

PI Precision Interfaces

Automatic Interface Design from Query Logs

Thibault Sellam
Columbia University
tsellam@cs.columbia.edu

Haoci Zhang
Tsinghua University
zhanghaoci@gmail.com

Eugene Wu
Columbia University
ewu@cs.columbia.edu

Problem How can we generate interactive applications from query logs?

Many businesses rely on IT support and consultants to create dashboards and run queries on their behalf. An automatic solution would be cheaper, remove strategic dependencies and reduce exposure to confidential data.

Our Approach Map pairwise differences between queries to interactions

Q1 select * from clients
where region = 'US'

Q2 select * from clients
where region = 'FR'



The PI Pipeline

Query log, provided by the user

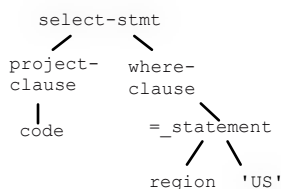
```
...
Q47 select code from products
     where region = 'US'
Q48 select price from products
     where region = 'US'
...
```

Set of **transformation patterns**, expressed in PI Lang, a domain-specific language to describe differences between trees

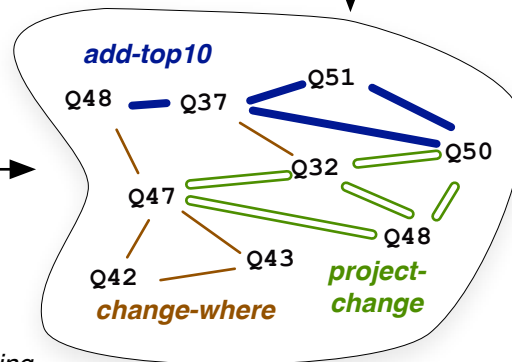
```
...
Interaction 23:
FROM Project//ProjectClauses as a
WHERE a@old != a@new
MATCH: PROJECT-CHANGE;
...
```

Parsing

Abstract Syntax Trees, describing the syntactical structure of the queries.



Execution



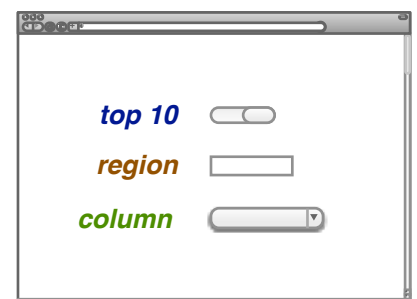
Transformation Graph, in which each vertex is a query and each edge describes a transformation.

Widget Mapping



Rendering

Interactive Application template, to be customized by the user.



Mapping between widgets and transformations, minimizing a cost model of the average user effort induced by the interface.