Simply Business

Spark & GraphX Workshop

www.simplybusiness.co.uk

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Returning Visitors

The Challenge

Accurately identify users over time as they interact with us

Why? Knowledge

To understand how our visitors behave:

- They have long buying cycles
- They use multiple devices
- They engage with us through multiple channels

Why? Cost Analysis

To know how much it costs to acquire new customers:

- They visit us from different marketing channels
- Each of them have different costs
- We remunerate our partners depending on that

Why? Personalization

To adapt their visit while they interact with us:

- We can trigger offers depending on the channel they come from
- We can prefill fields if they’re recognized
- We can change the look and feel of the website

Cookies?

Their work great when you want to identify people coming back to your website.

Challenges:

- Different devices
- Cleared cookies
- Private sessions
- What about telephone calls…?

Use More IDs!

We can use other IDs provided by visitors to link sessions:

- Login details
- Email addresses
- Telephone numbers
- Credit card numbers
- Fingerprints
- …

Proof of Age Card

VALIDATE UK

Name/Enw
Your Name

DoB/Dyddiad Geni
04 May 1996

PASS

0101 1045 9843 2301

18+

ASSOCIATION OF CHIEF POLICE OFFICERS

ts trading standards institute

sia Security Industry Authority

Example

How many visitors do we have here?

Timestamp	Event	Cookie ID	Email
1	page_view	111	
2	details_submitted	111	a@a.com
3	page_view	555	
4	page_view	888	
5	policy_sold	555	a@a.com
6	details_submitted	888	b@b.com

Example

How many visitors do we have here? Only 2

Timestamp	Event	Cookie ID	Email
1	page_view	111	
2	details_submitted	111	a@a.com
3	page_view	555	
4	page_view	888	
5	policy_sold	555	a@a.com
6	details_submitted	888	b@b.com

Example: Streaming

Timestamp	Event	Cookie ID	Email
1	page_view	111	
2	details_submitted	111	a@a.com
3	page_view	555	
4	page_view	888	
5	policy_sold	555	a@a.com
6	details_submitted	888	b@b.com

Visitor A: 111

Example: Streaming

Timestamp	Event	Cookie ID	Email
1	page_view	111	
2	details_submitted	111	a@a.com
3	page_view	555	
4	page_view	888	
5	policy_sold	555	a@a.com
6	details_submitted	888	b@b.com

Visitor A: 111, a@a.com

Example: Streaming

Timestamp	Event	Cookie ID	Email
1	page_view	111	
2	details_submitted	111	a@a.com
3	page_view	555	
4	page_view	888	
5	policy_sold	555	a@a.com
6	details_submitted	888	b@b.com

Visitor A: 111, a@a.com
Visitor B: 555

Example: Streaming

Timestamp	Event	Cookie ID	Email
1	page_view	111	
2	details_submitted	111	a@a.com
3	page_view	555	
4	page_view	888	
5	policy_sold	555	a@a.com
6	details_submitted	888	b@b.com

Visitor A: 111, a@a.com
Visitor B: 555
Visitor C: 888

Example: Streaming

Timestamp	Event	Cookie ID	Email
1	page_view	111	
2	details_submitted	111	a@a.com
3	page_view	555	
4	page_view	888	
5	policy_sold	555	a@a.com
6	details_submitted	888	b@b.com

Visitor A: 111, 555, a@a.com
Visitor C: 888

Visitors A and B were merged!

Example: Streaming

Timestamp	Event	Cookie ID	Email
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5	policy_sold	555	a@a.com
6	details_submitted	888	b@b.com

Visitor A: 111, 555, a@a.com
Visitor C: 888, b@b.com

Batch Solution

Example: Batch

Timestamp	Event	Cookie ID	Email
1	page_view	111	
2	details_submitted	111	a@a.com
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4	page_view	888	
5	policy_sold	555	a@a.com
6	details_submitted	888	b@b.com

Batch Algorithm

- Find the connected components in the graph
- Already implemented in GraphX!
  - Vertices: visitor IDs
  - Edges: pairs of IDs occurring in the same event

Example: Batch

Timestamp	Event	Cookie ID	Email
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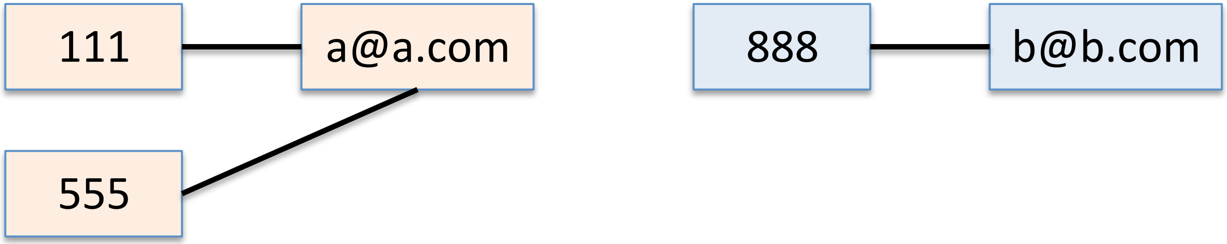
4	page_view	888	
5	policy_sold	555	a@a.com
6	details_submitted	888	b@b.com



GraphX: Issues

- There is no Python API for GraphX, and Graphframes performance is worse than GraphX's
- GraphX requires vertices to have numeric IDs
    - You'll have to create a mapping between the real IDs and the numeric IDs
    - Perform the connected components calculation
    - Map back the numeric IDs to the real IDs
- Documentation is not as good as other Spark projects

Beware

That two events share an ID does not necessarily mean that were generated by the same person. Watch out for:

- Clashing IDs
- Fake IDs: test@test.com, 07123456789, etc.
- Shared devices: couples, public computers, etc.
- People using your system on behalf of someone else
- Bugs

Analyze your data first!

Whizz-Kidz

move a life forward

Whizz-Kidz & Simply Business

Whizz-Kidz provides disabled children with the essential wheelchairs and other mobility equipment they need to lead fun and active childhoods.

Simply Business and its employees have pledged to raise £150,000 during the next three years. This amount of money is enough to clear Whizz Kidz' waiting list in both the London and Northampton region!

https://simplybusiness.everydayhero.com/uk/sahara-2016

Thank You!