**Run in Cloud Shell**

bq mk ecommerce

bq query --nouse\_legacy\_sql '

CREATE OR REPLACE MODEL `ecommerce.classification\_model`

OPTIONS

(

model\_type="logistic\_reg",

labels = ["will\_buy\_on\_return\_visit"]

)

AS

#standardSQL

SELECT

\* EXCEPT(fullVisitorId)

FROM

# features

(SELECT

fullVisitorId,

IFNULL(totals.bounces, 0) AS bounces,

IFNULL(totals.timeOnSite, 0) AS time\_on\_site

FROM

`data-to-insights.ecommerce.web\_analytics`

WHERE

totals.newVisits = 1

AND date BETWEEN "20160801" AND "20170430") # train on first 9 months

JOIN

(SELECT

fullvisitorid,

IF(COUNTIF(totals.transactions > 0 AND totals.newVisits IS NULL) > 0, 1, 0) AS will\_buy\_on\_return\_visit

FROM

`data-to-insights.ecommerce.web\_analytics`

GROUP BY fullvisitorid)

USING (fullVisitorId);'

bq query --nouse\_legacy\_sql '

SELECT

roc\_auc,

CASE

WHEN roc\_auc > .9 THEN "good"

WHEN roc\_auc > .8 THEN "fair"

WHEN roc\_auc > .7 THEN "decent"

WHEN roc\_auc > .6 THEN "not great"

ELSE "poor" END AS model\_quality

FROM

ML.EVALUATE(MODEL ecommerce.classification\_model, (

SELECT

\* EXCEPT(fullVisitorId)

FROM

# features

(SELECT

fullVisitorId,

IFNULL(totals.bounces, 0) AS bounces,

IFNULL(totals.timeOnSite, 0) AS time\_on\_site

FROM

`data-to-insights.ecommerce.web\_analytics`

WHERE

totals.newVisits = 1

AND date BETWEEN "20170501" AND "20170630") # eval on 2 months

JOIN

(SELECT

fullvisitorid,

IF(COUNTIF(totals.transactions > 0 AND totals.newVisits IS NULL) > 0, 1, 0) AS will\_buy\_on\_return\_visit

FROM

`data-to-insights.ecommerce.web\_analytics`

GROUP BY fullvisitorid)

USING (fullVisitorId)

));'

bq query --nouse\_legacy\_sql '

CREATE OR REPLACE MODEL `ecommerce.classification\_model\_2`

OPTIONS

(model\_type="logistic\_reg", labels = ["will\_buy\_on\_return\_visit"]) AS

WITH all\_visitor\_stats AS (

SELECT

fullvisitorid,

IF(COUNTIF(totals.transactions > 0 AND totals.newVisits IS NULL) > 0, 1, 0) AS will\_buy\_on\_return\_visit

FROM `data-to-insights.ecommerce.web\_analytics`

GROUP BY fullvisitorid

)

# add in new features

SELECT \* EXCEPT(unique\_session\_id) FROM (

SELECT

CONCAT(fullvisitorid, CAST(visitId AS STRING)) AS unique\_session\_id,

# labels

will\_buy\_on\_return\_visit,

MAX(CAST(h.eCommerceAction.action\_type AS INT64)) AS latest\_ecommerce\_progress,

# behavior on the site

IFNULL(totals.bounces, 0) AS bounces,

IFNULL(totals.timeOnSite, 0) AS time\_on\_site,

IFNULL(totals.pageviews, 0) AS pageviews,

# where the visitor came from

trafficSource.source,

trafficSource.medium,

channelGrouping,

# mobile or desktop

device.deviceCategory,

# geographic

IFNULL(geoNetwork.country, "") AS country

FROM `data-to-insights.ecommerce.web\_analytics`,

UNNEST(hits) AS h

JOIN all\_visitor\_stats USING(fullvisitorid)

WHERE 1=1

# only predict for new visits

AND totals.newVisits = 1

AND date BETWEEN "20160801" AND "20170430" # train 9 months

GROUP BY

unique\_session\_id,

will\_buy\_on\_return\_visit,

bounces,

time\_on\_site,

totals.pageviews,

trafficSource.source,

trafficSource.medium,

channelGrouping,

device.deviceCategory,

country

);'

bq query --nouse\_legacy\_sql '

#standardSQL

SELECT

roc\_auc,

CASE

WHEN roc\_auc > .9 THEN "good"

WHEN roc\_auc > .8 THEN "fair"

WHEN roc\_auc > .7 THEN "decent"

WHEN roc\_auc > .6 THEN "not great"

ELSE "poor" END AS model\_quality

FROM

ML.EVALUATE(MODEL ecommerce.classification\_model\_2, (

WITH all\_visitor\_stats AS (

SELECT

fullvisitorid,

IF(COUNTIF(totals.transactions > 0 AND totals.newVisits IS NULL) > 0, 1, 0) AS will\_buy\_on\_return\_visit

FROM `data-to-insights.ecommerce.web\_analytics`

GROUP BY fullvisitorid

)

# add in new features

SELECT \* EXCEPT(unique\_session\_id) FROM (

SELECT

CONCAT(fullvisitorid, CAST(visitId AS STRING)) AS unique\_session\_id,

# labels

will\_buy\_on\_return\_visit,

MAX(CAST(h.eCommerceAction.action\_type AS INT64)) AS latest\_ecommerce\_progress,

# behavior on the site

IFNULL(totals.bounces, 0) AS bounces,

IFNULL(totals.timeOnSite, 0) AS time\_on\_site,

totals.pageviews,

# where the visitor came from

trafficSource.source,

trafficSource.medium,

channelGrouping,

# mobile or desktop

device.deviceCategory,

# geographic

IFNULL(geoNetwork.country, "") AS country

FROM `data-to-insights.ecommerce.web\_analytics`,

UNNEST(hits) AS h

JOIN all\_visitor\_stats USING(fullvisitorid)

WHERE 1=1

# only predict for new visits

AND totals.newVisits = 1

AND date BETWEEN "20170501" AND "20170630" # eval 2 months

GROUP BY

unique\_session\_id,

will\_buy\_on\_return\_visit,

bounces,

time\_on\_site,

totals.pageviews,

trafficSource.source,

trafficSource.medium,

channelGrouping,

device.deviceCategory,

country

)

));'

bq query --nouse\_legacy\_sql '

SELECT

\*

FROM

ml.PREDICT(MODEL `ecommerce.classification\_model\_2`,

(

WITH all\_visitor\_stats AS (

SELECT

fullvisitorid,

IF(COUNTIF(totals.transactions > 0 AND totals.newVisits IS NULL) > 0, 1, 0) AS will\_buy\_on\_return\_visit

FROM `data-to-insights.ecommerce.web\_analytics`

GROUP BY fullvisitorid

)

SELECT

CONCAT(fullvisitorid, "-",CAST(visitId AS STRING)) AS unique\_session\_id,

# labels

will\_buy\_on\_return\_visit,

MAX(CAST(h.eCommerceAction.action\_type AS INT64)) AS latest\_ecommerce\_progress,

# behavior on the site

IFNULL(totals.bounces, 0) AS bounces,

IFNULL(totals.timeOnSite, 0) AS time\_on\_site,

totals.pageviews,

# where the visitor came from

trafficSource.source,

trafficSource.medium,

channelGrouping,

# mobile or desktop

device.deviceCategory,

# geographic

IFNULL(geoNetwork.country, "") AS country

FROM `data-to-insights.ecommerce.web\_analytics`,

UNNEST(hits) AS h

JOIN all\_visitor\_stats USING(fullvisitorid)

WHERE

# only predict for new visits

totals.newVisits = 1

AND date BETWEEN "20170701" AND "20170801" # test 1 month

GROUP BY

unique\_session\_id,

will\_buy\_on\_return\_visit,

bounces,

time\_on\_site,

totals.pageviews,

trafficSource.source,

trafficSource.medium,

channelGrouping,

device.deviceCategory,

country

)

)

ORDER BY

predicted\_will\_buy\_on\_return\_visit DESC;'