AudiTREE

Albuddy's Solution for:
BPK HACKATHON 2020

Jan 13 2021

Character Introduction

Audi is a professional auditor

He works more than 8 years in a well-known Audit Board in a country

During audit period, he spends a considerable amount of time and energy to process files and documents from auditee

He thinks whether his works should always last like this...

Then he meets his pal, Albuddy ..

He states his problems are:

- His physical files and documents are **SCATTERED** everywhere.
- He mostly uses his intuitive on **TEXT REPORTS** for Compliance Analysis.
- He search files and documents based on **TOKEN MATCHING**.
- He find it so hard to predict fraud/**FAKE NUMERICAL** value.

Albuddy introduces AudiTREE

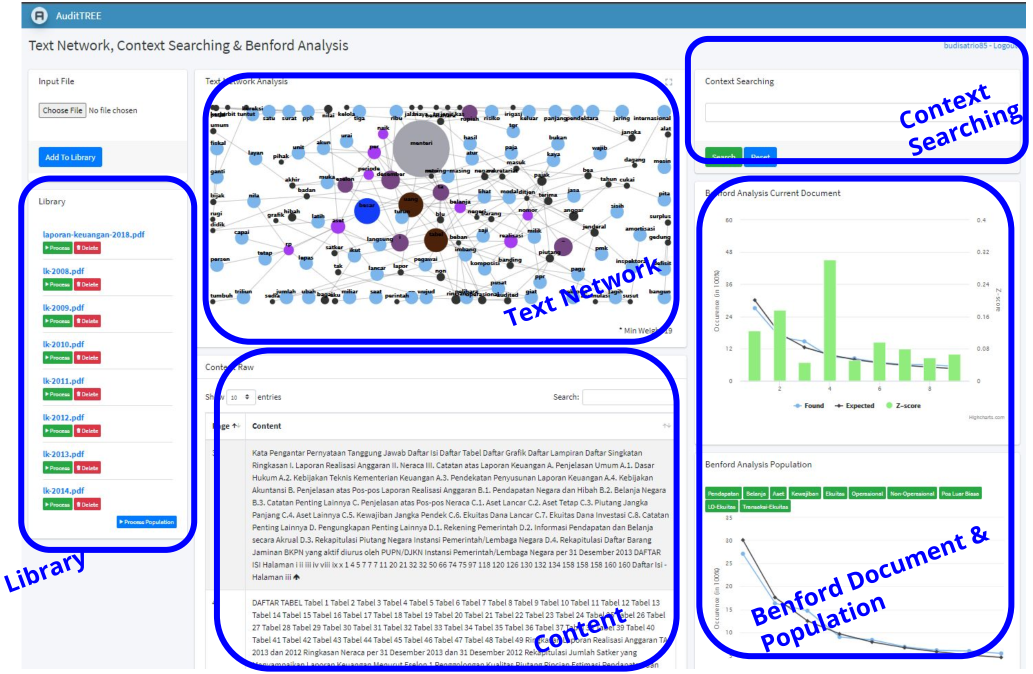
AudiTREE has the solutions of his problems:

- An **ELECTRONIC LIBRARY** of files and documents
- A text processor to enrich analysis with **NETWORK GRAPH VISUALIZATION**.
- A searching tool based on **CONTEXT MATCHING** of his files and documents.
- An intuitive chart and value of **BENFORD ALGORITHM** to predict fake numerical value.

Audi doing trial

- He gathers PDF document of Annual **FINANCIAL REPORT**S
- Documents are sampled from **21 MINISTRIES** where extractable
- He inserts financial report of a ministry from 2008 to 2014, and 2018 as his trial

Jos!, said Audi to the results



Text Network, Context Searching & Benford Analysis

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Audi finds AudiTREE really helps him accelerate his job

He tells his boss and colleagues about it and also proposes it as a central tools to be used when auditing

Audi now designs the Future Works

- **OPTIMIZE** the **CONTEXT** search by fine tuning on financial domain
- **ENRICH** data **GATHERING** to include scanned images using OCR
- Add **NER** (Named Entity Recognition) into Text Network Analysis

Ke Sabah membeli rotan,
pulang petang bawa selasih.
Ada salah mohon benarkan,
ini sekian **TERIMA KASIH**.

Technology Stack

- Python
- Flask
- AdminLTE by AppSeed
- Networkx
- Highcharts
- Faizz
- Benford-Py

Data Pipeline

1) **Search Tool**

   PDF → Convert to Text → Cleansing → Sentence/Paragraph/Summary list → BERT Embedding list → FAISS Clustering → Model Serialization → Search API → Inference Task

2) **Text Network Analysis**

   PDF → Convert to Text → Cleansing → Summary → Most relevant topics and their relations → visualize by Networkx→ Text Network Analysis

3) **Benford Histogram**

   PDF → Convert to Text → Cleansing → Crawl variable & numerical value from balance sheet → Cluster into Asset, Liability, Debts, Income, etc → Collect previous data → Calculate histogram

Process

1. Research of audit documents
2. Scraping data
3. Cleaning
4. Text Analysis
5. Visualization

Team Roles

1. Data Modeling/Mining : **AL**wi husada
2. LEAD, FrontEnd Engineer : **BUD**i satrio
3. Data Engineering : re**DY** andriyansah

Tools

- **IndoBERT** untuk text embedding
- BERT extractive **Summarizer**
- Facebook AI Similarity Search (**FAISS**)
- **NeoVis** untuk Text Graph Analysis
- **Uvicorn** Web Server