Metrics we should know - or not! but we are gonna learn it!

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Disclaimer
A story about data
Data gives the answer to the correct questions

Planes on the research → All hit on the same place → Research → Result
Analytics
### Data vs Metrics

- They are not the same

<table>
<thead>
<tr>
<th>Metrics</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metrics are what you measure</td>
<td>Data is generated by metrics</td>
</tr>
<tr>
<td>Consistent</td>
<td>You don’t pick your data, you pick your metrics</td>
</tr>
<tr>
<td>Cheap</td>
<td></td>
</tr>
<tr>
<td>Quick to collect</td>
<td></td>
</tr>
</tbody>
</table>
Analytics

- Analytics is the systematic computational analysis of data or statistics
  - Provides insight on app usage and user engagement.
  - Helps you understand how your users behave
Firebase has what you need and more
How does an analytic looks in Firebase

On android

```javascript
firebaseAnalytics.logEvent("SomeNameOfTheEvent") {
    // Extra parameters if you need more info
    param(FirebaseAnalytics.Param.ITEM_ID, id)
    param(FirebaseAnalytics.Param.ITEM_NAME, name)
    param(FirebaseAnalytics.Param.CONTENT_TYPE, "image")
}
```
How does an analytic looks in Firebase

• On iOS

```swift
Analytics.logEvent(AnalyticsEventSelectContent, parameters: [  AnalyticsParameterItemID: "id-(title!)",  AnalyticsParameterItemName: title!,  AnalyticsParameterContentType: "cont",])
```
Conversion
First, an example

Welcome to .Crypto
Your Best Crypto Wallet Partner!

Start Now

app-ca

app-email

app-account
Conversion

• Conversion analysis is the process of analyzing data related to conversions
  • A conversion is defined as a specific, desirable action that’s taken by a user
  • Depends on the analytics selected
Conversion

• Conversion rate can be calculated over a math func

\[ coR = \frac{total\text{Conversions}}{total\text{Interactions}} \]

\[ coR = \frac{50}{1000} \]

\[ coR = 5\% \]
Conversion

First Event
app-ca

Second Event
app-email

Conversion Event
app-account

@ddinorahtovar
Conversion

- notification_receive: 10,637
- notification_open: 7,755
- App_Hits: 6,842

Filter % between events:
- notification_receive: 72.9%
- notification_open: 88.2%
Conversion

<table>
<thead>
<tr>
<th>Event name</th>
<th>Conversions</th>
<th>Total users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totals</td>
<td>641,444.00</td>
<td>30,997</td>
</tr>
<tr>
<td>1 App_H</td>
<td>282,637.00</td>
<td>12,188</td>
</tr>
<tr>
<td>2 app_k</td>
<td>199,982.00</td>
<td>16,027</td>
</tr>
<tr>
<td>3 App_L</td>
<td>92,880.00</td>
<td>15,082</td>
</tr>
<tr>
<td>4 first_app</td>
<td>19,477.00</td>
<td>19,147</td>
</tr>
<tr>
<td>5 App_y</td>
<td>19,443.00</td>
<td>5,724</td>
</tr>
<tr>
<td>6 App_z</td>
<td>18,974.00</td>
<td>6,769</td>
</tr>
<tr>
<td>7 App_x</td>
<td>3,874.00</td>
<td>1,159</td>
</tr>
<tr>
<td>8 App_w</td>
<td>2,409.00</td>
<td>767</td>
</tr>
<tr>
<td>9 App_v</td>
<td>1,767.00</td>
<td>1,193</td>
</tr>
<tr>
<td>10 app_k</td>
<td>1.00</td>
<td>1</td>
</tr>
</tbody>
</table>

- Conversions are related to multiple events
- We decide which is the event we are interested
Conversion

- Conversions are directly related to the number of users and the number of clicks on the conversion.
- But it also can be unique.

![Chart showing conversions and total users by event name.](image_url)
Conversion

• Conversions are directly related to time dimensions
Retention
Retention

• Retention analysis (or survival analysis) is the process of analyzing user metrics to understand how and why customers churn.

• Retention analysis is key to gain insights on how to maintain a profitable customer base by improving retention and new user acquisition rates.
Retention

Time - Survival probability

- 60% of probability of surviving beyond 5 months
- 25% of probability of surviving beyond 11 months
Retention

User activity by cohort
Based on device data only

<table>
<thead>
<tr>
<th></th>
<th>Week 0</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Users</td>
<td>100.0%</td>
<td>25.1%</td>
<td>18.7%</td>
<td>17.4%</td>
<td>17.0%</td>
<td>16.4%</td>
</tr>
<tr>
<td>Sep 26 - Oct 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oct 3 - Oct 9</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Oct 10 - Oct 16</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Oct 17 - Oct 23</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Oct 24 - Oct 30</td>
<td></td>
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<td></td>
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<tr>
<td>Oct 31 - Nov 6</td>
<td></td>
<td></td>
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</tbody>
</table>

- Firebase - has this chart - you don’t have to do anything just plug the dependencies in your app and you are ready to go
AB Testing
But first - what is an prediction model

- Frequentist vs Bayesian

<table>
<thead>
<tr>
<th>Frequentist</th>
<th>Bayesian</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Assume the observed data is sampled from some distribution</td>
<td>• Assume the probabilities for both data and hypotheses (parameters specifying the distribution of the data)</td>
</tr>
</tbody>
</table>
Bayesian Models

• How does it looks

Less overlap = More confidence

More overlap = Less confidence

Observed data

Modeled data 📊
### Bayesian Models

- **How does it looks**

<table>
<thead>
<tr>
<th>Variant</th>
<th>Observed data</th>
<th>Modeled data</th>
<th>Conversion rate</th>
<th>Baseline Probabilty</th>
<th>Baseline % difference from baseline</th>
<th>Baseline % difference from baseline</th>
<th>Baseline % difference from baseline</th>
<th>Baseline % difference from baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>App_Home_ReportTool_Tap</td>
<td>Conversion rate</td>
<td>24%</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
<td>Baseline</td>
</tr>
<tr>
<td></td>
<td>7,398 users</td>
<td></td>
<td></td>
<td></td>
<td>24.49%</td>
<td>2.5%</td>
<td>25%</td>
<td>75%</td>
</tr>
<tr>
<td>Variant A</td>
<td>1,986</td>
<td>26%</td>
<td>+5.2%</td>
<td>97%</td>
<td>+5.3%</td>
<td>+0.4% to +11.2%</td>
<td>25.76%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7,708 users</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variant B</td>
<td>2,243</td>
<td>29%</td>
<td>+18%</td>
<td>&gt;99.9%</td>
<td>+17.8%</td>
<td>+11.8% to +24.4%</td>
<td>28.85%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7,774 users</td>
<td></td>
<td></td>
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