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Thanks

To someone.

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Part I

Intro Examples

El mundo real

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Lists

Example of making list automated, saving space and reducing errors.

Terms

endocrine cals

- proteins
- steroid hormones
- amine hormones
- testosterone
- insulin
- thyroxine
- epinephrine
- tropic hormones
- thyrotropin
- luteinizing hormone
- follicle-stimulating

chemi-

hor-

- mone
- corticotropin
- growth hormone
- prolactin
- melanocyte-stimulating hormone
- enkephalins
- endorphins
- POMC

receptor tyrosine ki- nases

- dimerization
- autophosphorylation
- SH2 domains
- EGFR
- Ras
- Raf
- MEK
- ERK
- SOS
- Sevenless
- Drk/Grb2
- Ras-GAP
- Ras-GEF

- cAMP
- signal amplification
- cGMP
- guanylyl cyclase
- phospholipids
- calmodulin
- protein-tyrosine phos-
phatase
- serine/threonine kinase
- intracellular signal trans-
duction
- NF- κ B
- I κ B

R

See proposed hierarchical neural networks pseudo-code block at end of paper for example implementation of this method in the R statistical language ([Code 1](#))—error handling and background of creation of some parts of the neural networks are left out for sake of clarity.

[Code 1](#): hierarchical neural networks in R

```
# Load neural net library
library(nnet)
library(neuralnet)

# Load trained neural nets
source("model.training.NN.hierarchical.v1")
trainedNeuralNets = NNtrained()

# Load data
source("data.run.NN.hierarchical")
this.data = NNdata()

# define the number of loops before an error has occurred
error.loop.value = 3

neuralNet <- function(neuralNetFxn, this.loop.input){
  # this function runs specific level of a hierarchal neural network then recursively calls the
  # next layer
  # base case is defined when a parent neural net has no children

  # run the initial neural net on the input
  # classifications is a tuple of probabilities for being in given class
  list(classifications,subfunctions) := neuralNetFxn(this.loop.input)

  # set the threshold
  threshold = this.loop.threshold.value

  # get index of next neural net function to be called
  subidx = max(find.col(classifications>threshold))
```

Python

A playlist maker for python ([Code 2](#)), see more concise implementation in bash ([Code 3](#)).

[Code 2](#): python playlist maker

```
#!/Python27/env python
#Biafra Ahanonu
#2012.12.02

#Makes .m3u extended playlist at first level folders in a directory

#Modules used
import os,re,time
#Import settings from settings.py
```

```

from settings import *
#Help filter out duplicates
from sets import Set

def folderBrowser():
    #Opens a folder
    import Tkinter, tkFileDialog
    root = Tkinter.Tk()
    root.withdraw()
    dir = tkFileDialog.askdirectory(parent=root,initialdir=DEFAULT_DIR,title='Please select a
        directory')
    return dir

def fileTree(dir,relDir):
    #Crawls through a directory and finds audio files, returns list of files
    print dir

    #Variable to save files to
    filesToSave = []

    #Valid mp3 files
    validFiles = set(VALID_AUDIO_FORMATS)

```

bash

Improved playlist maker implemented in bash (Code 3).

Code 3: bash playlist maker

```

#!/bin/bash
# biafra ahanonu
# 2013.02.23
# script to make playlists

# Yes/No function
getYesNo(){
    select terminateSignal in "Yes" "No"
    do
        case $terminateSignal in
            "Yes" )
                return 1;;
            "No" )
                return 0;;
        esac
    done
}

# Change file separator to allow use of files with spaces
oldIFS=$IFS
IFS=$(echo -en "\n\b")

# Ask user for directory
echo "Directory? "
read userDir
echo $userDir
cd $userDir

# Ask to remove old .m3u files

```

```
echo "Remove old .m3u files? "
```

FASTA

Example use of the fasta formatting for protein sequences.

FASTA sequences

D₁a dopamine receptor | Homo sapiens | Humans

```
MRTINTSAMDTGLVVERDFSVRLTACFLSLIILSTLLGNTLVCAAVIRFRHLSKVTNFFVISLAYSDLLVAVLVMPIWKAVAEIAGFWPFGSFCNIWVAFDIMCSTASILNLCVISVDRYWAISSPFYERKMTPKAAFIISVAWTLISVISFIPVQLSWHKAKPTSP
SDGNATSLAETIDNCDSLSRTYAISSVISFYIPVAIMIVTYTRIYRIAGKQIRRIALERA AVHAKNCQTTTGNKGKPVCEQSOPRESSFKMSFKRETQVILTSVIMGVFVCCWLPFFILNCLPFCGSGETQPFCDISNTFDVFVWFGWANSSLNPIYAFNADFRK
AFSTLLGCYRLCPATNNAIETVSININNGAAMFSSHHEPRGSISKECNLYIUPHAVGSSDLKKEEAAGIARPLEKLSPALSVILDYDIDVSLEKIQPTQNGQHPT
```

Problems

Problems

If there is any confusion about the questions, shoot me an email or talk to me after class.

1. Look at **??**, why is the heart rate of the iguana different at the same temperature? In the first case the body temperature is decreasing while in the second case the iguana raises its heart rate to increase blood flow, which leads to increased body temperature.
2. How does increasing heart rate while in direct sunlight help warm the body? More blood can flow to the skin and be warmed.
3. What does it mean for the Q10 of the metabolic rate of an animal to be 2? To be 1? the animal consumes half as much oxygen per hour at 20C as it does at 30C. In the case of 1, it doesn't change.

Equations

Example of several equations chosen at random from different works. Illustrates the use of the **lbpeq** macro.

$$E = \frac{1}{2} \sum_{q=1}^n \sum_{k=1}^K [y_k(x^q, w) - t_k^q]^2 \quad (1)$$

$$y_j(x) = \sum_{i=0}^n w_{i,j} \phi(x)_i \quad (2) \quad \left| \quad \phi(x)_i = \exp\left(-\frac{|x - \mu_i|^2}{2\omega_i^2}\right) \quad (3)\right.$$

$$M + Q_{abs} = \epsilon \sigma T_r^4 + h_c(T_r - T_a) + E + C \quad (4)$$

Appendix

Additional figures and tables are included. References and index found at the end.

Table

attenuation	laserPower	attenuationDirection
2	126.3	down
1.7	118.7	down
1.6	114.1	down
1.5	100.4	down
1.4	71.7	down
1.3	44.2	down
1.2	26.5	down
1.1	15.3	down
1	8.52	down
0.9	4.61	down
0.8	2.17	down
0.7	0.64	down
2	127	up
1.7	119	up
1.6	112.6	up
1.5	97.5	up
1.4	70.5	up
1.3	44	up
1.2	25	up
1.1	14.59	up
1	8.26	up
0.9	4.62	up
0.8	2.16	up
0.7	0.49	up

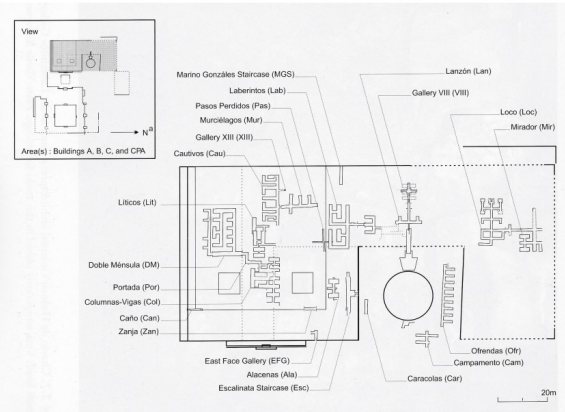
Name	Type	%Δ	Onset	Localization
YAP	protein	60	E18	Nuclear->Cytoplasm
Hippo	protein	40	E18	Cytoplasm
agmatine	metabolite	20	?	Ex->Cytoplasm
Lim1	protein	-50	E9.5	Cytoplasm
FoxC1/2	protein	-10	E11.5	Cytoplasm

Table 1 | Hypothetical list of kidney proteins and metabolites These were identified after removal of housekeeping and injury genes. %Δ is protein or metabolite level change from **onset** to cessation of kidney growth. Onset time is part hypothetical, part from the literature.

Figures



(a) fig



(b) fig



(c) fig



(d) fig

Figure 1 | Native Americans

(a) Pueblo Bonito was an.... (b) Located in Peru. (c) The different type of game hunted in the Americas. (d) The cenote, which were seen as sacred by the Maya.

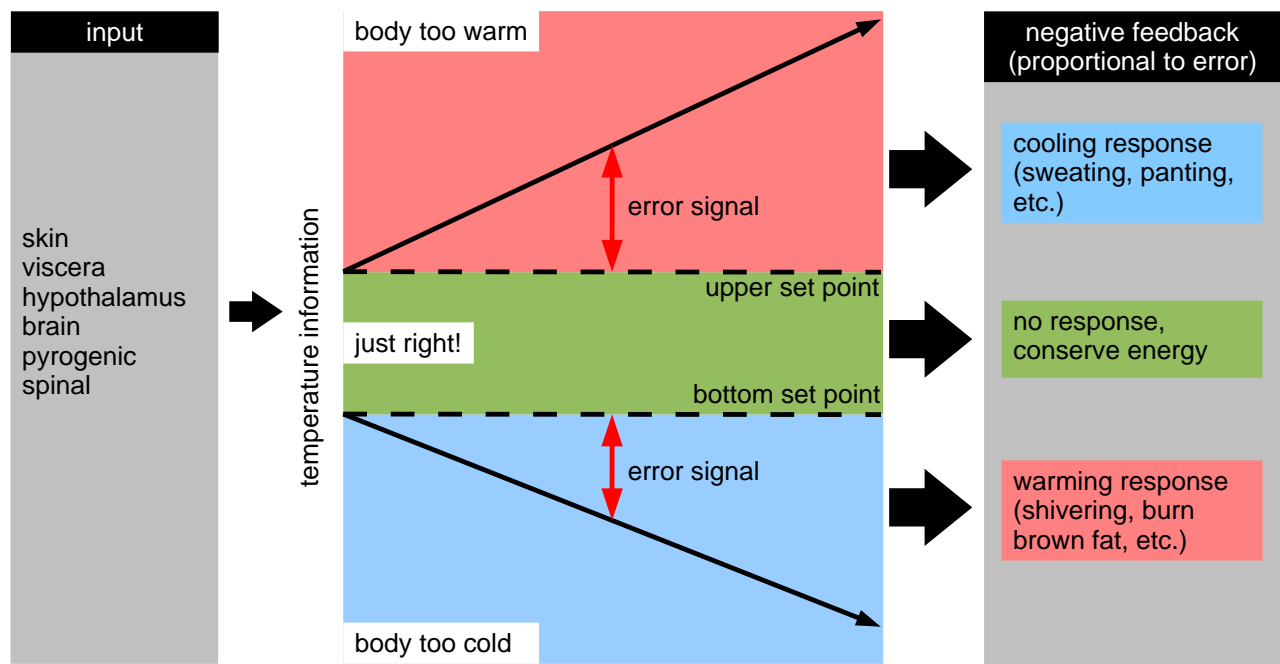


Figure 2 | Response regulation

General concept of integrating temperature information and formulating a response.

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