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

**Hopfield Neural Networks Convergent Algorithms**

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|  | Ali & Kamoun Algorithm Path Traversed | |
| Source/Destination | **Path Taken** | **Cost(α)** |
| Node 1 to 3 | 1-> 2-> 3-> | 843 |
| Node 1 to 5 | 1-> 5-> | 607 |
| Node 1 to 9 | 1-> 7-> 10-> 12-> 8-> 9-> | 1749 |
| Node 1 to 15 | No Convergence | No Convergence |
| Node 1 to 20 | 1-> 5-> 14-> 20-> | 2026 |
| Node 1 to 25 | No Convergence | No Convergence |
| Node 1 to 30 | No Convergence | No Convergence |
| Node 1 to 34 | No Convergence | No Convergence |

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| Park & Choi Algorithm Path Traversed | | |
| Source/Destination | **Path Taken** | **Cost(β)** |
| Node 1 to 3 | 1-> 2-> 3-> | 843 |
| Node 1 to 5 | 1-> 5-> | 607 |
| Node 1 to 9 | 1-> 2-> 3-> 8-> 9-> | 1749 |
| Node 1 to 15 | 1-> 7-> 10-> 17-> 25-> 15-> | 839 |
| Node 1 to 20 | 1-> 5-> 14-> 20-> | 2026 |
| Node 1 to 25 | 1-> 7-> 10-> 17-> 25-> | 633 |
| Node 1 to 30 | No Convergence | No Convergence |
| Node 1 to 34 | No Convergence | No Convergence |

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| Ahn & Ramakrishna Algorithm Path Traversed | | |
| Source/Destination | **Path Taken** | **Cost(ρ)** |
| Node 1 to 3 | 1-> 2-> 3-> | 843 |
| Node 1 to 5 | 1-> 5-> | 607 |
| Node 1 to 9 | 1-> 2-> 3-> 8-> 9-> | 1749 |
| Node 1 to 15 | 1-> 7-> 10-> 17-> 25-> 15-> | 839 |
| Node 1 to 20 | 1-> 5-> 14-> 20-> | 2026 |
| Node 1 to 25 | 1-> 7-> 10-> 17-> 25-> | 633 |
| Node 1 to 30 | No Convergence | No Convergence |
| Node 1 to 34 | No Convergence | No Convergence |

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| Park & Keum Algorithm Path Traversed | | |
| Source/Destination | **Path Taken** | **Cost(φ)** |
| Node 1 to 3 | 1-> 2-> 3-> | 843 |
| Node 1 to 5 | 1-> 5-> | 607 |
| Node 1 to 9 | 1-> 7-> 10-> 12-> 8-> 9-> | 875 |
| Node 1 to 15 | 1-> 7-> 10-> 17-> 25-> 15-> | 839 |
| Node 1 to 20 | 1-> 5-> 14-> 20-> | 2026 |
| Node 1 to 25 | 1-> 7-> 10-> 17-> 25-> | 633 |
| Node 1 to 30 | 1-> 7-> 10-> 17-> 25-> 15-> 26-> 27-> 30-> | 1983 |
| Node 1 to 34 | 1-> 7-> 10-> 17-> 25-> 15-> 26-> 27-> 34-> | 2311 |

**Non-Neural Convergent Algorithms**

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| Dijkstra Path Traversed | | |
| Source/Destination | **Path Taken** | **Cost(σ)** |
| Node 1 to 3 | 1-> 7-> 3-> | 676 |
| Node 1 to 5 | 1-> 5-> | 607 |
| Node 1 to 9 | 1->7->10->8->9-> | 875 |
| Node 1 to 15 | 1-> 7-> 10-> 17-> 25-> 15-> | 839 |
| Node 1 to 20 | 1-> 7-> 10-> 17-> 18-> 22-> 20 | 1420 |
| Node 1 to 25 | 1-> 7-> 10-> 17-> 25-> | 633 |
| Node 1 to 30 | 1-> 7-> 10-> 17-> 25-> 15-> 26-> 27-> 30-> | 1983 |
| Node 1 to 34 | 1-> 7-> 10-> 17-> 25-> 15-> 26-> 27-> 34-> | 2311 |

|  |  |  |
| --- | --- | --- |
| Bellman Ford Path Traversed | | |
| Source/Destination | **Path Taken** | **Cost(ω)** |
| Node 1 to 3 | 1-> 7-> 3-> | 699 |
| Node 1 to 5 | 1-> 5-> | 607 |
| Node 1 to 9 | 1->7->10->12->9-> | 1264 |
| Node 1 to 15 | 1-> 7-> 10-> 17-> 25-> 15-> | 839 |
| Node 1 to 20 | 1-> 5-> 14-> 20-> | 2026 |
| Node 1 to 25 | 1-> 7-> 10-> 17-> 25-> | 633 |
| Node 1 to 30 | 1->7->10->17->25->15->26->24->30-> | 2603 |
| Node 1 to 34 | 1->7->10->17->18->29->32->31->34-> | 3404 |

|  |  |
| --- | --- |
| Floyd Warshall Path Traversed | |
| Source/Destination | **Cost(τ)** |
| Node 1 to 3 | 1457 |
| Node 1 to 5 | 690 |
| Node 1 to 9 | 366 |
| Node 1 to 15 | 837 |
| Node 1 to 20 | 1421 |
| Node 1 to 25 | 870 |
| Node 1 to 30 | 1595 |
| Node 1 to 34 | 1910 |

**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 | 843 | 843 | 843 | 843 | 676 | 699 | 1457 |
| Node 1 to 5 | 607 | 607 | 607 | 607 | 607 | 607 | 690 |
| Node 1 to 9 | 1749 | 1749 | 1749 | 875 | 875 | 1264 | 366 |
| Node 1 to 15 | - | 839 | 839 | 839 | 839 | 839 | 837 |
| Node 1 to 20 | 2026 | 2026 | 2026 | 2026 | 1420 | 2026 | 1421 |
| Node 1 to 25 | - | 633 | 633 | 633 | 633 | 633 | 870 |
| Node 1 to 30 | - | - | - | 1983 | 1983 | 2603 | 1595 |
| Node 1 to 34 | - | - | - | 2311 | 2311 | 3404 | 1910 |