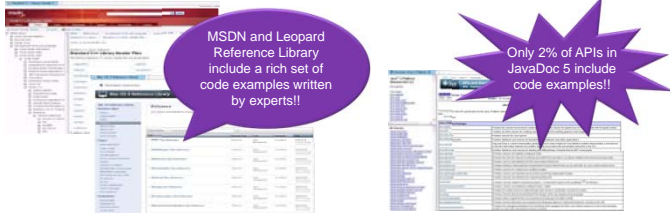# Example Oriented API Documents: Intelligent Code Example Search
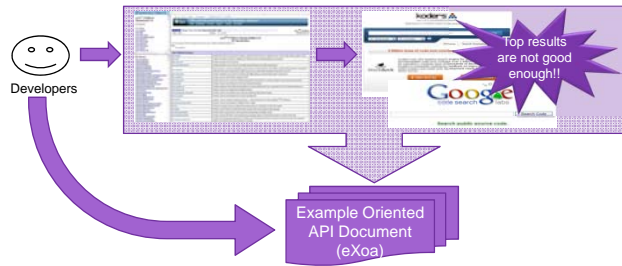
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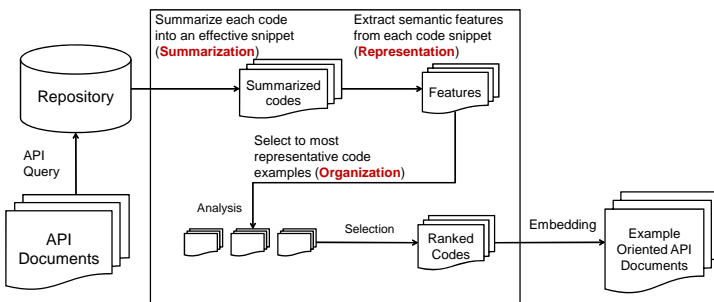(HKUST), Hong Kong
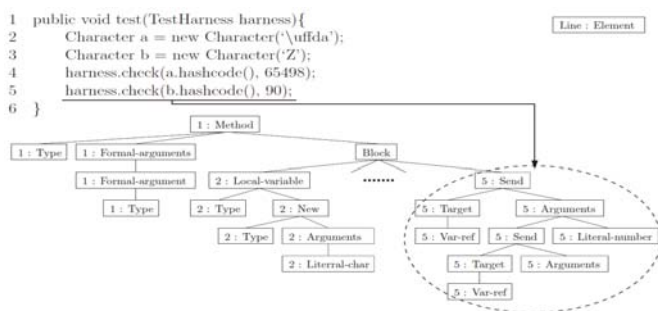hunkim@cse.ust.hk
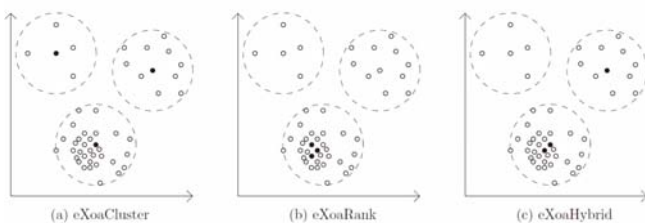
Lack of Code Examples in JavaDocs

MSDN and Leopard Reference Library include a rich set of code examples written by experts!!

Only 2% of APIs in JavaDoc 5 include code examples!!

An Automatic Code Example Generation

Developers

Top results are not good enough!!

Example Oriented API Document (eXoa)

System Architecture

Extract Features

```
1   public void test(TestHarness harness){
2       Character a = new Character('\uffda');
3       Character b = new Character('Z');
4       harness.check(a.hashcode(), 65498);
5       harness.check(b.hashcode(), 90);
6   }
```

Line : Element

Select Representative Code Examples

(a) eXoaCluster   (b) eXoaRank   (c) eXoaHybrid

Comparison of Organization Algorithms

R_{G1}	eXoaCluster	eXoaRank	eXoaHybrid
	0.6328	0.1808	0.5145

R_{G2}	eXoaCluster	eXoaRank	eXoaHybrid
	0.3168	**0.4615**	0.3434

Comparison with Code Search Engines

	Relevant Code and snippet	Relevant Code	Irrelevant Code
Koders	22%	8%	70%
Google	12%	10%	78%
eXoaDoc	92%	6%	2%

Comparison with JavaDocs 5

Our system could automatically extract high quality examples for about 75% of APIs in the JavaDoc.

Demonstration Snapshot

Figure 1 illustrates the snapshot of an automatically generated document, where Figure 1(a) suggests the popularity of API based on the number of API examples. Figure 1(b) illustrates an extracted example code.

This demonstration is also available at http://exoa.postech.ac.kr.

Figure 1. An Example of Automatically Generated Documents