Neo4j Recommendation Queries (MVP POC)

Recommendations based on Make and Model and collaborative filtering including the entire population

```
MATCH
    (mmyt)-[]->(mk:Make),
    (mmyt)-[]->(m:Model),
    (mmyt)-[]->(y:Year),
    (s:Search)-[]->(mmyt:MakeModelYearTrim),
    (c:Consumer)<-[]-(s)
WHERE
    mk.name='BMW' and m.name='X5' and y.name='2016'
WITH
    mk, m, y, c
MATCH
    (c)<-[]-(sr:Search),
    (sr)-[]->(mmytr:MakeModelYearTrim),
    (mmytr)-[]->(mkr:Make),
    (mmytr)-[]->(mr:Model),
    (mmytr)-[]->(yr:Year)
WHERE
    m<>mr and y.year<=yr.year
RETURN
    mkr.name, mr.name, yr.name, Sum(sr.impressionsCount)
ORDER BY
    Sum(sr.impressionsCount) DESC
LIMIT 25

MATCH
    (mmyt)-[]->(mk:Make),
    (mmyt)-[]->(m:Model),
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```
    (mmyt)-[]->(y:Year),
    (v:VDPImpression)-[]->(mmyt:MakeModelYearTrim),
    (c:Consumer)<-[]-(v)
WHERE
    mk.name='BMW' and m.name='X5' and y.name='2016'
WITH
    mk, m, y, c
MATCH
    (c)<-[]-(vr:VDPImpression),
    (vr)-[]->(mmytr:MakeModelYearTrim),
    (mmytr)-[]->(mkr:Make),
    (mmytr)-[]->(mr:Model),
    (mmytr)-[]->(yr:Year)
WHERE
    m<>mr and y.year<=yr.year
RETURN
    mkr.name, mr.name, yr.name, Sum(vr.impressionsCount)
ORDER BY
    Sum(vr.impressionsCount) DESC
LIMIT 25
```

Recommendations based on Make, Model and Body Style and collaborative filtering including on the entire population

```
MATCH
    (mmyt)-[]->(mk:Make),
    (mmyt)-[]->(m:Model),
    (mmyt)-[]->(y:Year),
    (mmyt)<-[]-(mmytb:MakeModelYearTrimBodyStyle),
    (b:BodyStyle)<-[]-(mmytb),
    (s:Search)-[]->(mmyt:MakeModelYearTrim),
    (c:Consumer)<-[]-(s)
WHERE
    mk.name='BMW' and m.name='X5' and y.name='2016'
WITH
    mk, m, y, b, c
MATCH
    (c)<-[]-(sr:Search),
```

```
    (sr)-[]->(mmytr:MakeModelYearTrim),
    (mmytr)-[]->(mkr:Make),
    (mmytr)-[]->(mr:Model),
    (mmytr)-[]->(yr:Year),
    (mmytr)<-[]-(mmytbr:MakeModelYearTrimBodyStyle),
    (br:BodyStyle)<-[]-(mmytbr)
WHERE
    m<>mr and y.year<=yr.year and b=br
RETURN
    mkr.name, mr.name, yr.name, Sum(sr.impressionsCount)
ORDER BY
    Sum(sr.impressionsCount) DESC
LIMIT 25

MATCH
    (mmyt)-[]->(mk:Make),
    (mmyt)-[]->(m:Model),
    (mmyt)-[]->(y:Year),
    (mmyt)<-[]-(mmytb:MakeModelYearTrimBodyStyle),
    (b:BodyStyle)<-[]-(mmytb),
    (v:VDPImpression)-[]->(mmyt:MakeModelYearTrim),
    (c:Consumer)<-[]-(v)
WHERE
    mk.name='BMW' and m.name='X5' and y.name='2016'
WITH
    mk, m, y, b, c
MATCH
    (c)<-[]-(vr:VDPImpression),
    (vr)-[]->(mmytr:MakeModelYearTrim),
    (mmytr)-[]->(mkr:Make),
    (mmytr)-[]->(mr:Model),
    (mmytr)-[]->(yr:Year),
    (mmytr)<-[]-(mmytbr:MakeModelYearTrimBodyStyle),
    (br:BodyStyle)<-[]-(mmytbr)
WHERE
    m<>mr and y.year<=yr.year and b=br
RETURN
    mkr.name, mr.name, yr.name, Sum(vr.impressionsCount)
ORDER BY
```

```
    Sum(vr.impressionsCount) DESC
LIMIT 25
```

Recommendations based on Make and Model and collaborative filtering based on age and gender of the consumer

```
MATCH
    (mmyt)-[]->(mk:Make),
    (mmyt)-[]->(m:Model),
    (mmyt)-[]->(y:Year),
    (s:Search)-[]->(mmyt:MakeModelYearTrim),
    (s)-[]->(c:Consumer)-[]->(a:Age)-[]->(AgeBucket)<-[]-(ao:Age)<-[]-(o:Consumer),
    (c)-[]->(g:Gender)<-[]-(o:Consumer)
WHERE
    mk.name='BMW' and m.name='X5' and y.name='2016' and a.age=40 and g.gender='Male'
WITH
    mk, m, y, o
MATCH
    (o)<-[]-(sr:Search),
    (sr)-[]->(mmytr:MakeModelYearTrim),
    (mmytr)-[]->(mkr:Make),
    (mmytr)-[]->(mr:Model),
    (mmytr)-[]->(yr:Year)
WHERE
    m<>mr and y.year<=yr.year
RETURN
    mkr.name, mr.name, yr.name, Sum(sr.impressionsCount)
ORDER BY
    Sum(sr.impressionsCount) DESC
LIMIT 25

MATCH
    (mmyt)-[]->(mk:Make),
    (mmyt)-[]->(m:Model),
    (mmyt)-[]->(y:Year),
    (mmyt)<-[]-(mmytb:MakeModelYearTrimBodyStyle),
```

```
    (b:BodyStyle)<-[]-(mmytb),
    (s:Search)-[]->(mmyt:MakeModelYearTrim),
    (s)-[]->(c:Consumer)-[]->(a:Age)-[]->(AgeBucket)<-[]-(ao:Age)<-[]-(o:Consumer),
    (c)-[]->(g:Gender)<-[]-(o:Consumer)
WHERE
    mk.name='BMW' and m.name='X5' and y.name='2016' and a.age=40 and g.gender='Male'
WITH
    mk, m, y, b, o
MATCH
    (o)<-[]-(sr:Search),
    (sr)-[]->(mmytr:MakeModelYearTrim),
    (mmytr)-[]->(mkr:Make),
    (mmytr)-[]->(mr:Model),
    (mmytr)-[]->(yr:Year),
    (mmytr)<-[]-(mmytbr:MakeModelYearTrimBodyStyle),
    (br:BodyStyle)<-[]-(mmytbr)
WHERE
    m<>mr and y.year<=yr.year and b=br
RETURN
    mkr.name, mr.name, yr.name, Sum(sr.impressionsCount)
ORDER BY
    Sum(sr.impressionsCount) DESC
LIMIT 25
```

Recommendations based on consumer's browsing history and collaborative filtering based on age group

```
MATCH
    (c)-[]->(a:Age)-[]->(AgeBucket)<-[]-(ao:Age)<-[]-(o:Consumer),
    (o:Consumer)<-[]-(s:Search),
    (mmyt)-[]->(mk:Make),
    (mmyt)-[]->(m:Model),
    (mmyt)-[]->(y:Year),
    (s)-[]->(mmyt:MakeModelYearTrim)
WHERE
    c.consumerId=2201416
WITH
    mk, m, y, s
RETURN
    mk.name, m.name, y.name, Sum(s.impressionsCount)
ORDER BY Sum(s.impressionsCount) DESC
LIMIT 25

MATCH
    (c)-[]->(a:Age)-[]->(AgeBucket)<-[]-(ao:Age)<-[]-(o:Consumer),
    (o:Consumer)<-[]-(v:VDPImpression),
    (mmyt)-[]->(mk:Make),
    (mmyt)-[]->(m:Model),
    (mmyt)-[]->(y:Year),
    (v)-[]->(mmyt:MakeModelYearTrim)
WHERE
    c.consumerId=2201416
WITH
    mk, m, y, v
RETURN
    mk.name, m.name, y.name, Sum(v.impressionsCount)
ORDER BY Sum(v.impressionsCount) DESC
LIMIT 25
```

Recommendations based on consumer's browsing history and collaborative filtering based on age and gender

```
MATCH
    (c)-[]->(a:Age)-[]->(AgeBucket)<-[]-(ao:Age)<-[]-(o:Consumer),
    (c)-[]->(g:Gender)<-[]-(o:Consumer),
    (o:Consumer)<-[]-(s:Search),
    (mmyt)-[]->(mk:Make),
    (mmyt)-[]->(m:Model),
    (mmyt)-[]->(y:Year),
    (s)-[]->(mmyt:MakeModelYearTrim)
WHERE
    c.consumerId=2201416
WITH
    mk, m, y, c, o, s
RETURN
    mk.name, m.name, y.name, Sum(s.impressionsCount)
ORDER BY Sum(s.impressionsCount) DESC
LIMIT 25

MATCH
    (c)-[]->(a:Age)-[]->(AgeBucket)<-[]-(ao:Age)<-[]-(o:Consumer),
    (c)-[]->(g:Gender)<-[]-(o:Consumer),
    (o:Consumer)<-[]-(v:VDPImpression),
    (mmyt)-[]->(mk:Make),
    (mmyt)-[]->(m:Model),
    (mmyt)-[]->(y:Year),
    (v)-[]->(mmyt:MakeModelYearTrim)
WHERE
    c.consumerId=2201416
WITH
    mk, m, y, v
RETURN
    mk.name, m.name, y.name, Sum(v.impressionsCount)
ORDER BY Sum(v.impressionsCount) DESC
LIMIT 25
```

Recommendations based on consumer's browsing history (top 1 Make and Model) and collaborative filtering based on age and gender

```
MATCH
            (c:Consumer)<-[]-(s:Search),
            (s)-[]->(mmyt:MakeModelYearTrim),
            (mmyt)-[]->(mk:Make),
            (mmyt)-[]->(m:Model),
            (mmyt)-[]->(y:Year),
            (mmyt)-[]->(t:Trim),
            (mmyt)<-[]-(mmytb:MakeModelYearTrimBodyStyle),
            (mmytb)-[]->(b:BodyStyle)
WHERE
            c.consumerId=2201416
WITH
            mk, m, y, t, b, Sum(s.impressionsCount) As ImpNum, c ORDER BY ImpNum DESC LIMIT 1
MATCH
            (c)-[]->(a:Age)-[]->(AgeBucket)<-[]-(ao:Age)<-[]-(o:Consumer),
            (c)-[]->(g:Gender)<-[]-(o),
            (o)<-[]-(sr:Search),
            (sr)-[]->(mmytr:MakeModelYearTrim),
            (mmytr)-[]->(mkr:Make),
            (mmytr)-[]->(mr:Model),
            (mmytr)-[]->(yr:Year),
            (mmytr)-[]->(tr:Trim),
            (mmytr)<-[]-(mmytbr:MakeModelYearTrimBodyStyle),
            (mmytbr)-[]->(br:BodyStyle)
WHERE
            c<>o and m<>mr and y.year<=yr.year and b=br
RETURN
            b.name, ImpNum, mkr.name, mr.name, yr.name, Sum(sr.impressionsCount)
ORDER BY
            Sum(sr.impressionsCount) DESC
LIMIT 25


MATCH
            (c:Consumer)<-[]-(v:VDPImpression),
            (v)-[]->(mmyt:MakeModelYearTrim),
            (mmyt)-[]->(mk:Make),
            (mmyt)-[]->(m:Model),
            (mmyt)-[]->(y:Year),
```

```
            (mmyt)-[]->(t:Trim),
            (mmyt)<-[]-(mmytb:MakeModelYearTrimBodyStyle),
            (mmytb)-[]->(b:BodyStyle)
WHERE
            c.consumerId=2201416
WITH
            mk, m, y, t, b, Sum(v.impressionsCount) As ImpNum, c ORDER BY ImpNum DESC LIMIT 1
MATCH
            (c)-[]->(a:Age)-[]->(AgeBucket)<-[]-(ao:Age)<-[]-(o:Consumer),
            (c)-[]->(g:Gender)<-[]-(o),
            (o)<-[]-(vr:VDPImpression),
            (vr)-[]->(mmytr:MakeModelYearTrim),
            (mmytr)-[]->(mkr:Make),
            (mmytr)-[]->(mr:Model),
            (mmytr)-[]->(yr:Year),
            (mmytr)-[]->(tr:Trim),
            (mmytr)<-[]-(mmytbr:MakeModelYearTrimBodyStyle),
            (mmytbr)-[]->(br:BodyStyle)
WHERE
            c<>o and m<>mr and y.year<=yr.year and b=br
RETURN
            b.name, ImpNum, mkr.name, mr.name, yr.name, Sum(vr.impressionsCount)
ORDER BY
            Sum(vr.impressionsCount) DESC
LIMIT 25
```

Recommendation Query without explicit VDP-impression table

```
MATCH
    (mmyt)-[]->(mk:Make),
    (mmyt)-[]->(m:Model),
    (mmyt)-[]->(y:Year),
    (mmyt)<-[]-(mmytb:MakeModelYearTrimBodyStyle),
    (b:BodyStyle)<-[]-(mmytb),
    (c:Consumer)<-[]-(mmyt:MakeModelYearTrim)
WHERE
    mk.name='BMW' and m.name='X5' and y.name='2016'
WITH
    mk, m, y, b, c
MATCH
    (c)<-[vr]-(mmytr:MakeModelYearTrim),
    (mmytr)-[]->(mkr:Make),
    (mmytr)-[]->(mr:Model),
    (mmytr)-[]->(yr:Year),
    (mmytr)<-[]-(mmytbr:MakeModelYearTrimBodyStyle),
    (br:BodyStyle)<-[]-(mmytbr)
WHERE
    m<>mr and y.year<=yr.year and b=br
RETURN
    mkr.name, mr.name, yr.name, Sum(vr.impressionsCount)
ORDER BY
    Sum(vr.impressionsCount) DESC
LIMIT 25
```