dbTouch: Analytics at your Fingertips

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Background

- Big Data Era
- Interactive Data Exploration
- Trending: Touch input
- Direct Manipulation

dbTouch: The Vision

- Touch and manipulate data
- Quick look and feel
- Rethink database kernel design
- Redefine query, query plan, and data flow

Challenges

- Touch Input
  - trending
  - versatile
- Translation from gesture to query

different data flow

Traditional:

- ➔ Write a complete query
- ➔ fire the query
- ➔ DBMS take full control of the data flow

dbTouch:

- ➔ react to every touch, user take the full control

Design Perspective

- As an exploration tool
  - fast, responsive
  - intuitive
  - minimal overhead
  - aiming at the challenge of big data

Details of dbTouch

Interactive Exploration

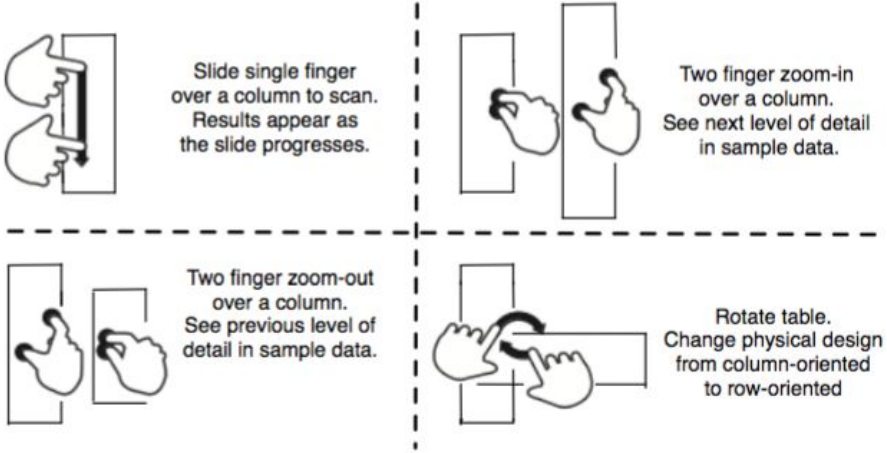
- Data exploration: get intuition of the data
- Interactive feeling promotes user’s exploration

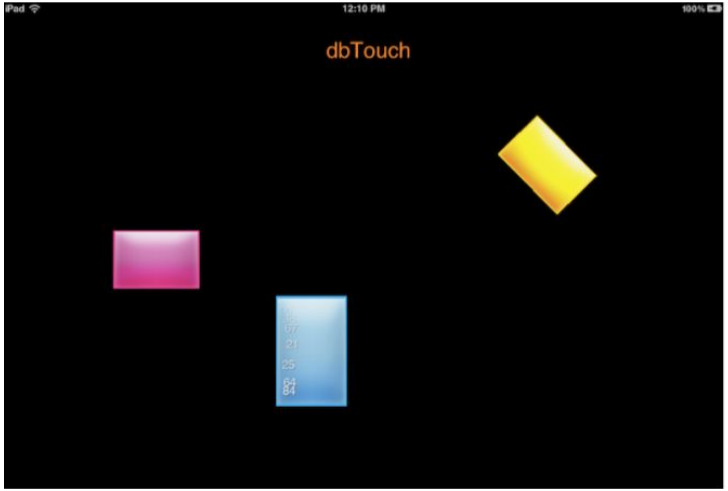
Interactive Feeling needs supports from

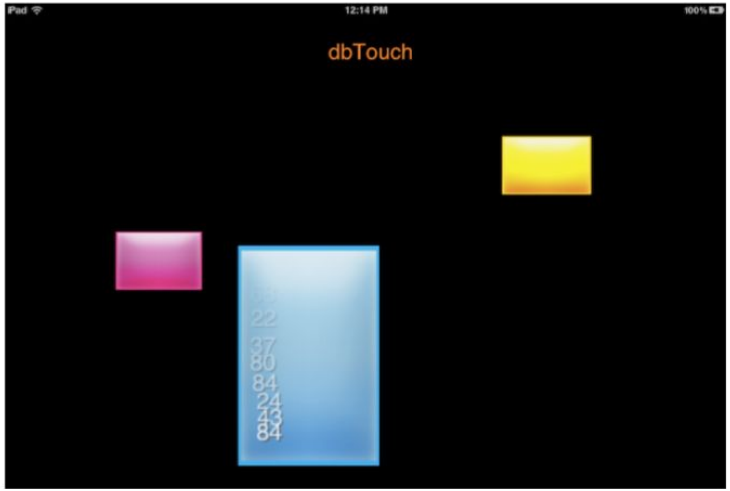
- Query processing technique
- Visualization

Front-end

- Data object
- Schema-less query







Slide to Explore

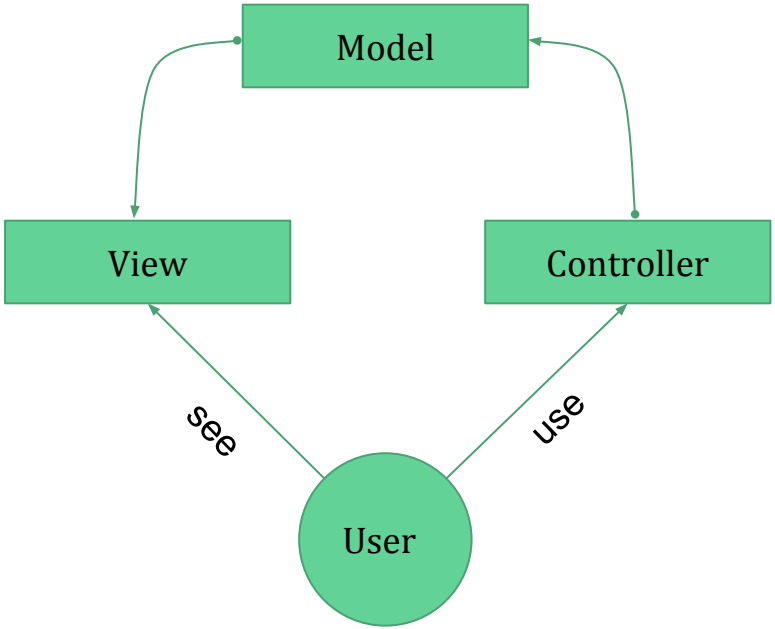
- Essential gesture
- Query processing
  - Feedback on the fly
- Inspecting Results

From Touch to Tuple Identifiers

- View concept
- Mapping a touch to a RowID

$$id = n * t / o$$

n: number of total tuples
t: touch location
o: size of data object



Data Access and Touch Granularity

- Touch to explore
- Sampling
- Gesture
  - speed
  - direction
- Zoom-in/out

Sorting and Accessing

- Physical layout: fixed-width matrix
- Sample based
- Prefetch
- Cache
- Index

Interactive Summaries

- summary: an aggregate value of several consecutive data entries.
- for position p, corresponding tuple id idp, aggregate:

$$[id_p - k, id_p + k]$$

- *k*: User defined

Schema and Storage Layout Gestures

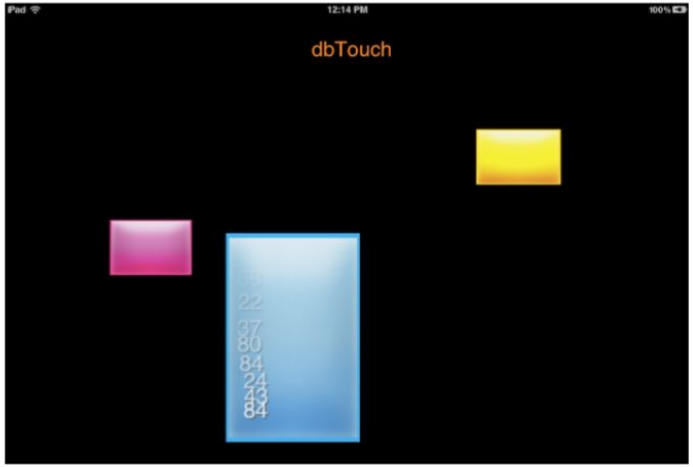
- Create table with drag-and-drop
- Change layout with rotation

Query Plan and Complex Queries

- Complex query
- Join
- Optimization

Prototype and Experiment

- Implementation: iPad
- Evaluation of scanning



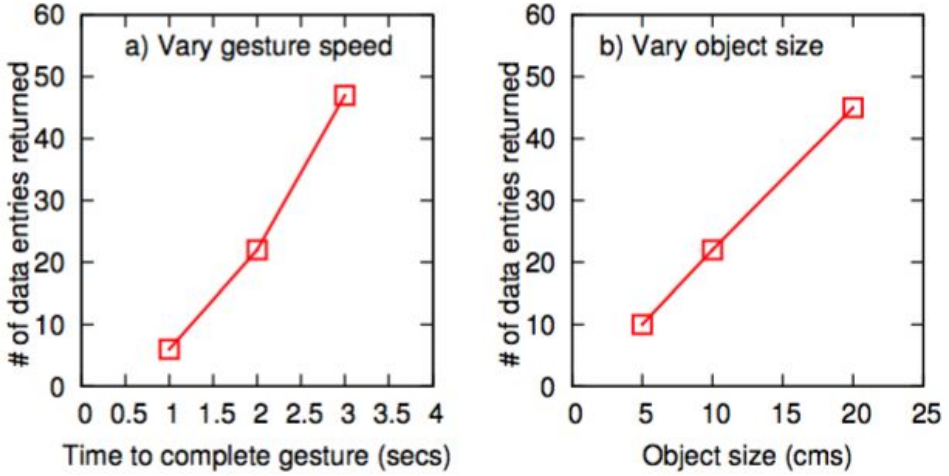


Figure 4: Effect of varying object size and slide gesture speed during a slide for interactive summaries.

Reflection

1. Is touch interface a suitable choice for data exploration?
2. What do you need for getting the intuition of data?
3. Is it capable of dealing with big data?
4. What kind of visualization should be considered?