**Expert Recommendation with Usage Expertise**

David Ma  
University of Calgary

David Schuler  
Saarland University

Thomas Zimmermann  
Microsoft Research

Jonathan Sillito  
University of Calgary

---

**Who Knows This Code?**  
(Implementation Expertise)

![Image]

Changes

methodX

By changing methodX, Anna gains implementation expertise for methodX.

---

**Who Knows This Code?**  
(Usage Expertise)

![Image]

Uses java.sql

Uses methodX

Bob has never changed methodX but knows how it works because he has used the same method calls before (usage expertise).

---

**Can’t Recommend When**

![Image]

- A project doesn’t have enough data or data is of poor quality.
- A project is new (no data).
- Experienced developers move to new or multiple projects.

---

**Questions**

1. Are usage-based recommendations as accurate as implementation-based recommendations?
2. Does usage-based accuracy improve when we consider developers to also know the surrounding method calls (context)?
3. When projects use common libraries, is it then possible to recommend across projects?

---

**Mine VCS for**

+ Changed Methods
+ Added Method Calls

**Expertise Profiles**

**Rank Experts based on heuristics**

- Impl
- Impl.
- Usage
- Usage
- Usage

---

**Results**

**Within Eclipse**

![Image]

- Expert in Top-3 Recommendations
  - Impl: 100%
  - Usage: 90%
  - Context: 80%

**Dev. From Other Project in Top-3**

![Image]

- Expert in Top-3 Recommendations
  - Impl: 100%
  - Usage: 80%
  - Context: 70%

---

**Takeaways**

1. **NO**  
   - Are usage-based recommendations as accurate as implementation-based recommendations?
2. **YES**  
   - Does usage-based accuracy improve when we consider developers to also know the surrounding method calls (context)?
3. **YES**  
   - When projects use common libraries, is it then possible to recommend across projects?

---

**Future Work**

- Can we recommend experts for projects with no or little history?
- How precise are recommendations made across projects?
- Will the combination of both usage and implementation expertise result in an increase in accuracy?