



论 文 汇 报

2021 本周论文汇报

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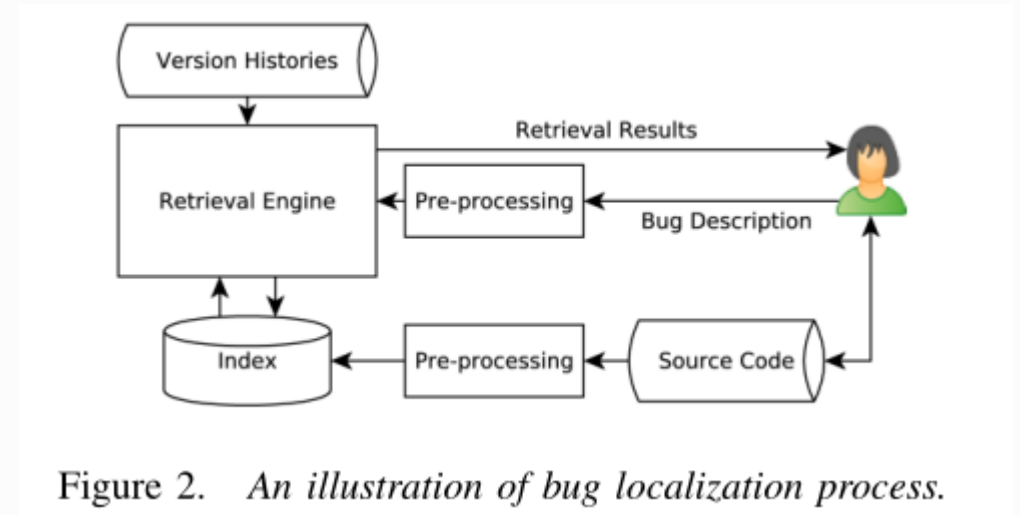
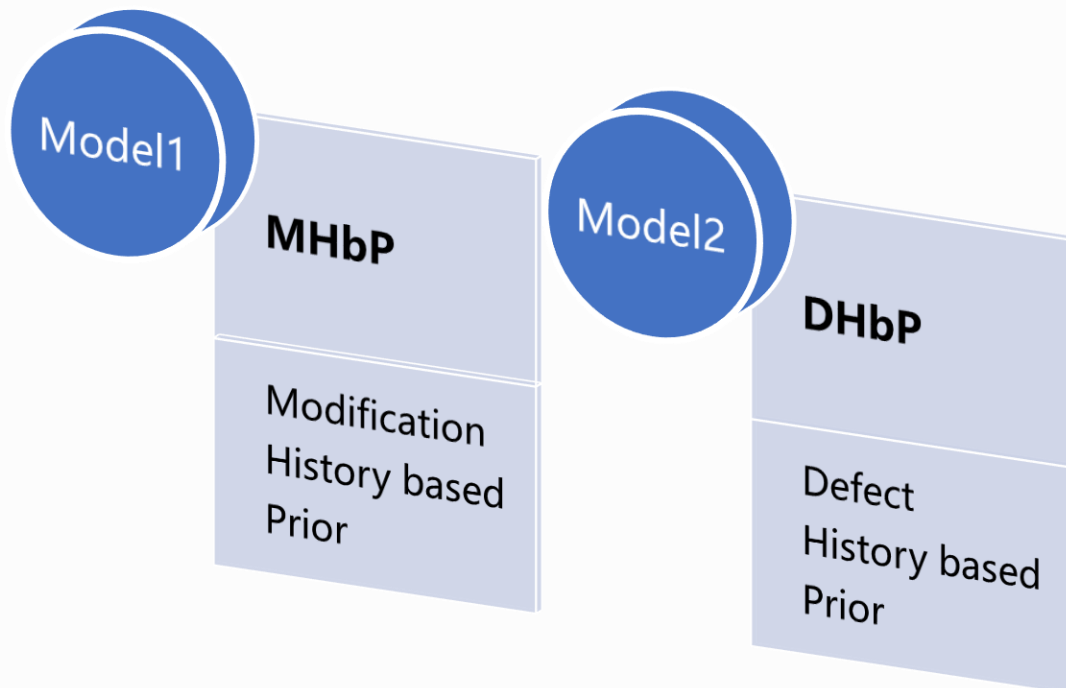
5 Papers

Title	Publication source	Year
Incorporating version histories in Information Retrieval based bug localization	MSR	2012
How Does the Degree of Variability Affect Bug Finding?	ICSE	2016
Comparing Static Bug Finders and Statistical Prediction	ICSE	2014

Incorporating version histories in Information Retrieval based bug localization — MSR (2012)

$$P_{MHbP}(f|C_k, R_k) = \frac{\sum_{i=1}^k I_m(f, r_i)}{\sum_{f' \in C_k} \sum_{i=1}^k I_m(f', r_i)}$$

$$P_{DHbP}(f|C_k, R_k) = \frac{\sum_{i=1}^k I_b(f, r_i)}{\sum_{f' \in C_k} \sum_{i=1}^k I_b(f', r_i)}$$



$$P_{MHbPd}(f|C_k, R_k) = \frac{\sum_{i=1}^k e^{\frac{1}{\beta_1}(t_i - t_k)} I_m(f, r_i)}{\sum_{f' \in C_k} \sum_{i=1}^k e^{\frac{1}{\beta_1}(t_i - t_k)} I_m(f', r_i)}$$

$$P_{DHbPd}(f|C_k, R_k) = \frac{\sum_{i=1}^k e^{\frac{1}{\beta_2}(t_i - t_k)} I_b(f, r_i)}{\sum_{f' \in C_k} \sum_{i=1}^k e^{\frac{1}{\beta_2}(t_i - t_k)} I_b(f', r_i)}$$

Time Decay Factor



- MHbPd
- DHbPd

How Does the Degree of Variability Affect Bug Finding? — ICSE (2016)

```
1 int netpollSetup() {  
2     int err;  
3     boolean ipv4 = true;  
4     boolean flag = true;  
5     ...  
6     flag = false;  
7     ...  
8     if (flag) err = -1;  
9     ...  
10    if (ipv4) return err;  
11    ...  
12    return 1;  
13 }
```

(a) No variability (zero features).

```
1 int netpollSetup() {  
2     int err;  
3     boolean ipv4 = true;  
4     boolean flag = true;  
5     ...  
6     flag = false;  
7     ...  
8     if (flag) err = -1;  
9     ...  
10    if (ipv4) return err;  
11    ...  
12    return 1;  
13 }
```

(b) Low variability (one feature).

```
1 int netpollSetup() {  
2     int err;  
3     boolean ipv4 = true;  
4     boolean flag = true;  
5     ...  
6     flag = false;  
7     ...  
8     if (flag) err = -1;  
9     ...  
10    if (ipv4) return err;  
11    ...  
12    return 1;  
13 }
```

(c) High(er) variability (three features).

Figure 1: A program with an *uninitiliazed variable* error with progressively increasing degrees of variability.

A controlled experiment designed to quantify the impact of the [degree of variability](#) in program code on bug finding.

- RQ1: How does the degree of variability affect the **time** of bug finding?
- RQ2: How does the degree of variability affect the **accuracy** of bug finding?

Comparing Static Bug Finders and Statistical Prediction — ICSE (2014)

Statistical defect prediction (DP)

vs

Static bug finding (SBF)

DP employs **historical data** on reported (and repaired) defects to predict the location of previously unknown defects that lurk in the code.

SBF begins with type checking built into the compiler. Analysis tools that can detect various classes of defects, including memory allocation errors, race conditions, buffer overflows, and taint-related errors, have been reported in the literature.

range from simple code pattern-matching techniques to rigorous static analyses that process carefully designed semantic abstractions of code



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