International Journal of Engineering Trends and Technology
ISSN: 2231 – 5381 /doi:10.14445/22315381/IJETT-V68I11P221

Volume 68 Issue 11, 156-162, November 2020

Identify the Image-Based CAPTCHA by Using Back Propagation Algorithm of Artificial Neural Network

Renu Saroha[1], Sumeet Gill[2]

[1]*PhD Scholar, Department of Computer Science Application Maharishi Dayanand University, Rohtak-124001, Haryana (India),* [2]*Department of Mathematics, Maharishi Dayanand University, Rohtak-124001, Haryana (India)*

renusaroha1983@gmail.com
drsumeetgill@gmail.com

Abstract: *CAPTCHA is an ultra-modern security approach in the world of internet. There is various form of CAPTCHA. This paper proposed another form of CAPTCHA called Image-based CAPTCHA. Image-based CAPTCHA is more securing as compare to other CAPTCHA (Text and Audio based CAPTCHA) techniques. Image-based CAPTCHA has been introduced to address the limitations of previous CAPTCHA methods. It is used to controlled mutilations are applied to haphazardly picked images and introduced to a client for an explanation from a given list of words. In this paper, we centre on how AI strategies perceive Image-based CAPTCHA. Additionally, we recall the image-based CAPTCHA. This paper proposed a strategy dependent on the Back Propagation algorithm to pinpoint the image-based CAPTCHA.*

Keywords*: Backpropagation model, nntool, ANN, MATLAB, 2017.*

I. Introduction

CAPTCHA is an abbreviation for "Completely Automated Public Turing test to distinguish Computers and Humans apart"[8]. CAPTCHAs were first noted in a paper via Moni Naor [3]. In 1996.CAPTCHA is a kind of challenge–reaction test utilized in registering to decide if the client is human. CAPTCHAs are, by definition, completely robotized, requiring minimal human support or mediation to regulate, creating benefits in cost and unwavering quality. CAPTCHA gives protection against malicious attacks and bots. The principle preferred position of image-based CAPTCHA is that design acknowledgement is hard AI issues. Along these lines, it is hard to break this test utilizing pattern recognition technique [1]. This paper focus on another variety of CAPTCHA called image-based CAPTCHA. It is a variation of text-based CAPTCHA. We propose a basic, quick, and effective image-based CAPTCHA, which provide security against attacks with artificial neural network technique. Traditionally we used Text-based CAPTCHA for security purposes. Text-based CAPTCHA contains simple English letters, which are limited to 62 categories (26 uppercase letter, 26 lower case letters, and 10 digits. It contains simple English words which are easily accessed by the hacker or an unauthorized person. It found more attacks occur in Text-based CAPTCHA. CAPTCHA fashioner was attempted to add different novel opposition systems to existing content CAPTCHAs like packing characters together, commotion curves. So on, however, these obstruction mechanisms appear to be inadequate, and they are no longer secure. General vision is, by all accounts a more difficult issue than character acknowledgement, so more structures have focused on utilizing pictures rather than words. Brute force and Dictionary attacks are normally found in Text-based CAPTCHA. Online secret key speculating assaults causes make numerous hurtful impacts on the security of information. Numerous online records are hacks through secret key speculating assaults. To overcome this type of problem, image-based CAPTCHA was introduced. It is a collection of images that are blended into one image. Chew and Tygar were the first to utilize a lot of marked pictures to create CAPTCHAs challenges. Yan and Ahmad additionally provided a technique to interrupt Google CAPTCHA of version 2010; they have got used shape patterns to phase the linked characters [7]. The fundamental trend in picture naming CAPTCHAs has been utilized effectively characterized pictures, either from interior databases or group processing of pictures. To breeze through this assessment client can choose just those pictures that match with the indicated sentence. The lower backpropagation algorithm is used to train the neural community. Starting from the output layer, layer employing layer goes again to the input layer, searching out the neurons that expected the mistake, best-tuning the weight of the input fee of those neurons to attain the purpose of repairing the output mistakes [2].

Fig1. Shows image-based CAPTCHA

In latest ten years, the research work of the synthetic neural community has made tremendous progress, the sample recognition, smart robotic, automated control, forecast estimates, biology, medication, economy and different fields have been efficaciously solved many modern pc is difficult to remedy the sensible troubles [4,5,6], showed right intelligence features.

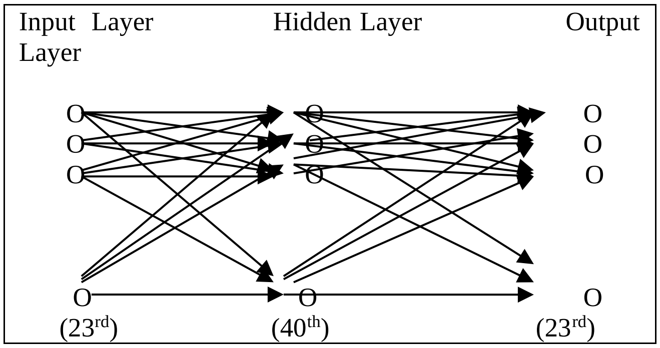

Fig2. Neural Network Architecture for a Feed-Forward Network

Table1: Parameter used for Training of Network using Back Propagation Mode

Parameter	**Values**
Neurons in the input layer	1
Number of hidden layers	1
Neurons in the hidden layer	1
Neurons in the output layer	10
A minimum error exist in the network	0.001
Initial weights and biased term values	Values between 0 and 1

II. Experimental design

Feed-Forward neural network is the most successful learning algorithm. All the layers are connected in a crossway fashion. In feed-forward neural networks, the flow of information takes place in the forward direction. As we have seen in the experiment, we have taken 23 neurons in the input layer, 30 for the hidden layer, and 23 neurons are in the output layer for our experiment. The experiment has been conducted in MATLAB 2017. We used nntool keyword to train the network and nnstart keyword to recall the image in MATLAB 2017 software.

The initial parameters taken before training for formation on the network are given in the table below.

A. Input-output pattern set

Training of the system was carried out for following 23*40 matrix input-output pattern sets.

Inputs

Table2. Shows input-Output pattern dataset sets

1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	0	1	1	0	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

B. Outputs

1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	0	1	1	0	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Table3. Shows the weights matrix of Test pattern sets.

I

.7385	0.7821	0.01465	.7377	.44662
0.1582	.5574	.459 78	.5859	.3865
.9288	0.9405	.5069	0.5260	.490
.50024	.6535	.8893	.6974	0.046586
.4861	.379	.6556	.86415	.3804
.44569	.6829	0.94876	.0781	.2376
.4066	.0851	.612	.46019	.4066
.6796	.0181	.6861	0.6254	.8221
.7557	.4842	0.09630	0.2004	.8591
0.7446	0.03193	.5248	.5043	.0564;
.0622	.8254	.3409	.6878	.4366
.82855	.7373	.91602	0.7089	.7336
.9599	.0638	.28104	.9599	.9638
0.2608	.53182	.6952	.5645;	0.26081
.5717	.6421	0.53461	.5717	.6421
.52182	0.32613	.0384	.74468	.7929
0.3671	.80355	.30855	.92	.735
.5339	.4927	.7246	.5339	.4927
.1926	.71621	0.9743	.1415	.60005
.81324	0.72501	0.9543	.81324	.72501
-2.2261	.615939	.7761	0.7025	.6112
.8599	.729225	.9664	.8599	.929225
.75529	.7634;	0.55295	.7634;	.55295
.81657	.44241	.8115	.7701	0.1657
.91054	.70054	.61054	.70054	.71054
.7365	.0286	.6098	.7365	.7286
.7929	.712921	.6324	.61292	.6324
.6.322 -	.70071	.93008	.7773	.61
.4339	.5355	0.45161	.1745;	.4339
0.0411	0.50153	-0.2291	.88244	.60019
2.0043	0.65972	2.0043	0.6597	2.0043
0.54812	0.60821	.51872	0.5481	0.60821
.5849	.44438	.9448	0.9366	.5849
.80202	.4046	.80202	.4046	.70202
.538215	.8948	0.64063	.2065	0.59197
.72647	0.93252	.4239	.6024	.6347
0.86683	.8505	.51223;	0.8668	.8505
.986 -	.6616	0.83786	.83619;	0.46353
0.78377	.41203	.9427;	0.7837	.71203
.51954	.80482	0.8421	.61954	.90482
.60438	.70035	.8338;	0.9218	.622156
.6276	.61766	.6276	.81766	.6276
.4922	.716293	.70956	.4922	.616293
.4305	.87210	.4305	.70721	.4305
.44829	.8444	.6647	.6306;	.44829
.9256	0.4655;	.9256	0.4655;	.9256
0.87117	.6794	.6197;	0.7711	.6794
0.7474	0.9194	0.81849	.91146	.9194
.6973	.6068	.4138	0.7270	.1757
.62897	.803	0.6139	0.6811	0.9473

III. Memorized Pattern set

The network was trained for the following 23*40 matrix input-output pattern sets.

A. Inputs

Table4. Shows the memorized pattern set

1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	0	1	1	0	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Outputs

1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	0	1	1	0	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

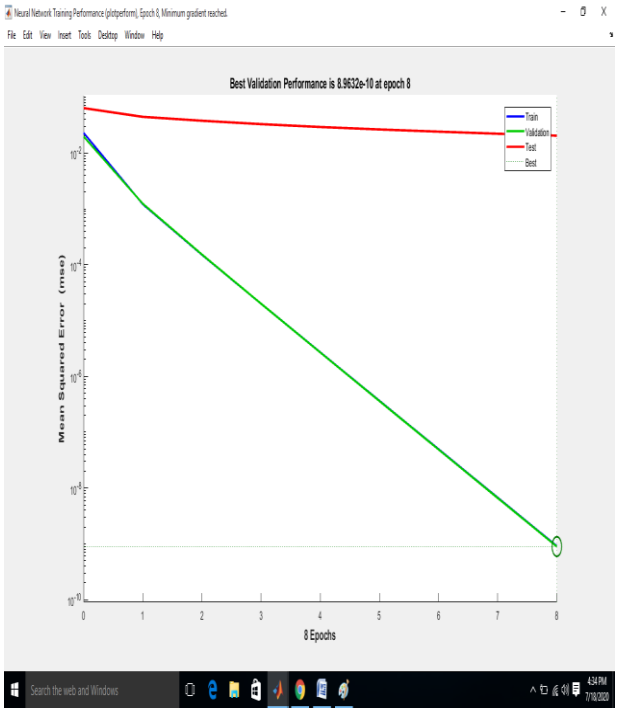

Fig3. Shows that the Performance curve of neural network

(sources MATLAB 2017)

Fig4. Shows that the Neural network architecture of Recalling. (sources MATLAB 2017)

After the neural network changed into built and skilled, it turned into necessary to study the success level of the neural network. For this reason, a MATLAB Simulink version changed into designed as visible in Figure 3 for the neural network performance checks. A learning curve is a plot of model learning performance over experience or time. Learning curves are a widely used diagnostic tool in machine learning for algorithms that learn from a training dataset incrementally. As we have seen in figure3, Machine has recognized the image at 8 epochs. Best validation performance is 8.9632e-10.

Figure4 shows the Neural Network Training (nntraintool). It shows that at 23 ages machines can see the image. It requires some investment to recognize the picture, and 0.332 is its performance.

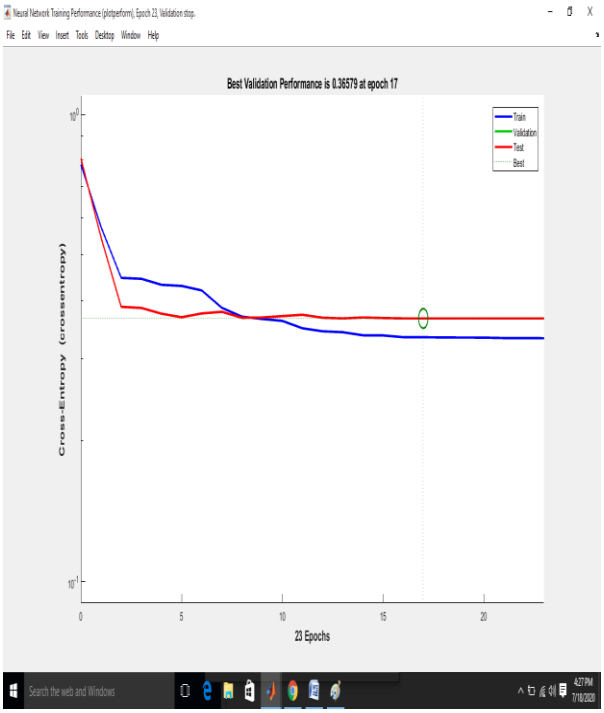

Fig5. Shows that the Recalling Performance curve of neural networks. (sources MATLAB 2017)

IV. Recalling

Generally, the basic meaning of recalling is a review in memory alludes to the psychological procedure of recovery of data from an earlier time. We utilized the same procedure in our test to review the image. The same input-output pattern set is used for Recalling, as shown in table 4.Above figure shows the recalling performance curve. It shows two lines- blue lines and red lines. The blue line indicates the training line and the red line are used for testing the image.

The intersection point is 23 epochs means the Machine recognizes the image at 23 epochs. The best validation performance is 0.36579. According to the curve, we obtained satisfying results. In the current paper, an exertion has been made for putting away and reviewing pictures with BP calculation of ANN. Images are stored by calculating a corresponding weight matrix. From that point, beginning from a subjective setup, the memory will choose precisely that put away a picture, which is closest to the beginning design as far as learning state. Along these lines given a deficient or defiled rendition of a put-away picture, the organization can review the unique comparing image.

The storing of the objects has been performed according to the BP of ANN. When the net has taken in this arrangement of info designs, a lot of testing designs containing corrupted pictures will be given to the net. At that point, the BP algorithm will, in general review the nearest coordinating example for the given corrupted images.

V. Discussion

With the above examination has been demonstrated that one image which is 23*40 of image CAPTCHA can be put away in the system. It likewise shows that the framework is working appropriately for secret word approval and finding putting away them utilizing the model of BP of ANN. Secret word quality depends on the number of neurons in the model. As appeared in figure 3, is indicated by the performance curve shows the Machine perceives the character at 8 ages which shows an awesome consequence of our investigation. Best validation performance is 8.9632e10. BP trains the memorized pattern set for Feed Forward Network. Table2. Shows that the framework can create information dependent on design planned before during the preparation and give excellent results for design never prepared. TRAINLM work is utilized among all other 14 functions to prepare the system which gives the best outcome as a contrast with all other functions. It requires some investment to prepare the system and the least number of cycles to prepare the system. Table5. Shows the memorized pattern set for Feed-Forward Network trained by BP of ANN. Figure 4. Shows that the Neural network architecture of recalling. Figure5. Shows the recalling performance curve of the neural network. According to this, Machine recalled the image at 23 epochs which is generally an excellent outcome.

VI. Results

We have seen, in table 2 (weights matrix of test pattern sets) we get higher values from our experiment, which is satisfied with our result. With the above experiment has been shown that binary bits of image-based CAPTCHA can be stored in the network, it also indicates that the system is working properly for password validation and finding storing them using the model of BP of ANN. Password strength is depending on the number of neurons in the model. TRAINLM function is used to train the network, which gives the best result as compare to all other function. It takes minimum time to train the network and the minimum number of iteration to train the network. Additionally, we also get the excellent result of recalling the image at shown in out figure 5.

VII. Conclusion and Future work

The BP model of ANN is used for storing and recalling the CAPTCHA. We can improve the security level by using the BP algorithm of ANN. By using nntool, we can easily identify the image-based CAPTCHA without any additional steps like pre-processing, feature extraction, segmentation. The BP model is introduced to improve network performance, which can recognize the different images of image-based CAPTCHA with a minimum number of iterations. Additionally, we also recall the image-based CAPTCHA in a very effective way with the help of BP model of ANN.

References

[1] Francois Fleuret, Ting Li, Charles Dubout, Emma K. Wampler, Steven Yantis, and Donald German, Comparing machines and humans on a visual categorization test, Proceedings of the National Academy of Sciences, 2011.

[2] Zheng Chun, Zhang Jishan. Application of Genetic Algorithm in Computer Network Optimization Design. Natural Sciences Journal of Harbin Normal University, 34: (2018) 41-45.

[3] Moni Naor. Verification of a human in the loop or Identification via the Turing Test. Unpublished Manuscript, 1997.

[4] Wan Xiaoqi, Song Hui.Application of Convolution Neural Networks in Pattern Recognition of Partial Discharge Image. Power System Technology. 2018.

[5] Zhang Fan, Wang Guoqing.Research on Intelligent Robot Based on Neural Network Technology in the Background of WSN.Journal of Anhui Vocational College of Electronics & Information Technology, 17: (2018) 5-10.

[6] Yuan Zhu, Shen Yige," Automatic Control of Trajectory Optimization for Agricultural Robot," Agricultural mechanization research, (6) 2017.

[7] El Ahmad AS, Yan J, Tayara M the robustness of Google CAPTCHA's. Computing Science, Newcastle University. 2011.

[8] Husain, R.; Kumar, K.; Gao, H.; Khan, I. Recognition of merged characters in Text-based CAPTCHAs. In Proceedings of the 2016 3rd International Conference on Computing for Sustainable Global Development (INDIA Com), New Delhi, India, 16(18) (2016) 3917–3921.