

KODE PROGRAM

Lampiran 1 kode program Index.js

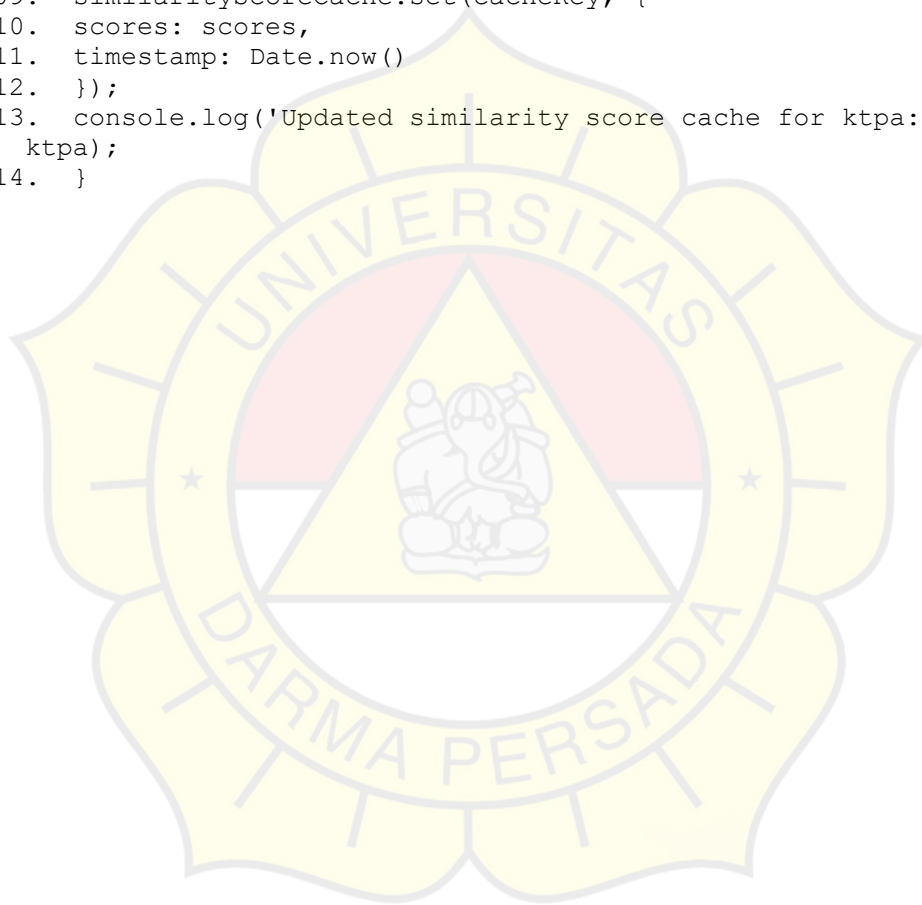
```
1. class TfIdfService {
2.   constructor() {
3.     this.tfIdfMatrix = new Map();
4.     this.idfScores = new Map();
5.     this.allDocuments = [];
6.     this.stopWords = new Set([
7.       'yang', 'dan', 'di', 'ke', 'dari', 'ini', 'itu', 'dengan',
8.         'untuk', 'pada',
9.       'adalah', 'dalam', 'oleh', 'karena', 'jika', 'atau', 'tetapi',
10.        'namun', 'sehingga',
11.       'agar', 'supaya', 'karena', 'sebab', 'maka', 'jadi', 'oleh',
12.        'karena', 'sehingga',
13.       'saya', 'kamu', 'dia', 'mereka', 'kita', 'kami', 'anda',
14.        'beliau', 'mereka',
15.       'ini', 'itu', 'sini', 'situ', 'sana', 'mana', 'apa',
16.        'siapa', 'kapan', 'dimana',
17.       'bagaimana', 'mengapa', 'berapa', 'yang', 'pun', 'lah',
18.        'kah', 'tah', 'kan',
19.       'nya', 'ku', 'mu', 'nya', 'kau', 'dia', 'mereka', 'kita',
20.        'kami', 'anda'
21.     ]);
22.   }
23.   preprocessText(text) {
24.     if (!text) return '';
25.     // Convert to lowercase and remove special characters
26.     let processed = text.toLowerCase().replace(/[^a-z\s]/g, '');
27.     // Remove extra whitespace
28.     processed = processed.replace(/\s+/g, ' ').trim();
29.     // Tokenize and remove stopwords
30.     const tokens = processed.split(' ');
31.     const filteredTokens = tokens.filter(token =>
32.       token && !this.stopWords.has(token)
33.     );
34.     return filteredTokens;
35.   }
36.   calculateTF(documentTokens, term) {
37.     if (!documentTokens || documentTokens.length === 0) return
38.       0;
39.     const termCount = documentTokens.filter(t => t ===
40.       term).length;
41.     return termCount / documentTokens.length;
42.   }
43.   // Formula IDF yang diupdate:  $w_{ij} = \log((N+1)/df_i) + 1$ 
44.   calculateIDF(allDocumentsTokens, term) {
45.     const documentsContainingTerm =
46.       allDocumentsTokens.filter(docTokens =>
47.         docTokens.includes(term)
48.       ).length;
49.     if (documentsContainingTerm === 0) return 0;
50.     const N = allDocumentsTokens.length;
51.     // Formula baru:  $\log((N+1)/df_i) + 1$ 
52.     return Math.log((N + 1.0) / documentsContainingTerm) + 1.0;
53.   }
54. }
```

```

44.   createTfIdfVector(documentTokens, idfScores) {
45.     const tfIdfVector = new Map();
46.     const uniqueTerms = new Set(documentTokens);
47.     for (const term of uniqueTerms) {
48.       const tf = this.calculateTF(documentTokens, term);
49.       const idf = idfScores.get(term) || 0;
50.       // Formula TF-IDF standar: TF * IDF
51.       const tfIdfScore = tf * idf;
52.       tfIdfVector.set(term, tfIdfScore);
53.     }
54.     return tfIdfVector;
55.   }
56.   processDocuments(documents) {
57.     if (!documents || documents.length === 0) return;
58.     // Preprocess all documents
59.     this.allDocuments = documents.map(doc =>
60.       this.preprocessText(doc));
61.     // Calculate IDF scores for all terms
62.     const allTerms = new Set();
63.     this.allDocuments.forEach(docTokens => {
64.       docTokens.forEach(term => allTerms.add(term));
65.     });
66.     for (const term of allTerms) {
67.       this.idfScores.set(term,
68.         this.calculateIDF(this.allDocuments, term));
69.     }
70.     // Calculate TF-IDF vectors for all documents
71.     this.allDocuments.forEach((docTokens, index) => {
72.       const tfIdfVector = this.createTfIdfVector(docTokens,
73.         this.idfScores);
74.       this.tfIdfMatrix.set(documents[index], tfIdfVector);
75.     });
76.   }
77.   calculateCosineSimilarity(vec1, vec2) {
78.     if (!vec1 || !vec2) return 0;
79.     const allTerms = new Set([...vec1.keys(), ...vec2.keys()]);
80.     let dotProduct = 0;
81.     let magnitude1 = 0;
82.     let magnitude2 = 0;
83.     for (const term of allTerms) {
84.       const val1 = vec1.get(term) || 0;
85.       const val2 = vec2.get(term) || 0;
86.       dotProduct += val1 * val2;
87.       magnitude1 += val1 * val1;
88.       magnitude2 += val2 * val2;
89.     }
90.     magnitude1 = Math.sqrt(magnitude1);
91.     magnitude2 = Math.sqrt(magnitude2);
92.     if (magnitude1 === 0 || magnitude2 === 0) return 0;
93.     return dotProduct / (magnitude1 * magnitude2);
94.   }
95.   // Cache configuration
96.   const similarityScoreCache = new Map();
97.   const CACHE_TTL = 5 * 60 * 1000; // 5 minutes in
98.   milliseconds

```

```
96. const BATCH_SIZE = 100; // Process 100 posts at a time
97. // Cache management functions
98. function getCachedSimilarityScores(ktpa) {
99.   const cacheKey = `similarity_${ktpa}`;
100.   const cached = similarityScoreCache.get(cacheKey);
101.   if (cached && (Date.now() - cached.timestamp) < CACHE_TTL) {
102.     console.log('Using cached similarity scores for ktpa:',
      ktpa);
103.     return cached.scores;
104.   }
105.   return null;
106. }
107. function updateSimilarityScoreCache(ktpa, scores) {
108.   const cacheKey = `similarity_${ktpa}`;
109.   similarityScoreCache.set(cacheKey, {
110.     scores: scores,
111.     timestamp: Date.now()
112.   });
113.   console.log('Updated similarity score cache for ktpa:',
      ktpa);
114. }
```





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