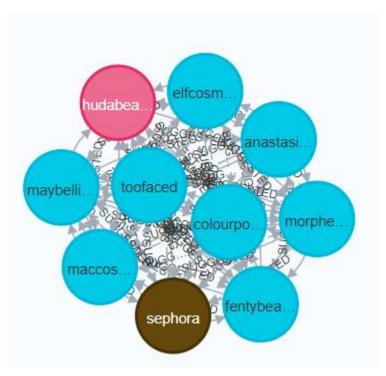# Network Analysis Using Cypher in Neo4j

1. **Top 10 beauty entities having maximum in-degree connections. It is an indication of popular entities appearing in suggested accounts of other beauty entities.**

Query:

```
MATCH ()-[:SUGGESTED]→(e:BeautyEntity)  WITH e, count(*) as `incoming connections` ORDER BY
`incoming connections` desc RETURN e limit 10
```

Output:

Node	incoming connections
"fentybeauty"	122
"maccosmetics"	116
"sephora"	116
"colourpopcosmetics"	111
"anastasiabeverlyhills"	111
"hudabeauty"	99
"maybelline"	99
"morphebrushes"	97

"toofaced"	97
"elfcosmetics"	96

2. **Average incoming connections to beauty entities**

Query:

```
MATCH ()-[:SUGGESTED]→(e:BeautyEntity)  WITH e, count(*) as `incoming connections` RETURN
avg(`incoming connections`)
```

avg(`incoming connections`)
22.12254901960785

3. **Top 10 beauty entities with highest degree connections(in-degree + out-degree)**

Query:

```
MATCH (e:BeautyEntity)-[:SUGGESTED]-() WITH e, count(*) as degree ORDER BY degree desc RETURN e.name,
degree limit 10
```

Node	Degree
"fentybeauty"	202
"maccosmetics"	196
"sephora"	196
"colourpopcosmetics"	191
"anastasiabeverlyhills"	191
"maybelline"	179
"hudabeauty"	179
"morphebrushes"	177
"toofaced"	177
"elfcosmetics"	176

4. **Top 10 beauty entities with highest PageRank score**

Query:

```
1  CALL gds.pageRank.stream('InstagramLocalAnalysis')
2  YIELD nodeId, score
3  RETURN gds.util.asNode(nodeId).name AS name, score
4  ORDER BY score DESC, name ASC limit 20
```

Node	PageRank
"fentybeauty"	0.477892
"sephora"	0.46773
"maccosmetics"	0.466771
"anastasiabeverlyhills"	0.45502
"colourpopcosmetics"	0.45216
"maybelline"	0.429215
"toofaced"	0.428212
"elfcosmetics"	0.426905
"morphebrushes"	0.426825
"nyxcosmetics"	0.424147

5. **Top 10 nodes with highest Betweeness Centrality**

Query:

```
CALL gds.betweenness.stream('InstagramLocalAnalysis')
YIELD nodeId, score
RETURN gds.util.asNode(nodeId).name AS name, score
ORDER BY score DESC, name ASC limit 20
```

Node	Betweeness Score
"danessa_myricks"	520501.9362
"nablacosmetics"	425309.6184
"toofaced"	365080.5048
"lacolorscosmetics"	325971.1509
"makeupworldnews"	277916.2826
"nyxcosmetics_france"	265261.7141
"clarinsofficial"	248118.9687
"opi"	235454.0919
"kikomilano"	225106.6957
"maybelline"	222026.9687

Individual Node Analysis

1. **Out of 310 Brands, one of the top beauty entities "FentyBeauty", appeared as suggestion of how many other brands**

Query:

```
MATCH (s:Brand)-[r:SUGGESTED]-(t:BeautyEntity{name:'fentybeauty'}) RETURN count(*) as Count
```

Count
111

Query: To display 10 out of 111 connections

```
MATCH (s:Brand)-[r:SUGGESTED]-(t:BeautyEntity{name:'fentybeauty'}) RETURN s,t,r LIMIT 10
```