**Data Analysis** - Sample Date for a **40 Node Network - Single Source to Single Destination**

**Hopfield Neural Networks Convergent Algorithms**

|  |  |  |
| --- | --- | --- |
|  | Ali & Kamoun Algorithm Path Traversed | |
| Source/Destination | **Path Taken** | **Cost(α)** |
| Node 1 to 3 | 1-> 3 | 122 |
| Node 1 to 6 | No Convergence | − |
| Node 1 to 9 | 1-> 9 | 688 |
| Node 1 to 12 | 1-> 11-> 12-> | 954 |
| Node 1 to 15 | 1-> 3-> 25-> 14-> 15-> | 1369 |
| Node 1 to 18 | 1-> 9-> 20-> 19-> 18-> | 1156 |
| Node 1 to 20 | 1-> 9-> 20-> | 739 |
| Node 1 to 23 | 1-> 10-> 23-> | 1300 |
| Node 1 to 26 | No Convergence | − |

|  |  |  |
| --- | --- | --- |
| Park & Choi Algorithm Path Traversed | | |
| Source/Destination | **Path Taken** | **Cost(β)** |
| Node 1 to 3 | 1-> 3 | 122 |
| Node 1 to 6 | 1-> 9-> 8-> 7-> 6-> | 2558 |
| Node 1 to 9 | 1-> 9 | 688 |
| Node 1 to 12 | 1-> 2-> 12 | 553 |
| Node 1 to 15 | 1-> 3-> 25-> 14-> 15-> | 1369 |
| Node 1 to 18 | 1-> 9-> 20-> 19-> 18-> | 1156 |
| Node 1 to 20 | 1-> 9-> 20-> | 739 |
| Node 1 to 23 | 1-> 10-> 23-> | 1300 |
| Node 1 to 26 | 1-> 3-> 25-> 14-> 15-> 26-> | 2118 |

|  |  |  |
| --- | --- | --- |
| Ahn & Ramakrishna Algorithm Path Traversed | | |
| Source/Destination | **Path Taken** | **Cost(ρ)** |
| Node 1 to 3 | 1-> 3 | 122 |
| Node 1 to 6 | 1-> 3-> 25-> 14-> 4-> 5-> 6-> | 1994 |
| Node 1 to 9 | 1-> 9 | 688 |
| Node 1 to 12 | 1-> 11-> 12 | 954 |
| Node 1 to 15 | 1-> 3-> 25-> 14-> 15-> | 1369 |
| Node 1 to 18 | 1-> 3-> 25-> 14-> 15-> 17-> 18-> | 1686 |
| Node 1 to 20 | 1-> 9-> 20-> | 739 |
| Node 1 to 23 | 1-> 10-> 23-> | 1300 |
| Node 1 to 26 | 1-> 3-> 25-> 14-> 15-> 26-> | 2118 |

|  |  |  |
| --- | --- | --- |
| Park & Keum Algorithm Path Traversed | | |
| Source/Destination | **Path Taken** | **Cost(φ)** |
| Node 1 to 3 | 1-> 3 | 122 |
| Node 1 to 6 | 1-> 3-> 25-> 14-> 4-> 5-> 6-> | 1994 |
| Node 1 to 9 | 1-> 9 | 688 |
| Node 1 to 12 | 1-> 2-> 12 | 553 |
| Node 1 to 15 | 1-> 3-> 25-> 14-> 15-> | 1369 |
| Node 1 to 18 | 1-> 9-> 20-> 19-> 18-> | 1156 |
| Node 1 to 20 | 1-> 9-> 20-> | 739 |
| Node 1 to 23 | 1-> 10-> 23-> | 1300 |
| Node 1 to 26 | 1-> 3-> 25-> 14-> 15-> 26-> | 2118 |

**Non-Neural Convergent Algorithms**

|  |  |  |
| --- | --- | --- |
| Dijkstra Path Traversed | | |
| Source/Destination | **Path Taken** | **Cost(σ)** |
| Node 1 to 3 | 1-> 3 | 122 |
| Node 1 to 6 | 1-> 3-> 25-> 14-> 4-> 5-> 6-> | 1994 |
| Node 1 to 9 | 1-> 9 | 688 |
| Node 1 to 12 | 1-> 2->12 | 553 |
| Node 1 to 15 | 1-> 3-> 25-> 14-> 15-> | 1369 |
| Node 1 to 18 | 1-> 9-> 20-> 19-> 18-> | 1156 |
| Node 1 to 20 | 1-> 9-> 20-> | 739 |
| Node 1 to 23 | 1-> 2-> 12->23-> | 1275 |
| Node 1 to 26 | 1-> 3-> 25-> 14-> 15-> 26-> | 2118 |

|  |  |  |
| --- | --- | --- |
| Bellman Ford Path Traversed | | |
| Source/Destination | **Path Taken** | **Cost(ω)** |
| Node 1 to 3 | 1-> 3 | 122 |
| Node 1 to 6 | 1-> 9-> 20-> 19-> 18-> 17-> 6-> | 2233 |
| Node 1 to 9 | 1-> 9 | 688 |
| Node 1 to 12 | 1-> 2->12 | 553 |
| Node 1 to 15 | 1-> 9-> 20-> 19-> 18-> 17-> 15-> | 2059 |
| Node 1 to 18 | 1-> 9-> 20-> 19-> 18-> | 1156 |
| Node 1 to 20 | 1-> 9-> 20-> | 739 |
| Node 1 to 23 | 1-> 10-> 23-> | 1300 |
| Node 1 to 26 | 1-> 9-> 20-> 19-> 18-> 17-> 16-> 26-> | 2465 |

|  |  |
| --- | --- |
| Floyd Warshall Path Traversed | |
| Source/Destination | **Cost(τ)** |
| Node 1 to 3 | 122 |
| Node 1 to 6 | 1995 |
| Node 1 to 9 | 688 |
| Node 1 to 12 | 553 |
| Node 1 to 15 | 1369 |
| Node 1 to 18 | 1156 |
| Node 1 to 20 | 739 |
| Node 1 to 23 | 1275 |
| Node 1 to 26 | 2118 |

**Total Results for 40 Node Network - Single Source to Single Destination**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Source/Destination | Cost(α) | Cost(β) | Cost(ρ) | Cost(φ) | Cost(σ) | Cost(ω) | Cost(τ) |
| Node 1 to 3 | 122 | 122 | 122 | 122 | 122 | 122 | 122 |
| Node 1 to 6 | − | 2558 | 1994 | 1994 | 1994 | 2233 | 1995 |
| Node 1 to 9 | 688 | 688 | 688 | 688 | 688 | 688 | 688 |
| Node 1 to 12 | 954 | 553 | 954 | 553 | 553 | 553 | 553 |
| Node 1 to 15 | 1369 | 1369 | 1369 | 1369 | 1369 | 2059 | 1369 |
| Node 1 to 18 | 1156 | 1156 | 1686 | 1156 | 1156 | 1156 | 1156 |
| Node 1 to 20 | 739 | 739 | 739 | 739 | 739 | 739 | 739 |
| Node 1 to 23 | 1300 | 1300 | 1300 | 1300 | 1275 | 1300 | 1275 |
| Node 1 to 26 | − | 2118 | 2118 | 2118 | 2118 | 2465 | 2118 |