

Type-guided synthesis for dynamic languages

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1 INTRODUCTION

Background

Dynamic programming languages can make writing programs quick and easy because they don't require specifying static bounds on behavior. Two of the most popular programming languages today, Javascript and Python, are dynamic programming languages. Javascript is the language of the web, while Python the most popular choice for data science and machine learning projects.

Although dynamic languages already offer programming ease and efficiency, it may be possible to increase the ease of writing program by autocompletion, or synthesis of programs from surrounding context.

Challenge

This article presents a theoretical system that synthesizes terms from context in a dynamic language. In keeping with the spirit of dynamic languages, type annotations are not required, but they are optional.

Synthesis of of programs for a dynamic language introduces a fundamental tension. While dynamic language programs benefit from a lack of static bounds, program synthesis must be a terminating procedure driven by static bounds representing the goals of synthesis.

Type-directed synthesis

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