Accelerating SE research adoption with Analysis Bots

https://github.com/AnalysisBotsPlatform

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Wanted: SE research impact

• SE research community developing numerous analysis techniques and tools that use them

• But, practitioner adoption is a struggle

“many tools are so hard to configure, they prevent you from doing anything.” [1]

“I find that the information they provide is not very useful, so I tend to ignore them.” [1]

“if it disrupts your flow, you’re not gonna use it.” [1]

Each paper creates its own zoo

• (Stereotypical) SE research evaluation workflow:
  • Identify a set of projects/revisions
  • Run the tool on revisions
  • (Optional) Submit bug reports to projects e.g., [1]
  • Write evaluation section

Each paper creates its own zoo
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- Tool runs on project in controlled environment
- No involvement of the project community
- Tool not used by target user population
Each paper creates its own zoo

- Tool run in controlled environment
- No involvement of the project community
- Tool not used by target user population

End-result: slow tool adoption and low research impact
Going into the wild
Going into the wild: it’s hard!

- How will developers find the research tool?
  - Requires evangelism/advertising

- How will developers use the research tool?
  - Requires end-to-end working artifact

- How will they want to use the tools?
  - Easy to install
  - Simple to configure
  - Immediate value
  - …
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Rethinking SE research transfer

• How do we make it easier (for researchers)?
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  ...What if developers came to us?
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Idea: Build a one-stop-shop platform for hosting research tools (analysis bots)
Analysis bots platform vision

Analysis bot := partial automation of some SE task

Key features

• Low barrier to entry
  • For bot users/developers

• Fine-grained bot control
  • Developer in control

• Openness
  • Anyone can use/build a bot
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...like iRobot!
How would it work?

Bot creators (you?)

Bot Upload

Bot Runner

Bot Ranker

Reporter

API

Twitter
Mail
Chat Bots
Dashboard

Pull requests
Issues

Developers

Project
Development

Mediam

Versions, Issues, ...

Social coding platforms

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How would it work?

Bot creators → Mediam → Bot Runner → Bot Ranker → Reporter → API

Twitter, Mail, Chat Bots, Dashboard

Developers

Pull requests, Issues

Project Development

Versions, Issues, ...

Social coding platforms
How would it work?

Bot creators → Bot Upload → Bot Runner → Bot Ranker → Reporter → API → Mediam

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Mediam

Twitter Mail Chat Bots Dashboard

Pull requests Issues

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Social coding platforms

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Defining the right APIs is key

Bot creators → Bot Upload → Bot Runner → Bot Ranker → Reporter → API

Developers

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Mail
Chat Bots
Dashboard

Pull requests
Issues

Project
Development

Social coding platforms

Versions, Issues, ...

Bot creators
Analysis bots benefits

- *Naturalistic* evaluation
- Improved replication of academic artifacts
- Deals with aspects of tool delivery that tool developers don’t want to deal with
- Quick iteration to understand what works and what doesn’t
- Developers get to subscribe and use the latest and greatest SE research

*(Survival of the fittest: most useful tools receive attention and contributions)*
Open questions

• **Trust/discovery**: how to bootstrap uptake of the platform?

• **Preventing abuse**: what are the appropriate and inappropriate ways in which analysis bots can interact with developers?

• **Usability**: how can analysis bots be designed to prevent information overload for developers?

• **Economics**: How and where should these bots be hosted?

• **Design**: What are the right platform APIs and reputation system?
Related work

- **Google**: Tricorder [1] and Shipshape [2] (analysis infrastructure)
- **Academia**: CodeDrones [3]
- **OpenSource**: Various bots on GitHub; Imageoptimiser bot [6]
- **Other ‘bots’**: Hubot programmable bot [7]

Analysis bots vision

SE research adoption a consistent challenge; requires concentrated effort

Vision: Analysis Bots platform lowers barriers for developers and researchers

- Bot discovery
- Trust
- Information overload
+ Centralized repository
+ A robust reputation system
+ Common APIs and runtimes

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