In this talk, we discuss our novel theoretical foundation that allows stakeholders to predict and localize functional faults for field failures automatically with a high degree of precision using symptoms only (e.g., the sign of the output value is incorrect) and without instrumenting deployed applications to collect runtime data, thus avoiding the deployment runtime overhead, and without having any tests with oracles to uncover the fault, without performing contrasting successful and failed runs, and without collecting runtime data from field failures. With this theoretical foundation, researchers can collaborate more closely in planning the future of fault localization by expanding each other’s results based on probabilistic graphical models as common abstractions. Based only on failure symptoms occurring during deployment of a given application, the location of faults in the source code will be determined, as well as navigation paths from likely faults to the code that can fix these faults. We will describe our initial results and discuss current limitations of our approach as well as new directions that our solution opens.

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