APPLYING THE NEURAL NETWORKS CONCEPT ON TRAFFIC LOAD FORECASTING -TAKING THE BROADBAND NETWORKS AS AN EXAMPLE

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ABSTRACT

THE BROADBAND NETWORKS TECHNOLOGY EXPLODED VERY QUICK AND THAT BECOME MORE COMPLEX AND BIGGER. HOW TO MAKE AN ACCURATE TRAFFIC FORECASTING THAT CAN PROMOTE THE NETWORKS SERVICE QUALITY AND EFFICIENCY BECOMES A NECESSARY WORK IN INTERNET SERVICE PROVIDER. NEURAL NETWO -RKS ARE APPROVED WITH THE ABILITY OF FUNCTION APPROXIMATION, LEARNING AND PARALLEL PROCES -SING CAPABILITY,FLEXIBILITY TO DIFFERENT CONDITIONS AND HAVE GOOD PERFORMANCE ON NON-LINE -AR PHENOMENON. IN RECENT YEARS,NEURAL NETWORKS TECHNIQUE HAS BEEN WIDELY USED IN FORECAST -ING FIELDS SINCE ITS EXCELLENT CHARACTERISTICS. IN MOST OF THESE STUDIES, NN STRUCTURE IS FIXED THAT MEANS THE NN KEEPS SAME SIZE DURING THE TRAINING AND TESTING PHASES.HOWEVER,THE CORRELATIONS BETWEEN TRAFFICS AND ITS INFLUENCING FACTORS ARE VARIOUS, WHEN TRAINING PATTE -RNS ARE UNSUITABLE,THE IMPROPER INFORMATION WILL MAKE FIXED NN TO AN ILL LEARNING AND CAU -SE A POOR FORECASTING.THE PURPOSE OF THIS THESIS IS TO APPLY THE FRAME OF OLS (ORTHOGONAL LEAST SQUARE) LEARNINGRULES.AIMING AT THE RBF'S CHARACTERISTICS BRINGS UP IMPROVED LEARNIN -G RULES IN CONTAIN INPUT VARIABLE FOR TUNING THE WEIGHTS AND DYNAMIC ADJUST HIDDEN UNITS. THEREFORE,WE CONSTRUCT AN ADVANCED ADAPTATION SCHEME FOR UPGRADING THE APPROXIMATION ACCUR -ACY OF RBF NEURAL NETWORKS AND ON-LINE ADAPTIVE.IN THIS THESIS,TWO MODULES OF NEURAL NETW -ORKS ARE STUDIED AND ANALYZED.ONE IS NEURAL NETWORKS WITH ENHANCED ADAPTIVE RADIAL-BASIS- FUNCTION METHODOLOGY,THE OTHER ONE IS NEURAL NETWORKS WITH CONVENTIONAL BACK-PROPAGATION LE -ARNING ALGORITHM.HINET TRAFFIC DATA FROM JAN,2002 TO MAY,2002 FIVE MONTHS DATA ARE UTILIZ -ED FOR EXPERIMENTATION.TWO TYPES FOR TRAFFIC FORECASTING ARE INVESTIGATED,I.E., TEN-MINUTE-AHEAD TRAFFIC FORECASTING, ONE-HOUR-AHEAD TRAFFIC LOAD FORECASTING. THE SIMULAT -ION RESULTS BY EACH MODULE ARE THEN COMPARED.THE ADVANTAGES OF DISTINCT FORECASTING MODUL -E ARE ALSO ANALYZED AND DISCUSSED.

Keywords : NEURAL NETWORKS,RADIAL BASIS FUNCTION NEURAL NETWORKS,BACK PROPAGATION NEURAL NETWORKS,TRA FFIC LOAD FORECASTI

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