PRÁCTICA Nº 3

Medidas de centralidad, comunidades y enlaces

- Módulo: Big Data Aplicado
- Unidad de trabajo: UND 1
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Enunciado

Realiza los ejemplos recogidos en el pdf a partir del punto 4.2.5. Medidas de centralidad, detección de comunidades y predicción de enlaces

Casi con toda probabilidad tendrás que realizar adaptaciones en el código debido a cambios en la librería

Solución

Importación de CSVs

```
1
2  WITH "https://github.com/neo4j-graph-analytics/book/raw/master/data/" + "social-nodes.csv" AS uri
3  LOAD CSV WITH HEADERS FROM uri AS row
4  MERGE (:User {id: row.id})
5
6  WITH "https://github.com/neo4j-graph-analytics/book/raw/master/data/" + "social-relationships.csv" AS uri
7  LOAD CSV WITH HEADERS FROM uri AS row
8  MATCH (source:User {id: row.src})
9  MATCH (destination:User {id: row.dst})
0  MERGE (source)-[:FOLLOWS]→(destination)
```

Added 9 labels, created 9 nodes, set 9 properties, created 16 relationships, completed after 5417 ms.

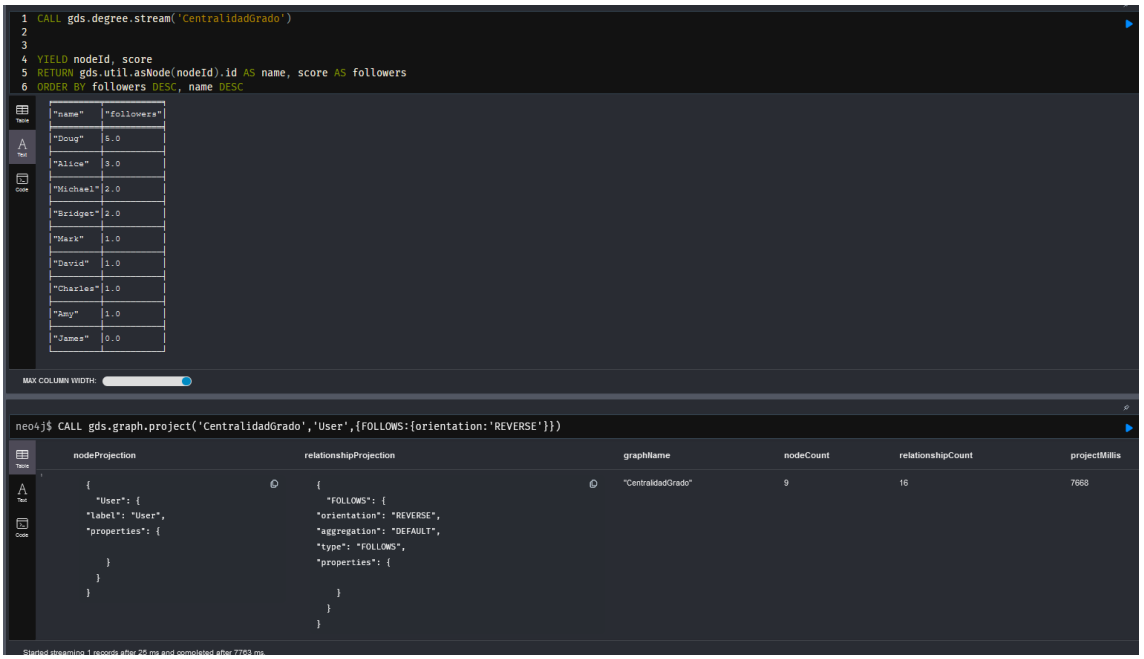
Ejemplos

Medidas de centralidad

- Centralidad de grado

```
CALL gds.degree.stream('CentralidadGrado')


YIELD nodeId, score
RETURN gds.util.asNode(nodeId).id AS name, score AS followers
ORDER BY followers DESC, name DESC
```



- Cercanía

```
CALL gds.beta.closeness.stream('Cercania',{nodeLabels:['User'],relationshipTypes:['FOLLOWS']})
YIELD nodeId, score
RETURN gds.util.asNode(nodeId).id AS User, score
ORDER BY score DESC
```

```
CALL gds.beta.closeness.stream('Cercania',{nodeLabels:['User'],relationshipTypes:['FOLLOWS']})
YIELD nodeId, score
RETURN gds.util.asNode(nodeId).id AS User, score
ORDER BY score DESC
```

"User"	"score"
"David"	1.0
"Alice"	0.8333333333333334
"Bridget"	0.7142857142857143
"Michael"	0.7142857142857143
"James"	0.6666666666666666
"Mark"	0.625
"Doug"	0.4166666666666667
"Charles"	0.35714285714285715
"Amy"	0.0

MAX COLUMN WIDTH:

- Intermediación

```
CALL gds.betweenness.stream('Intermediacion')
YIELD nodeId, score
RETURN gds.util.asNode(nodeId).id AS name, score
ORDER BY score DESC
```

```
CALL gds.betweenness.stream('Intermediacion')
YIELD nodeId, score
RETURN gds.util.asNode(nodeId).id AS name, score
ORDER BY score DESC
```

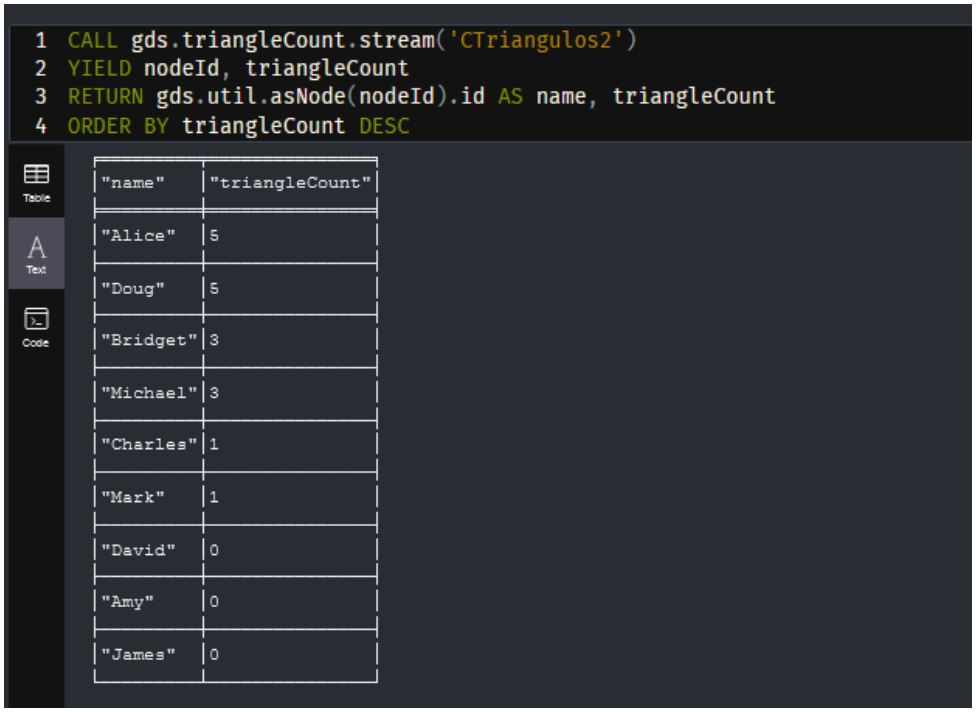
"name"	"score"
"Alice"	10.0
"Doug"	7.0
"Mark"	7.0
"David"	1.0
"Bridget"	0.0
"Charles"	0.0
"Michael"	0.0
"Amy"	0.0
"James"	0.0

Detección de comunidades

- Conteo de triángulos

```
CALL gds.graph.project('CTriangulos2','User',{FOLLOWS: {orientation: 'UNDIRECTED'}})
```

```
CALL gds.triangleCount.stream('CTriangulos2')
YIELD nodeId, triangleCount
RETURN gds.util.asNode(nodeId).id AS name, triangleCount
ORDER BY triangleCount DESC
```



- Coeficiente local de clustering

```
CALL gds.localClusteringCoefficient.stream('CTriangulos2')
YIELD nodeId, localClusteringCoefficient
RETURN gds.util.asNode(nodeId).id AS name, localClusteringCoefficient
ORDER BY localClusteringCoefficient DESC
```

```
CALL gds.localClusteringCoefficient.stream('CTriangulos2')
YIELD nodeId, localClusteringCoefficient
RETURN gds.util.asNode(nodeId).id AS name, localClusteringCoefficient
ORDER BY localClusteringCoefficient DESC
```

"name"	"localClusteringCoefficient"
"Bridget"	1.0
"Charles"	1.0
"Mark"	1.0
"Michael"	1.0
"Alice"	0.5
"Doug"	0.5
"David"	0.0
"Amy"	0.0
"James"	0.0

- Componentes fuertemente conexas

```
CALL gds.alpha.scc.stream('CTriangulos2',{nodeLabels:[ 'User'],
relationshipTypes:['FOLLOWS']})
YIELD nodeId, componentId
RETURN gds.util.asNode(nodeId).id AS Name, componentId AS Component
ORDER BY Component DESC
```

```
1 CALL gds.alpha.scc.stream('CTriangulos2',{nodeLabels:[ 'User'], relationshipTypes:['FOLLOWS']})
2 YIELD nodeId, componentId
3 RETURN gds.util.asNode(nodeId).id AS Name, componentId AS Component
4 ORDER BY Component DESC
5
```

"Name"	"Component"
"David"	6
"Amy"	6
"James"	6
"Alice"	0
"Bridget"	0
"Charles"	0
"Doug"	0
"Mark"	0
"Michael"	0

Predicción de enlaces

- Vecinos comunes

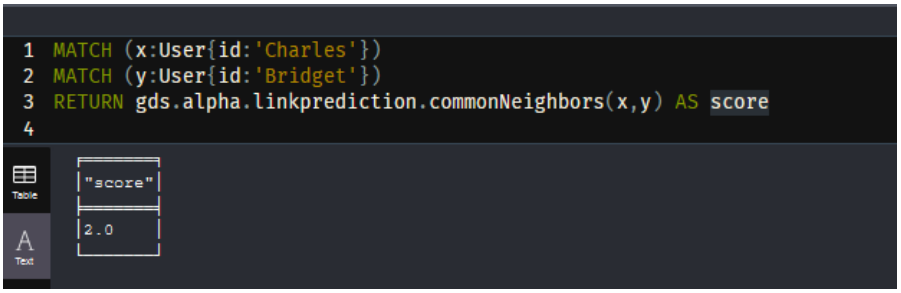
```
MATCH (x:User{id:'Charles'})
MATCH (y:User{id:'Bridget'})
RETURN gds.alpha.linkprediction.commonNeighbors(x,y) AS score
```

```
1 MATCH (x:User{id:'Charles'})
2 MATCH (y:User{id:'Bridget'})
3 RETURN gds.alpha.linkprediction.commonNeighbors(x,y) AS score
4
```

"score"
2.0

- Adhesión preferencial

```
MATCH (x:User{id:'Charles'})
MATCH (y:User{id:'Bridget'})
RETURN gds.alpha.linkprediction.commonNeighbors(x,y) AS score
```



- Asignación de recursos

```
MATCH (x:User{id:'Charles'})
MATCH (y:User{id:'Bridget'})
RETURN gds.alpha.linkprediction.resourceAllocation(x, y) AS score
```