# DYNAMIC BANDWIDTH ALLOCATION USING NEURAL-FUZZY IN ATM NETWORK

by

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*To Celine*

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# LIST OF ABBREVIATIONS

1. AAL.....ATM Adaptation Layer
2. ABR.....Available Bit Rate
3. AHHM.....Adaptive Hidden Markov Model
4. AI.....Artificial Intelligence
5. ARIMA.....Auto Regressive Integrated Moving Average
6. ATM.....Asynchronous Transfer Mode
7. BECN.....Backward Explicit Congestion Notification
8. BD.....Bandwidth Distribution
9. B-ISDN.....Broadband Integrated Service Digital Network
10. CAC.....Connection Admission Control
11. CBR.....Constant Bit Rate
12. CCR.....Current Cell Rate
13. CDV.....Cell Delay Variation
14. CDVT.....Cell Delay Variation Tolerance
15. CLP.....Cell Loss Priority
16. CLR.....Cell Loss Ratio
17. CoS.....Class of Service
18. CS.....Convergence Sublayer
19. CTD.....Cell Transfer Delay
20. DTS.....Dynamic Time Slice
21. EFCI.....Explicit Forward Congestion Indication
22. ER.....Explicit Rate
23. FFNN.....Feed-Forward Neural Network
24. FIFO.....First In First Out
25. GFC.....Generic Flow Control
26. HBS.....High Bandwidth Service
27. HEC.....Header Error Check

## LIST OF ABBREVIATIONS (continued)

28. HHM.....Hidden Markov Model
29. LAN.....Local Area Network
30. MBS.....Maximum Burst Size
31. MCR.....Minimum Cell Rate
32. MOTA.....Minimum Overflow Traffic Algorithm
33. NN.....Neural Network
34. NNI.....Network-to-Network Interface
35. nrt.....non-real time
36. OAM.....Operations, Administration, Maintenance
37. PCR.....Peak Cell Rate
38. PDU.....Protocol Data Unit
39. pps.....packets per second
40. PVC.....Permanent Virtual Connection
41. QoS.....Quality of Service
42. RM.....Resources Management
43. rt.....real time
44. SAR.....Segmentation and Reassembly
45. SCR.....Sustained Cell Rate
46. SDU.....Service Data Unit
47. SMS.....Statistically Multiplexed Services
48. SONET.....Synchronous Optical NETwork
49. SVC.....Switched Virtual Connection
50. TDL.....Tapped Delay Line
51. UBR.....Unspecified Bit Rate
52. UNI.....User-to-Network Interface
53. UPC.....Usage Parameter Control
54. VC.....Virtual Channel
55. VCC.....Virtual Channel Connection
56. VBR.....Variable Bit Rate

## LIST OF ABBREVIATIONS (continued)

57. VCI.....Virtual Channel Identifier
58. VCLP.....Virtual Cell Loss Probability
59. VPI.....Virtual Path Identifier
60. VPC.....Virtual Path Connection
61. WAN.....Wide Area Network

**FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY**
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# ABSTRACT

Dynamic bandwidth allocation is becoming one of the crucial issues in the design and research in the computer network. This is due to the continuous increasing demand of intensive applications that require more bandwidth while retaining higher quality. Dynamic bandwidth allocation utilises the current network state information to optimise the bandwidth distribution. The state information can be gathered through prediction using past data and measurement on current state. Agility and flexibility of dynamic bandwidth allocation using Neural-Fuzzy has the advantage that it can adapt to the state changes of the network. ATM network carries heterogeneous traffic and this causes the management on bandwidth to be more complex.

Neural Network and Fuzzy Logic are two fields of Artificial Intelligence, which are commonly used for solving prediction and decision-making problem. Neural-Fuzzy integration has the nature of tolerance of ambiguous and uncertainty. So, it is the most reliable method in controlling bandwidth distribution in the real ATM network environment.

The main objective of this project is to investigate the performance of the ATM network after implementing the dynamic bandwidth allocation algorithm. The Available Bit Rate (ABR) is a type of ATM service classes, in which the dynamic bandwidth allocation can be used to improve its performance.

Simulation of the traffic prediction and bandwidth re-allocation is done and compared with static bandwidth. Detailed investigation will be carried out to measure the effectiveness of the different bandwidth re-allocation methods.