



User Interactions and Permission Use on Android

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Interactive Use



Background Use



How do users reason about these uses?

Is that what apps are doing?

Two Studies, Contrasted

App Study: How do apps use permissions?

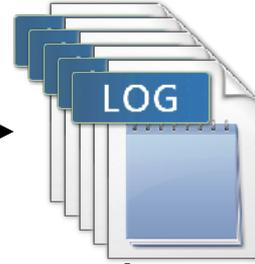
- When does interactivity influence use?

User Study: When do users *expect* use?

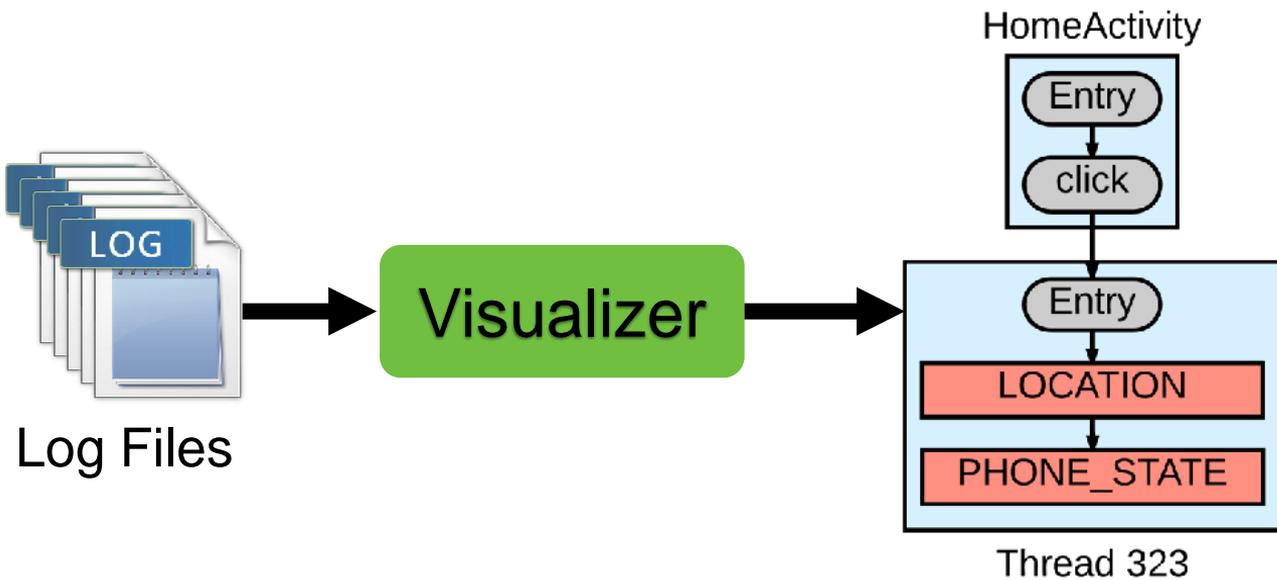
Are apps “doing the right thing”

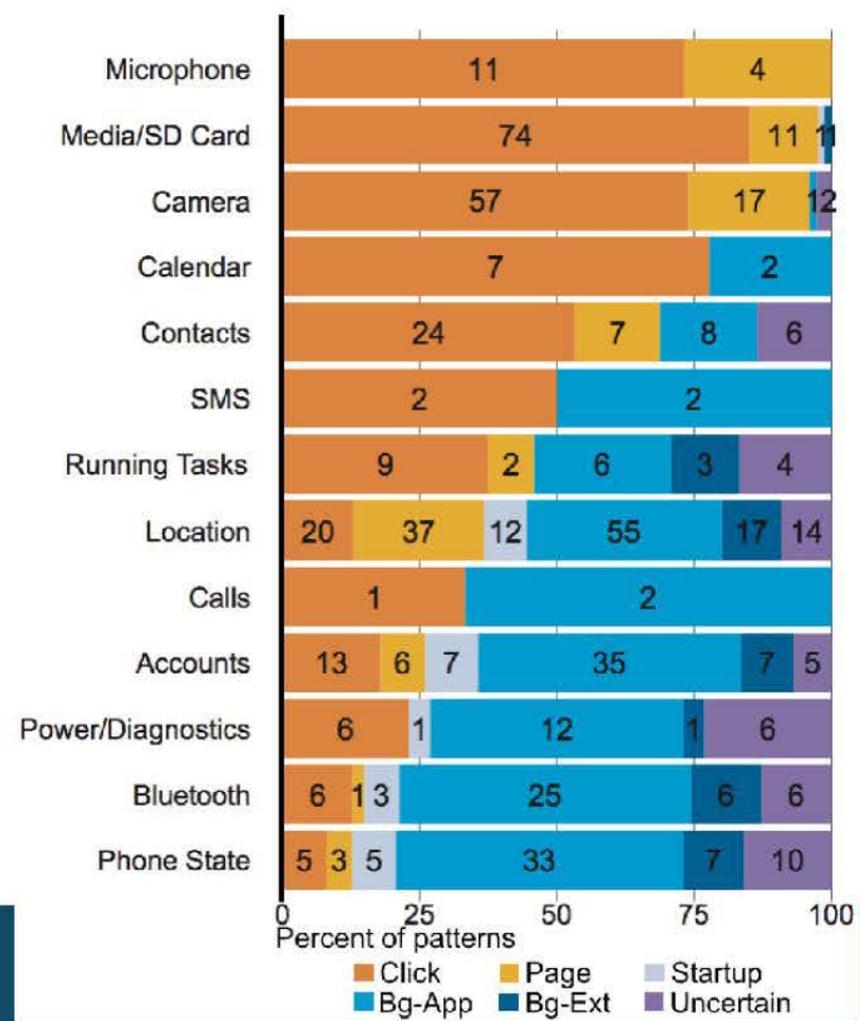


Instrumented
App

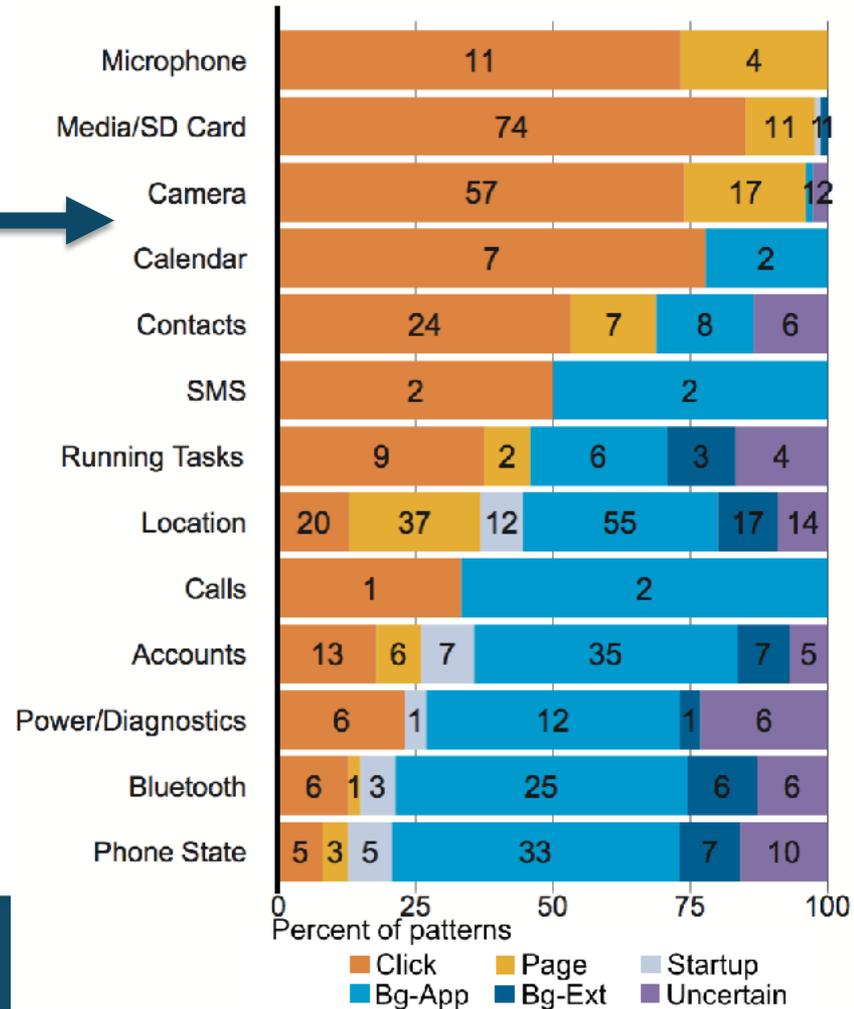


Log
Files



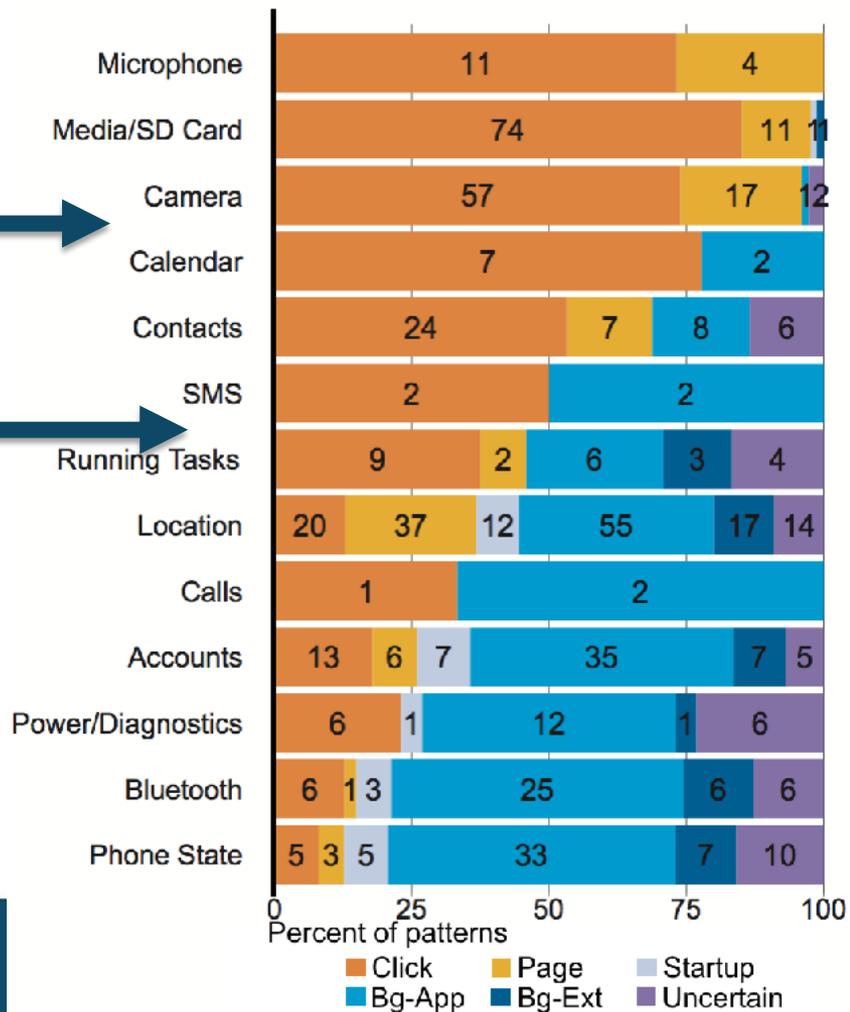


Observation: some resources already used interactively



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Some could be more



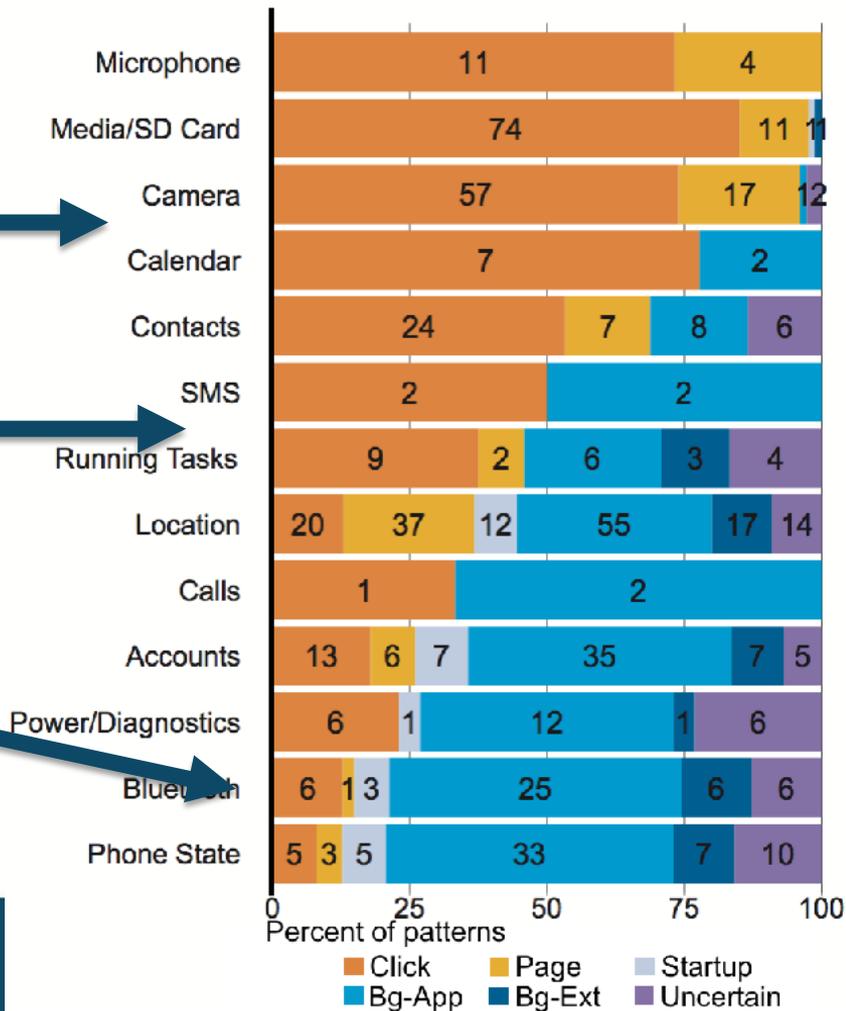
Observation: some resources **already used interactively**



Some **could be more**



Some **rarely** used interactively

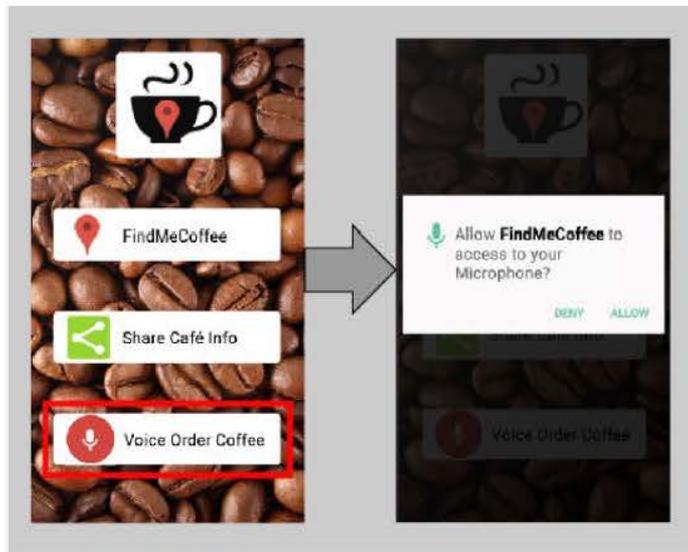


User Study

Measure: do user expectations align with patterns observed in apps?

Users watch slideshows of app screenshots

“Is Background use Expected after Foreground use?”



B

	Definitely not	Probably Not	Unsure	F
Accessing your location	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Taking a picture	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Reading your text messages	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Listening through your microphone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	



Results

Users **much more** likely to expect after Click

- 106 times Click as Background

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“On first use” can *condition* users

- E.g., “on first use” in maps app: less likely to expect Bg access later!

Recommendations

Require interactive access for many things now

- Camera, Mic, etc... Apps already do this!

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Make background use predictable