere. Seems particularly poor, especially losing your documents"	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3126	0	4	09/01/2015 17:18:45	user1	Step parent - not getting anywhere with social worker	Thanks for your message. We have sent letter of intention 2 years ago and waited all this time for social worker to do her job. She is supposed to send the application with her report and our documents but as i said keeps making mistakes and nothing gets done.	<a href="#">Edit</a>	<a href="#">Export file</a>

## Appendix 16 - keyword search results of inputting work

Search Query:

## Appendix 17 - keyword search results of inputting people

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1		
5 to 9	%do you know%	178	3125	0	3	09/01/2015 17:10:13	user3	Step parent - not getting anywhere with social worker	"Complain to supervising social worker /director of social care if that doesn't get Get you anywhere. Seems particularly poor, especially losing your documents"	<a href="#">Edit</a>	<a href="#">Export file</a>

## Appendix 18 - keyword search results of inputting car

Search Query:

## Appendix 19 - keyword search results of inputting alien

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1		
5 to 9	%do you know%	178	3123	1	1	09/01/2015 14:17:13	user1	Step parent - not getting anywhere with social worker	Hi there I need some advice from anyone going through step parent adoption or any solicitors. My single husband applied to adopt my DD in 2015 to the local authority. It took them 1 year to allocate a social worker. We have been dealing with this social worker now for over a year and my patience is running thin. She took 1 year to interview everyone and prepare a report and we got to the stage to finally submit everything to local court but she made a mistake with dates and all got returned and all documents lost in post . She made numerous mistakes and there is constant delay. She is very nice but very inefficient and I really don't know where to take this now. It's been 2 years since we applied and application is not even in court yet. Do you know if possible for us to apply directly to court with our own statement or maybe instruct a solicitor?	Edit	Export file
5 to 9	%do you know%	178	3124	0	2	09/01/2015 16:36:00	user2	Step parent - not getting anywhere with social worker	"Can apply direct too court , need too write too your LA of your intent, go on line too Family Court Adoption. (Adoption for Guidance). We did our own , though social services etc still have too do their input and searches on referee's , etc. Think it cost us around £170 was some years ago (6). Cost too LA around £9000 and Agency's charge anything from £16000 upwards. Court will send you relevant paperwork. Would speak too family court for advice and guidance thing's may have changed. Coram Legal will also give you advice."	Edit	Export file
5 to 9	%do you know%	178	3125	0	3	09/01/2015 17:10:13	user3	Step parent - not getting anywhere with social worker	"Complain to supervising social worker /director of social care if that doesn't get Get you anywhere. Seems particularly poor, especially losing your documents"	Edit	Export file
5 to 9	%do you know%	178	3126	0	4	09/01/2015 17:18:45	user1	Step parent - not getting anywhere with social worker	Thanks for your message. We have sent letter of intention 2 years ago and waited all this time for social worker to do her job. She is supposed to send the application with her report and our documents but as i said keeps making mistakes and nothing gets done.	Edit	Export file
5 to 9	%do you know%	178	3127	0	5	09/01/2015 17:29:28	user1	Step parent - not getting anywhere with social worker	It's just frustrating why for other things one can apply to court direct with solicitor but for adoption you have to deal with local authority and they are so slow and not efficient	Edit	Export file

## Appendix - keyword search results of inputting 5 to 9

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1		
5 to 9	%do you know%	178	3123	1	1	09/01/2015 14:17:13	user1	Step parent - not getting anywhere with social worker	Hi there I need some advice from anyone going through step parent adoption or any solicitors. My single husband applied to adopt my DD in 2015 to the local authority. It took them 1 year to allocate a social worker. We have been dealing with this social worker now for over a year and my patience is running thin. She took 1 year to interview everyone and prepare a report and we got to the stage to finally submit everything to local court but she made a mistake with dates and all got returned and all documents lost in post . She made numerous mistakes and there is constant delay. She is very nice but very inefficient and I really don't know where to take this now. It's been 2 years since we applied and application is not even in court yet. Do you know if possible for us to apply directly to court with our own statement or maybe instruct a solicitor?	Edit	Export file
5 to 9	%do you know%	178	3123	1	1	09/01/2015 14:17:13	user1	Step parent - not getting anywhere with social worker	Hi there I need some advice from anyone going through step parent adoption or any solicitors. My husband applied to adopt my DD in 2015 to the local authority. It took them 1 year to allocate a social worker. We have been dealing with this social worker now for over a year and my patience is running thin. She took 1 year to interview everyone and prepare a report and we got to the stage to finally submit everything to local court but she made a mistake with dates and all got returned and all documents lost in post . She made numerous mistakes and there is constant delay. She is very nice but very inefficient and I really don't know where to take this now. It's been 2 years since we applied and application is not even in court yet. Do you know if possible for us to apply directly to court with our own statement or maybe instruct a solicitor?	Edit	Export file

## Appendix 21 - keyword search results of inputting 3123

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1		
5 to 9	%do you know%	178	3124	0	2	09/01/2015 16:36:00	user2	Step parent - not getting anywhere with social worker	"Can apply direct too court , need too write too your LA of your intent, go on line too Family Court Adoption. (Adoption for Guidance). We did our own , though social services etc still have too do their input and searches on referee's , etc. Think it cost us around £170 was some years ago (6). Cost too LA around £9000 and Agency's charge anything from £16000 upwards. Court will send you relevant paperwork. Would speak too family court for advice and guidance thing's may have changed. Coram Legal will also give you advice."	Edit	Export file
5 to 9	%do you know%	178	3125	0	3	09/01/2015 17:10:13	user3	Step parent - not getting anywhere with social worker	"Complain to supervising social worker /director of social care if that doesn't get Get you anywhere. Seems particularly poor, especially losing your documents"	Edit	Export file
5 to 9	%do you know%	178	3126	0	4	09/01/2015 17:18:45	user1	Step parent - not getting anywhere with social worker	Thanks for your message. We have sent letter of intention 2 years ago and waited all this time for social worker to do her job. She is supposed to send the application with her report and our documents but as i said keeps making mistakes and nothing gets done.	Edit	Export file
5 to 9	%do you know%	178	3127	0	5	09/01/2015 17:29:28	user1	Step parent - not getting anywhere with social worker	It's just frustrating why for other things one can apply to court direct with solicitor but for adoption you have to deal with local authority and they are so slow and not efficient	Edit	Export file
5 to 9	%do you know%	178	3124	0	2	09/01/2015 16:36:00	user2	Step parent - not getting anywhere with social worker	Why an not getting any response? This is taking too long.	Edit	Export file
5 to 9	%do you know%	178	3125	0	3	09/01/2015 17:10:13	user3	Step parent - not getting anywhere with social worker	Can I please complain to the local authority?	Edit	Export file

## Appendix 22 - keyword search results of inputting 0

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1		
5 to 9	%do you know%	178	3123	1	1	09/01/2015 14:17:13	user1	Step parent - not getting anywhere with social worker	Hi there I need some advice from anyone going through step parent adoption or any solicitors. My single husband applied to adopt my DD in 2015 to the local authority. It took them 1 year to allocate a social worker. We have been dealing with this social worker now for over a year and my patience is running thin. She took 1 year to interview everyone and prepare a report and we got to the stage to finally submit everything to local court but she made a mistake with dates and all got returned and all documents lost in post . She made numerous mistakes and there is constant delay. She is very nice but very inefficient and I really don't know where to take this now. It's been 2 years since we applied and application is not even in court yet. Do you know if possible for us to apply directly to court with our own statement or maybe instruct a solicitor?	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3123	1	1	09/01/2015 14:17:13	user1	Step parent - not getting anywhere with social worker	Hi there I need some advice from anyone going through step parent adoption or any solicitors. My husband applied to adopt my DD in 2015 to the local authority. It took them 1 year to allocate a social worker. We have been dealing with this social worker now for over a year and my patience is running thin. She took 1 year to interview everyone and prepare a report and we got to the stage to finally submit everything to local court but she made a mistake with dates and all got returned and all documents lost in post . She made numerous mistakes and there is constant delay. She is very nice but very inefficient and I really don't know where to take this now. It's been 2 years since we applied and application is not even in court yet. Do you know if possible for us to apply directly to court with our own statement or maybe instruct a solicitor?	<a href="#">Edit</a>	<a href="#">Export file</a>

### Appendix 23 - keyword search results of inputting 1

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1		
5 to 9	%do you know%	178	3123	1	1	09/01/2015 14:17:13	user1	Step parent - not getting anywhere with social worker	Hi there I need some advice from anyone going through step parent adoption or any solicitors. My single husband applied to adopt my DD in 2015 to the local authority. It took them 1 year to allocate a social worker. We have been dealing with this social worker now for over a year and my patience is running thin. She took 1 year to interview everyone and prepare a report and we got to the stage to finally submit everything to local court but she made a mistake with dates and all got returned and all documents lost in post . She made numerous mistakes and there is constant delay. She is very nice but very inefficient and I really don't know where to take this now. It's been 2 years since we applied and application is not even in court yet. Do you know if possible for us to apply directly to court with our own statement or maybe instruct a solicitor?	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3124	0	2	09/01/2015 16:36:00	user2	Step parent - not getting anywhere with social worker	"Can apply direct too court , need too write too your LA of your intent, go on line too Family Court Adoption. (Adoption for Guidance). We did our own , though social services etc still have too do their input and searches on referee's , etc. Think it cost us around £170 was some years ago (6). Cost too LA around £9000 and Agency's charge anything from £16000 upwards. Court will send you relevant paperwork. Would speak too family court for advice and guidance thing's may have changed. Coram Legal will also give you advice."	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3125	0	3	09/01/2015 17:10:13	user3	Step parent - not getting anywhere with social worker	"Complain to supervising social worker /director of social care if that doesn't get you anywhere. Seems particularly poor, especially losing your documents"	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3126	0	4	09/01/2015 17:18:45	user1	Step parent - not getting anywhere with social worker	Thanks for your message. We have sent letter of intention 2 years ago and waited all this time for social worker to do her job. She is supposed to send the application with her report and our documents but as i said keeps making mistakes and nothing gets done.	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3127	0	5	09/01/2015 17:29:28	user1	Step parent - not getting anywhere with social worker	It's just frustrating why for other things one can apply to court direct with solicitor but for adoption you have to deal with local authority and they are so slow and not efficient	<a href="#">Edit</a>	<a href="#">Export file</a>

### Appendix 24 - keyword search results of inputting 09/01/2015

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1		
5 to 9	%do you know%	178	3123	1	1	09/01/2015 14:17:13	user1	Step parent - not getting anywhere with social worker	Hi there I need some advice from anyone going through step parent adoption or any solicitors. My single husband applied to adopt my DD in 2015 to the local authority. It took them 1 year to allocate a social worker. We have been dealing with this social worker now for over a year and my patience is running thin. She took 1 year to interview everyone and prepare a report and we got to the stage to finally submit everything to local court but she made a mistake with dates and all got returned and all documents lost in post . She made numerous mistakes and there is constant delay. She is very nice but very inefficient and I really don't know where to take this now. It's been 2 years since we applied and application is not even in court yet. Do you know if possible for us to apply directly to court with our own statement or maybe instruct a solicitor?	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3126	0	4	09/01/2015 17:18:45	user1	Step parent - not getting anywhere with social worker	Thanks for your message. We have sent letter of intention 2 years ago and waited all this time for social worker to do her job. She is supposed to send the application with her report and our documents but as i said keeps making mistakes and nothing gets done.	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3127	0	5	09/01/2015 17:29:28	user1	Step parent - not getting anywhere with social worker	It's just frustrating why for other things one can apply to court direct with solicitor but for adoption you have to deal with local authority and they are so slow and not efficient	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3123	1	1	09/01/2015 14:17:13	user1	Step parent - not getting anywhere with social worker	Hi there I need some advice from anyone going through step parent adoption or any solicitors. My husband applied to adopt my DD in 2015 to the local authority. It took them 1 year to allocate a social worker. We have been dealing with this social worker now for over a year and my patience is running thin. She took 1 year to interview everyone and prepare a report and we got to the stage to finally submit everything to local court but she made a mistake with dates and all got returned and all documents lost in post . She made numerous mistakes and there is constant delay. She is very nice but very inefficient and I really don't know where to take this now. It's been 2 years since we applied and application is not even in court yet. Do you know if possible for us to apply directly to court with our own statement or maybe instruct a solicitor?	<a href="#">Edit</a>	<a href="#">Export file</a>

### Appendix 25 - keyword search results of inputting user1

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1		
5 to 9	%do you know%	178	3123	1	1	09/01/2015 14:17:13	user1	Step parent - not getting anywhere with social worker	Hi there I need some advice from anyone going through step parent adoption or any solicitors. My single husband applied to adopt my DD in 2015 to the local authority. It took them 1 year to allocate a social worker. We have been dealing with this social worker now for over a year and my patience is running thin. She took 1 year to interview everyone and prepare a report and we got to the stage to finally submit everything to local court but she made a mistake with dates and all got returned and all documents lost in post . She made numerous mistakes and there is constant delay. She is very nice but very inefficient and I really don't know where to take this now. It's been 2 years since we applied and application is not even in court yet. Do you know if possible for us to apply directly to court with our own statement or maybe instruct a solicitor?	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3124	0	2	09/01/2015 16:36:00	user2	Step parent - not getting anywhere with social worker	"Can apply direct too court , need too write too your LA of your intent, go on line too Family Court Adoption. (Adoption for Guidance). We did our own , though social services etc still have too do their input and searches on referee's , etc. Think it cost us around £170 was some years ago (6). Cost too LA around £9000 and Agency's charge anything from £16000 upwards. Court will send you relevant paperwork. Would speak too family court for advice and guidance thing's may have changed. Coman Legal will also give you advice."	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3125	0	3	09/01/2015 17:10:13	user3	Step parent - not getting anywhere with social worker	"Complain to supervising social worker /director of social care if that doesn't get Get you anywhere. Seems particularly poor, especially losing your documents"	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3126	0	4	09/01/2015 17:18:45	user1	Step parent - not getting anywhere with social worker	Thanks for your message. We have sent letter of intention 2 years ago and waited all this time for social worker to do her job. She is supposed to send the application with her report and our documents but as i said keeps making mistakes and nothing gets done.	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3127	0	5	09/01/2015 17:29:28	user1	Step parent - not getting anywhere with social worker	It's just frustrating why for other things one can apply to court direct with solicitor but for adoption you have to deal with local authority and they are so slow and not efficient	<a href="#">Edit</a>	<a href="#">Export file</a>

## Appendix 26 - keyword search results of inputting step parent

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1		
5 to 9	%do you know%	178	3123	1	1	09/01/2015 14:17:13	user1	Step parent - not getting anywhere with social worker	Hi there I need some advice from anyone going through step parent adoption or any solicitors. My single husband applied to adopt my DD in 2015 to the local authority. It took them 1 year to allocate a social worker. We have been dealing with this social worker now for over a year and my patience is running thin. She took 1 year to interview everyone and prepare a report and we got to the stage to finally submit everything to local court but she made a mistake with dates and all got returned and all documents lost in post . She made numerous mistakes and there is constant delay. She is very nice but very inefficient and I really don't know where to take this now. It's been 2 years since we applied and application is not even in court yet. Do you know if possible for us to apply directly to court with our own statement or maybe instruct a solicitor?	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3124	0	2	09/01/2015 16:36:00	user2	Step parent - not getting anywhere with social worker	"Can apply direct too court , need too write too your LA of your intent, go on line too Family Court Adoption. (Adoption for Guidance). We did our own , though social services etc still have too do their input and searches on referee's , etc. Think it cost us around £170 was some years ago (6). Cost too LA around £9000 and Agency's charge anything from £16000 upwards. Court will send you relevant paperwork. Would speak too family court for advice and guidance thing's may have changed. Coman Legal will also give you advice."	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3127	0	5	09/01/2015 17:29:28	user1	Step parent - not getting anywhere with social worker	It's just frustrating why for other things one can apply to court direct with solicitor but for adoption you have to deal with local authority and they are so slow and not efficient	<a href="#">Edit</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3123	1	1	09/01/2015 14:17:13	user1	Step parent - not getting anywhere with social worker	Hi there I need some advice from anyone going through step parent adoption or any solicitors. My husband applied to adopt my DD in 2015 to the local authority. It took them 1 year to allocate a social worker. We have been dealing with this social worker now for over a year and my patience is running thin. She took 1 year to interview everyone and prepare a report and we got to the stage to finally submit everything to local court but she made a mistake with dates and all got returned and all documents lost in post . She made numerous mistakes and there is constant delay. She is very nice but very inefficient and I really don't know where to take this now. It's been 2 years since we applied and application is not even in court yet. Do you know if possible for us to apply directly to court with our own statement or maybe instruct a solicitor?	<a href="#">Edit</a>	<a href="#">Export file</a>

## Appendix 27 - keyword search results of inputting adoption

Search Query:

## Appendix 28 - keyword search results of inputting 0101

info1	info2	info3	post_id	main_post	post_num	date	user	title	text1		
5 to 9	%do you know%	178	3123	1	1	09/01/2015 14:17:13	user1	Step parent - not getting anywhere with social worker	Hi there I need some advice from anyone going through step parent adoption or any solicitors. My single husband applied to adopt my DD in 2015 to the local authority. It took them 1 year to allocate a social worker. We have been dealing with this social worker now for over a year and my patience is running thin. She took 1 year to interview everyone and prepare a report and we got to the stage to finally submit everything to local court but she made a mistake with dates and all got returned and all documents lost in post . She made numerous mistakes and there is constant delay. She is very nice but very inefficient and I really don't know where to take this now. It's been 2 years since we applied and application is not even in court yet. Do you know if possible for us to apply directly to court with our own statement or maybe instruct a solicitor?	<a href="#">Edit data</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3124	0	2	09/01/2015 16:36:00	user2	Step parent - not getting anywhere with social worker	"Can apply direct too court , need too write too your LA of your intent, go on line too Family Court Adoption. (Adoption for Guidance). We did our own , though social services etc still have too do their input and searches on referee's , etc. Think it cost us around £170 was some years ago (6). Cost too LA around £9000 and Agency's charge anything from £16000 upwards. Court will send you relevant paperwork. Would speak too family court for advice and guidance thing's may have changed. Coram Legal will also give you advice."	<a href="#">Edit data</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3125	0	3	09/01/2015 17:10:13	user3	Step parent - not getting anywhere with social worker	"Complain to supervising social worker /director of social care if that doesn't get Get you anywhere. Seems particularly poor, especially losing your documents"	<a href="#">Edit data</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3126	0	4	09/01/2015 17:18:45	user1	Step parent - not getting anywhere with social worker	Thanks for your message. We have sent letter of intention 2 years ago and waited all this time for social worker to do her job. She is supposed to send the application with her report and our documents but as i said keeps making mistakes and nothing gets done.	<a href="#">Edit data</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3127	0	5	09/01/2015 17:29:28	user1	Step parent - not getting anywhere with social worker	It's just frustrating why for other things one can apply to court direct with solicitor but for adoption you have to deal with local authority and they are so slow and not efficient	<a href="#">Edit data</a>	<a href="#">Export file</a>

### Appendix 29 – data shows example\_file uploaded onto database

5 to 9	%do you know%	178	3123	1	1	09/01/2015 14:17:13	user1	Step parent - not getting anywhere with social worker	Hi there I need some advice from anyone going through step parent adoption or any solicitors. My husband applied to adopt my DD in 2015 to the local authority. It took them 1 year to allocate a social worker. We have been dealing with this social worker now for over a year and my patience is running thin. She took 1 year to interview everyone and prepare a report and we got to the stage to finally submit everything to local court but she made a mistake with dates and all got returned and all documents lost in post . She made numerous mistakes and there is constant delay. She is very nice but very inefficient and I really don't know where to take this now. It's been 2 years since we applied and application is not even in court yet. Do you know if possible for us to apply directly to court with our own statement or maybe instruct a solicitor?	<a href="#">Edit data</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3124	0	2	09/01/2015 16:36:00	user2	Step parent - not getting anywhere with social worker	Why an not getting any response? This is taking too long.	<a href="#">Edit data</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3125	0	3	09/01/2015 17:10:13	user3	Step parent - not getting anywhere with social worker	Can I please complain to the local authority?	<a href="#">Edit data</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3126	0	4	09/01/2015 17:18:45	user1	Step parent - not getting anywhere with social worker	We have sent a application three years ago and we have not get any reply.	<a href="#">Edit data</a>	<a href="#">Export file</a>
5 to 9	%do you know%	178	3127	0	5	09/01/2015 17:29:28	user1	Step parent - not getting anywhere with social worker	The local authority is so slow. Is there anyway to speed it up?	<a href="#">Edit data</a>	<a href="#">Export file</a>

### Appendix 30 - data shows example\_file2 uploaded onto database