**HOME WORK – Graph Neural Network**

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**Convert the features into a matrix: H**

male: 0, female: 1, unknown: 2;

study:0, football: 1, skateboard: 2, photography: 3;

|  |  |
| --- | --- |
| 0 | 0 |
| 1 | 1 |
| 1 | 2 |
| 0 | 0 |
| 2 | 0 |
| 0 | 3 |

**Calculate Adjacency Matrix (A~)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Node 1 | Node 2 | Node 3 | Node 4 | Node 5 | Node 6 |
| Node 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| Node 2 | 1 | 1 | 1 | 0 | 0 | 1 |
| Node 3 | 1 | 1 | 1 | 0 | 0 | 0 |
| Node 4 | 0 | 0 | 0 | 1 | 1 | 1 |
| Node 5 | 0 | 0 | 0 | 1 | 1 | 1 |
| Node 6 | 0 | 1 | 0 | 1 | 1 | 1 |

**Calculate the Degree Matrix (D~)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 3 |  |  |  |  |  |
|  | 4 |  |  |  |  |
|  |  | 3 |  |  |  |
|  |  |  | 3 |  |  |
|  |  |  |  | 3 |  |
|  |  |  |  |  | 4 |

**Bias W**

|  |  |
| --- | --- |
| 0,25 | 0,3 |
| 0,7 | 0,6 |
| 0,1 | 0,5 |
| 0,8 | 0,9 |
| 0,4 | 0,3 |
| 0,2 | 0,12 |

**GCN Formula**

D 1/2 =

1/3 1/3 1/3 0 0 0

1/4 1/4 1/4 0 0 1/4

1/3 1/3 1/3 0 0 0

0 0 0 1/3 1/3 1/3

0 0 0 1/3 1/3 1/3

0 1/4 0 1/4 1/4 1/4

=

7/20 7/15

21/16 69/50

27/20 37/15

7/15 11/25

37/15 11/25

21/40 87/25

=

77/120 53/60

397/240 137/75

197/120 173/60

11/12 87/100

35/12 87/100

23/20 203/50