BANASTHALI VIDYAPEETH

SEMINAR PRESENTATION
ON
"CROP PREDICTION"

DELIVERED TO :
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AN ARTIFICIAL NEURAL NETWORK APPROACH FOR

AGRICULTURAL CROP PREDICTION

DISCUSSION ON

* INTRODUCTION
* WHY CROP PREDICTION ?
* HOW WE PREDICT ?
* ARTIFICIAL NEURAL NETWORK
* BACK-PROPOGATION ALGORITHM
* DESIGN FLOW
* FUTURE WORK
* CONCLUSION
* REFRENCES

INTRODUCTION

Crop prediction methodology is used to predict the suitable crop by sensing various parameter of soil(such as pH , Nitrogen , Phosphate , Potassium,) and also parameter related to atmosphere(such as sunshine hours , rainfall , temperature).

CONT..

❑ These weather conditions have a direct effect on crop yield.

❑ There are various effective tool in modeling and prediction.

❑ These tools have certain parameters that decide the crop type.

❑ Hence these parameters are considered as the input for the proposed system and based on the manipulation with these inputs, the desired output must be produced.

WHY ??

Agriculture is a business with risk and reliable crop yield prediction is vital for decisions related to agriculture risk management.

The vision of meeting world's food demands for the increasing population throughout the world is becoming more important in these recent years.

Eventually, helps in achieving ZERO hunger.

Predictions could be used by crop managers to minimize losses when unfavorable conditions may occur.

HOW??

There is Scalable, Accurate, and Inexpensive and a versatile method to predict crop yield i.e..,

"ARTIFICIAL NEURAL NETWORK"

● Information processing architecture loosely modeled on the brain.

● Consist of a large number of interconnected processing units.

● Work in parallel to accomplish a global task .

● Main function is to receive a set of input , perform progressively complex calculation and use the output to solve a problem.

An ANN is typically defined by three types of parameters:

1. The interconnection pattern between different layers of neurons(commonly called weight).

2. The learning process for updating the weights of the interconnections

3. The activation function that converts a neuron's weighted input to its output activation.

SINGLE LAYER NEURON DIAGRAM
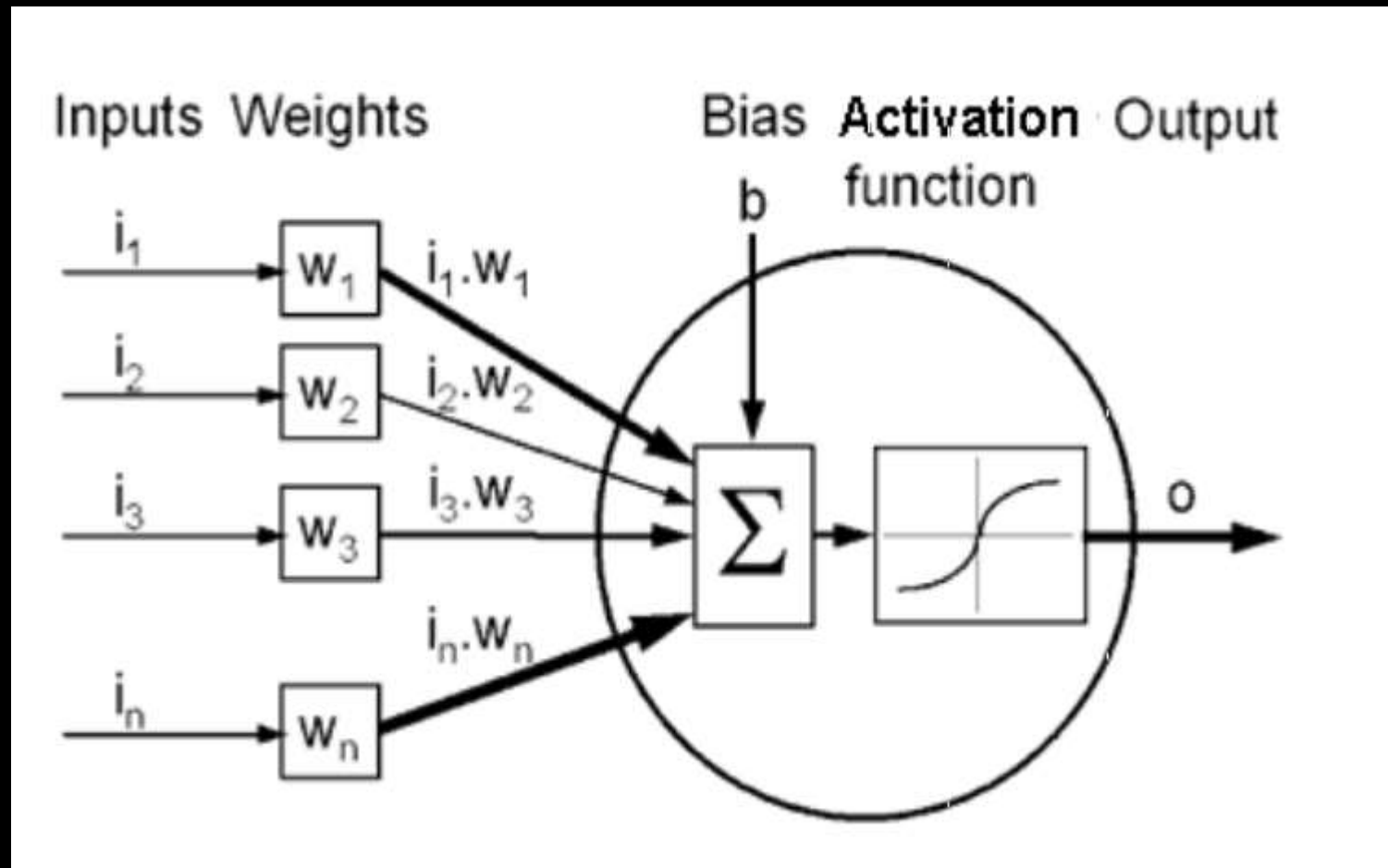
BACK-PROPAGATION MODEL

One of the most widely used algorithms for training the multi-layer neural networks is the back-propagation algorithm.
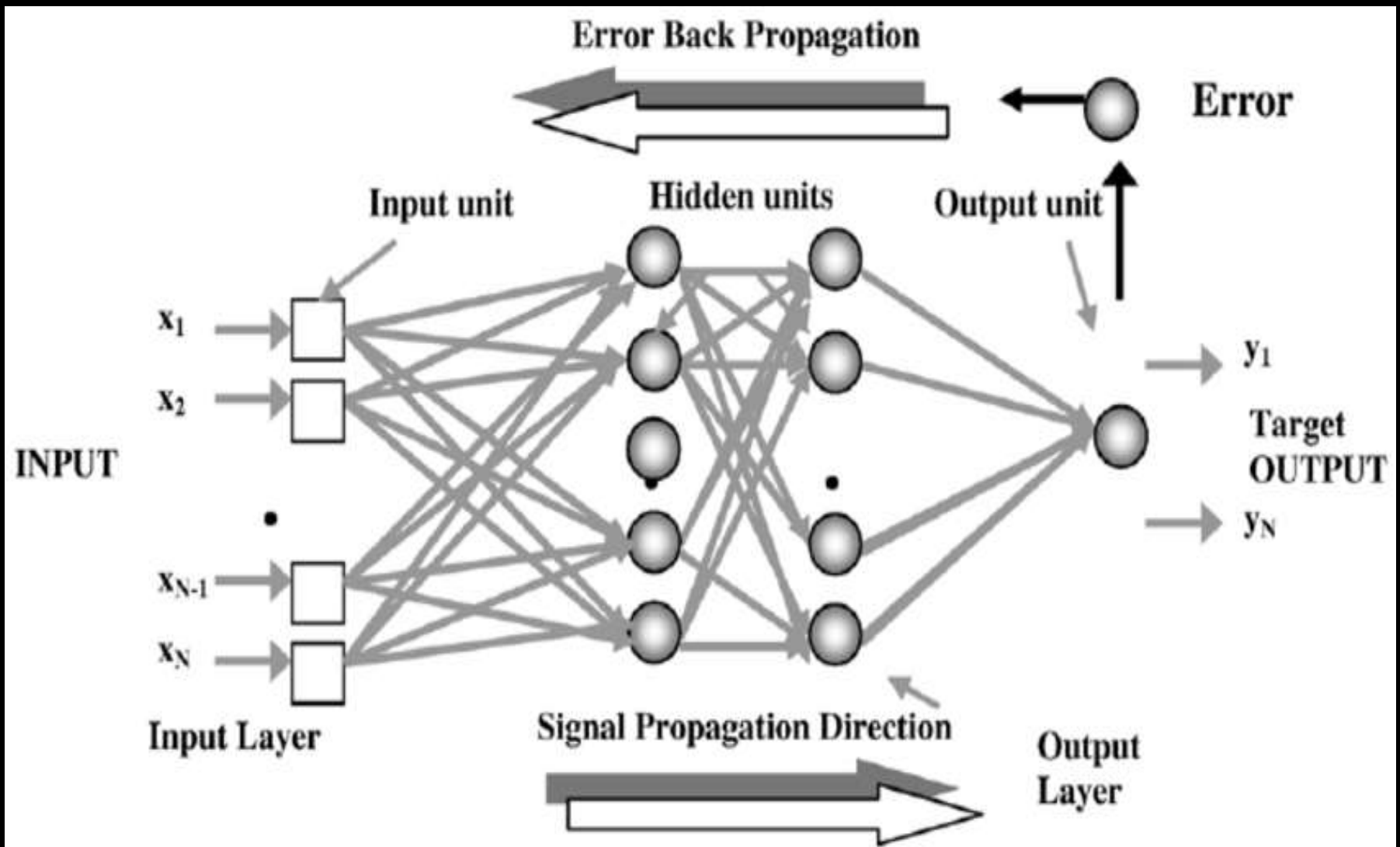
The back-propagation algorithm attempts to find the minimum of the error function using methods based on the gradient descent which send their signals "forward", and then the errors are propagated backwards.

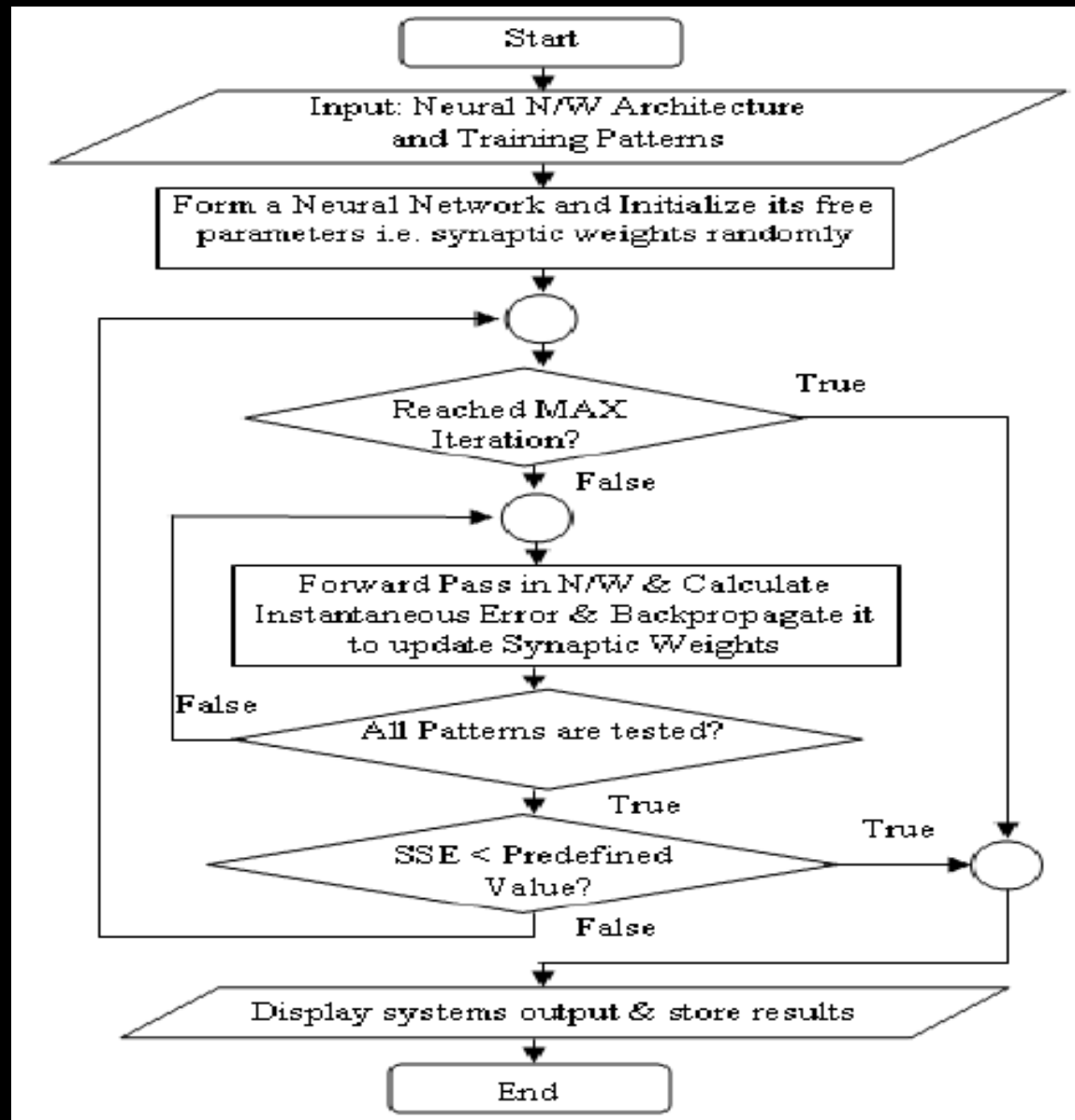The model have 3 layers:
Input layer
Output layer
Hidden layer

BACK PROPAGATION MODEL

FLOWCHART

Back-propagation animated model

The model is shown by small video clip..s

DESIGN FLOW

The process of developing the proposed system involves the following process:

1. Data collection/ Preparation

2. Build the Prediction Model

3. Classification

4. Fertilizer suggestion for respective crop.

Feed-forward back propagation mechanism and its   parameters are shown below:

No of input neurons=7 (pH, N ,K ,P , DEPTH ,TEMP ,RAINFALL)
No of output neurons=1
No of hidden layers= more than 50
Learning rate varies from 0-1
No of iteration perform 10000-12000
activation functions

Data collection

pH	N	P	K	Depth	T	Rainfall	Crop
7.2-8.4	110	45	50	20-30	26-32	750-1200	Cotton
6.3-7.6	175	100	100	40-60	25-50	700-1200	Sugar Cane
5.8-8.5	85	35	45	5-20	24-29	850-100	Jowar
7.2-8.6	50	25	20	15-25	29-32	350-750	Bajra
6.5-7.8	25	70	20	15-20	26-34	750-1000	Soybeans
7.1-8.4	90	25	10	20-50	14-28	400-600	Corn
6.2-8.6	100	50	50	15-25	15-24	50-200	Rice
5.4-8.5	110	50	50	5-20	20-25	800-1400	Wheat
6.1-7.8	30	50	50	20-30	25-28	600-1200	Ground Nut

PREDICTED CROPS BY THE SYSTEM FOR VARIOUS INPUT PARAMETERS

pH	N	P	K	Depth	T	Rain fall	Crop Predicted
8.0	95	48	45	35	30	800	Cotton
6.8	70	50	30	25	25	1000	Groundnut
7.5	80	50	45	20	28	700	Cotton**
6.5	95	45	55	20	23	200	Rice
7.3	45	25	25	10	31	800	Bajra
6.0	120	45	45	50	23	900	Wheat
7.0	25	70	10	20	32	800	Soyabeans
7.2	75	45	35	45	29	900	Jowar
6.9	150	80	80	50	30	850	Sugarcane

How to compute output:

$$y = \sum w_i * x_i + b_i$$

The output can be obtain using the formulae where,
 t= target output,
y=actual output of output neuron.
 n=the number of input units to the neuron,
 wi=the ith weight ,
 xi=the ith input value to the neuron

$$E = 1/2(t-y)^2$$

COMPUTATION:

The percentage Prediction Error (PE) of a model is computed using the formulae:

$$PE = (|X-Y|/|X|) \times 100$$

where, X is the actual output and
Y is the predicted output predicted by the prediction model.

The lower the value of PE, the lesser is the error rate and better is the predictive accuracy of the model.

AGRO CROP PREDICTOR AND ADVISOR

Enter the Input Parameters

Parameters

pH

N

P

K

Depth

T

Rainfall

GO

AGRO CROP PREDICTOR AND ADVISOR

Enter the Input Parameters

Parameters

pH: 7.1

N: 175

P: 100

K: 100

Depth: 60

T: 30

Rainfall: 800

Suggested Crop

sugarcane

Ph=6.5-7.5,N=175,P=100,K=100,D=60,T=20-50,R=750-1200

NEXT

CROP REQUIRED

Enter Crop Name

(cotton - cot
sugarcane - sug
jawar - jaw
bajara - baj
soyabean - soy
corn - cor
wheat - whe
rice - ric
groundnut - gro)

gro

GO

Deficiency

N - Low, P - Low, K-
Low

**Suggested
Fertilizers**

Urea,Sodium
Nitrate,Ammonium
Phosphate, Potassium
Chloride, Potassium
Sulphate

Production is possible

SUGGESTION OF FERTILIZERS

In such controversial situation the proposed system has an added advantage of suggesting the fertilizer for his land for his desired crop.

Here Nitrogen, Phosphate and Potassium are the three basic important minerals for a crop growth and hence the fertilizer suggestion is based on these three values.

If there is the optimum availability of these basic nutrition in the soil, then no fertilizers are required. When there occurs the deficiency of nutrients then the fertilizers are suggested

Future Work

1.Building this particular application in the regional languages, so that it would be more comfortable for farmers.

2.Crop disease detection and prevention.

3. A generalized prediction model for various crops by considering other parameters like humidity and solar radiation can be developed.

4.Giving information about micronutrients also.

Conclusion

From the above results it is clearly identified that the proposed system functions properly on the input data, manipulates it and provides the desirable output.

Hence, ANN is beneficial tool for crop prediction.

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THANK YOU…

ANY QUERIES??

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