Mnet Mental Nets

0: Introduction

The main purpose of these notes is to describe the functioning of the basic nervous system , BNS, of a living being ,LV..

The complete nervous system of living being, LV, will be considered virtually partitioned in two parts one operates the central and high level functions and will named <basic nervous system> ,BNS, and the remaining functions will be the task of the <peripheral nervous system> , PNS .

The reunion of BNS and PNS is the <total nervous system>, TNS, of LV ..

A living being, LV, is the reunion of TNS and the <remaining organs> of LV , RLV.. Sometimes the reunion of TNS and RLV will be called the body of LV.

All LV, are a part of an <active universal set> , LVU, which is contained in the <Universe>, U . .

It is an explicit or implicit assumption that LV has contacts and interactions exclusively with LVU and this means that LV is completely isolated from the remaining universe, RU , where RU= U - LVU ..

The <active exterior>, AX, of BNS is PNS and LVU but if the above referred assnmption is false then RU is also an <active exterior> of BNS .

Some general objectives must be fulfilled by the <basic nervous system> ,BNS, namely : perfecting the learning capacity, increasing the volume of information memorised , improving the transfer of information , to develop some kind of an imaginative capacity and not the least enable the living being to survive .

The model is not a topologic one, the partition of BNS is essentially functional .and the physical localisation of the organs belonging to BNS may be anywhere in the body of LV .

The description of BNS is made by means of various neuronal nets , nods and respective arcs which are uni-directional .

The main tasks of BNS are observation, preparation of a suitable reaction and execution of the chosen reaction

A list of conditions and restrictions must be met and a measure should be devised to appreciate and quantify the performance of BNS .

1: Concepts and Partition

1.1: Language, sentences and translation

The concept of <language> is interpreted in a very comprehensive and extensive way, sounds, light , form of objects, reactions, dance, odours , etc. can all convey information and may be considered a language to a given aggregate of beings that associate the same meaning to the sentences of that language

Human aggregates have developed languages that can describe many objects, acts, sentiments, emotions, etc. and a very special subset must be referred , namely all formal languages : logic, geometry mathematics .

The main objective of a formal language is that the truthfulness of the conclusive sentence depends only of the truthfulness of the data and provided that deductive argumentation was applied correctly .

Given two languages the translation is always a difficult problem and in general, after version and a reversion the finishing sentence is not equal to the starting sentence e.g.: it is very rare that the following proposition is true , " if (T(Sa)> Sb) and °T(Sb)> °Sa)) then °Sa=Sb "

Sentences may be true or false or multi valued or contradictory etc and this enables living beings to use false sentences to fool the contender or competitor .

As the form of objects, alphabets, sounds , odours etc are considered ways and means of conveying information, the Latin word <forma> will be used instead of information .

1.2: The Partition of BNS

The *basic nervous system*, BNS, will be virtually partitioned and each part would have specialised tasks .

a:: Observer and Translator

Sensorial operators, that convert information, *forma*, supported in diverse languages in an internal language. This operator functions like an artefact or an *instrument* , e.g.: *forma* supported by light is translated into *forma* supported by electric impulses .

b:: Recognition

Using *forma* stored in memory and the *forma* received from a:: are compared and the best match concludes the recognition . The quality of the recognition function is very variable starting with no

matching to a perfect match . The time consumed will depend on the number and types of memory to be consulted and also of the number and time of observation that was necessary to improve de information collected .

c:: Reaction Decision

All *forma* observed may imply an external reaction e.g.: fight , flight or even no reaction .Even if no external reaction is chosen , the decision may consist in reinforcement of the task of observation or that of consulting personal memory or external memory or even to investigate the subject .

d:: Reaction Preparation

If a reaction is decided (c::) the <memory of past reactions> is consulted and eventually a reaction procedure is found that conforms to the chosen reaction or can be easily adapted . If no suitable model is found then a new reaction must be invented . This information is invoiced to c::

e:: Decision to Act

This decision is very important and risky , the success or victory is never sure . Time is very limited and the collected <forma> seems insufficient but nevertheless a decision must be taken .

f:: Execution

Execution implies the use of the <body)> of the being to perform the commands and it is assumed that a vast collections of procedures are available and the body is fit to execute them .

g: Controlling the execution

To the execution of an act corresponds a reaction of the outside world and that reaction should have been accounted for during the preparation stage . But some <surprises> may occur and should be feedback to f:: because eventually new instructions may be issued .

h:: End of the process

With success or failure, some kind of stopping procedure should be implemented .

1.3: The Structure of BNS

The functional parts resulting of the partition of BNS are connected in such a way that the parts and the connections are equivalent to BNS .

The partition is a virtual operation and not a real one and the parts of BNS will be named *organs* and there are 8 organs , [A, B,..,H] . A model of the structure is given in 2

The same type of structure , neuronal net, is applied to both BNS and all the 8 organs .

2: Model structure

2.1: Organ functions

The organ functions to be modelled will be based essentially on the <forma> ,Fo, received from the exterior, elaborated in the organ and send to the exterior .

The organ is connected by a frontier enabling the distinction of self and non-self regarding the functions and forma, Fo .

The organ is partitioned in a finite number, N, of parts which will be represented as nods of a net and will be classified in 3 sets, r-nods, .that receive forma, Fo, from the exterior, e-nods , that emit forma to the exterior and i-nods that are not directly connected with the exterior .

The outside world will also be represented by M nods which are also classified in 3 sets , namely : r-nods, e-nods and i-nods

2.2: Inverse square matrix

The overall inverse square matrix representation of the net

	eX1	eX2	eXp					rX1	rEx2	rXq
	rY1	rY2	rYp	iY1	iY2		iYd	eY1	eY2	eYq
rY1	0	0	0					0	0	0
rY2	0	0	0					0	0	0
rYp	0	0	0					0	0	0
iY1	0	0	0							
iY2	0	0	0							
iYd	0	0	0							
eY1	0	0	0	0	0			0	0	0
eY2	0	0	0	0	0			0	0	0
eYq	0	0	0	0	0			0	0	0

2.3: Permissible Connections

Regarding the non permissible connections, the following assumptions are stated :

a:: (rY > rY) , no recursion, (rY > eY) no direct link between receivers and emitters

b:: (iY > rY) , no circulation with receiving nods is enabled with information

d:: (eY > rY) , (eY > iY), (eY > eY) are not permissible .

All connections not above referred are permissible but must be stated or a procedure be given to create and define the proprieties of the connections .

The connections are not simple (yes/no) operators and are in general endowed with variable flux proprieties .

Some examples of (yes/no) connections are presented : .

1: { eX2>rY1 & rY1>iY4 & rY1>iY7 & iY4>eY3 & iY7>iY9 & iY9>eY1 & eY9>rX3 & eY1>rX2 }

2: { eX2>rY1 & rY1>iY4 & rY1>iY7 & iY4>eY3 & iY7>iY9 & **iY9>iY9** & iY9>eY1 & eY9>rX3 & eY1>rX2 }

The procedure **iY9>iY9** is a circulation that eventually must be stopped when a reasonable convergence is attained .

3: { eX2>rY1 & rY1>iY4 & rY1>iY7 & iY4>eY3 & iY7>iY9 & iY9>iY7 & iY7>iY2 & iY2>iY9 & iY9>eY1 & eY9>rX3 & eY1>rX2 }

The circulation iY9>iY7 & iY7>iY2 & iY2>iY9 may need a stop procedure , see 2::

4: { eX2>rY1 & rY1>iY4 & iY4>eY3 & eY3>rX2 } is the simplest connection between an entry and an exit .

2.4: Simplified Matrix

	iY1 iY2	iYd	eY1	eY2	eYq
rY1			0	0	0
rY2			0	0	0
rYp			0	0	0
iY1					
iY2					
iYd					

Each nod is endowed with a matrix of procedures that can be a simple (yes/no) instruction or a non linear function .

3: Model of Organ Function

3.1: External Connections of an Organ

BNS is virtually composed of 8 organs [A,..,H)] and will be symbolised by Om , m ∈ [1,..,8] .

Any Om can be connected to all other organs (including Om) .. The symbol Xm can also be used instead of Om when it is important to refer Om as an external organ .

There are : receiving nods rYk, emitting nods, eYk and interior nods iYK .

The connections are of the following types

1• (iYk>eYk) , eYk can be connected and emit *forma* to all organs .

2• (rYj>iYj), rYj can be connected and receive *forma* from all organs

3• (eOm>rYj) in general for all m there exists a connection that enables the transfer of *forma* from any organ O to Y

4• (eYk>rXm) the same as 3• , all organs Om can receive *forma* from Y .

The main objective is that all organs of a BNS con transfer directly *forma* inter se .

3.2: Research Team

The program of BNS is run with the help of a research team , RT, .

It is assumed that the program is sufficiently developed to run alone but can be perfected by the intervention of a team of specialists .

To each member of the team, RT, is attributed one organ and given the symbol Rp , where p represents the organ, p ∈[A,..,H] . The head of the team, Rr, has the general task of conceiving the various runs of BNS .

Each operator, Rp, is supposed o be able to conceive new solutions and operate the Organ Op . Rp will be provided with all the <forma> available regarding Op but a more reduced information of the remaining organs . The objective is that the operator, Rp, must concentrate in the refinement and running of his Op The head of the team has access to all information .

3.3: Research Team Tasks

The general assumption is that the program of BNS is already in a reasonable running condition but the intervention of a team of specialists may eventually improve it .

The tasks are :

1• Adjust the parameters of the procedures and functions . Some adjustments may improve the running of an organ but simultaneously reduce the efficiency of other organs and even the overall efficiency of BNS .

2• If parameters should be adjusted frequently and depending of the data input then procedures must be revue mainly by including information from other sources .

3• The problem is not the functioning of each organ but the general structure of BNS . This can be corrected choosing one of the organs to play the function of a general decision maker .

4• The final task is that BNS functions well without the interventions of the research team.

4: External Milieu and Remaining Universe

4.1: Introduction

The body that hosts BNS is its more direct <ambient> and must be distinguished from the external entities that act and react upon the body .

A quick review of the symbols introduced in chapter 0:: and their meaning seams appropriate .

U the Universe, LV a living being, LVU the part of U that interacts with LV, RU=U-LVU

The <ambient>of LV is LVU and LV is isolated from the remaining universe, RU.

The living being, LV is virtually partitioned in two sets the total nervous system , TNS and RLV the remaining constituents of LV that is LV=TNS & RLV .

The Total nervous system is split virtually in BNS the basic system and RNS the complement and TNS = BNS & RNS .

The word <body> , <ambient> and <milieu> will be used in a colloquial way . .

The body can be in different physical states, capacities , needs, etc- and all this information must be conveyed to BNS because it is essential to prepare and decide actions

Regarding the external milieu or ambient of the living being, some model must be imagined or constructed if experimental data is available .

Essentially it is necessary to dispose of a set of pairs (action and reaction) of the external ambient ..

4.2: Model of Milieu

The general structure is similar to that of the organs .

(eYk>rXj) represent the transfer of <forma> from body+BNS to the milieu

(eXm>rYn) represent the transfer of <forma> from the milieu to body+BNS

The iXp are the interior organs of the milieu .

The milieu being of a unlimited dimension, in each case a limited description of the milieu must be axiomatically declared appropriate and a reasonable model .

Some typical milieus are expounded later , vide 5

4.3: Model of Milieu

	eY1 eY2	eYd	rY1	rY2	rYq
	iX1 iX2	iXd	eX1	eX2	eXq
rX1			0	0	0
rX2			0	0	0
rXp			0	0	0
iX1					
iX2					
iXd					

5: Typical Runs

5.1: Introduction

[A,..H] is the set resulting from the partition of BNS in 8 parts .and is not an ordered set .

All 8 organs can be the starting nodes and the next organ may be any of the organs of the set provided that the connecting arcs exist .

From any organ <forma> can be send simultaneously to many other organs if the connections exist and provide the array of computers work in parallel .

If a serial operation is adopted then an arbitrary order must be imposed ..

Some examples follow .

5.2: Modelling a Function

A function U=F(V) is given U and V are vectors of the uSpace and vSpace respectively and u and v are the dimensions of the spaces ..

The domain of V is defined by a simple connected surface contained in a finite parallel trope and all F(V) are finite .

A vector vk of V is chosen and the corresponding uk=F(vk) is calculated and vk is send to rYv of BBNS which processes the <forma> received and produces the output , eYn .

The distance of the pair (uk , eYk) is calculated and if the distance is above a reference value then the procedure of <parameters revision> of BNS is applied .

The parameters correction is repeated for many values of V till the distance (uk , eYk) conforms to the reference value .

5.3: Modelling an Organ

Each organ of BNS or Body can be programmed separately and an artificial ambient must be created and adjusted to that organ .

As BNS is build out of 8 organs and each expert of a given organ function may need the help from other functions experts to be able to create a reasonable ambient .

These organ models should be considered a provisional edition to be further corrected See 5.4::

5.4: Modelling twin BNS

To model BNS it is necessary to create a provisional model of the body and of the milieu .

A simple way consists to use a twin brother to mimic the outside world and the milieu and promote a <fight> between the twins. The fight or play would abide to some clear and strict rules and both opponents would be punished if breaching would occur .

The fight would be stopped when a winner is declared or the match is null .

Let twin A be chosen to be improved and twin B will be used as an invariant reference of the ambient . The parameters of B are kept invariant ... .

Many runs must be executed and the interpretation of the results would enable the correction of the parameters of twin A but kept invariant those of twin B . .

Hopefully some improvements of A will be obtained and a new series of experiments starts with two improved twins, the new B would be equal to A . .

5.5: Modelling BNS / ambient

The modelling of BNS is performed by an independent ambient and either given or created . .

In general , many agents intervene in the match and the battle ground is limited by frontiers and some regions are dangerous and others are good and coveted .

6: Competitive Runs

6.1: Decision classified by Experts

The experts team can participate in <competitive runs> .

BNS can be linked to an human player that can intervene only in the end of the process of preparing a decision and the intervention consists of classifying the <projected decision >, e.g.: 0..9 .

The computer BNS may or may not take in consideration this classification .

The expert participation is soft and its influence will be measured by the relation of the corrections done by BNS and the expert classification .

6.3: Game with many participants

Each participant is an expert operating a station and is function is to decide the execution of commands and not simply task of classifying them

The stations are all equal and can do all the same tasks .

The game will be stopped when winners and losers are identified .

A complete and detailed history of the game is recorded .

After each game and based on personal experience of he players, the recorded history and much discussion some corrections to the programs should be uncovered .

The final objective is to create a set of procedures and functions that enables a robot to act and react like an human being is supposed to do .