The Role of Computational Neuroscience Machine Intelligence in Sentience, Common Sense and Artificial Consciousness

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REVIEW

Mathematical Theory of Machine Intelligence

An Accident in the Kitchen

A Fire in the Forest

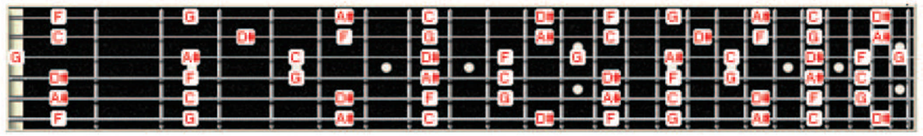
Humanoids vs Humans

Mathematical Theory of Machine Intelligence

Rules for Processing and Manipulating Scalar Music Theory.

Funerals, blues and happy

And on a guitar:



X	J^I	J^{II}	J^{III}	J^{IV}	J^V	Scale	Region	Genre	Emotion	sma
X_1	2	2	3	2		Pentatonic Major	Western	Blues	melancholy	s
X_2	3	2	1	1	2	Blues Major	Western	Blues	depressive	s
X_3	3	2	2	3		Pentatonic Minor	Western	Jazz	melancholy	s
X_4	3	2	1	1	3	Blues Minor	Western	Blues	dramatic	s
X_5	3	1	3	1	3	Augmented	Western	Jazz	feel-good	s
X_6	2	2	2	2	2	Whole Tone	Western	Jazz	push-pull	s

X_{32}	2	2	1	2	3	Major 11th	neutral	neutral	happy	a
X_{33}	2	1	2	2	3	Minor 11th	neutral	neutral	not happy	a
X_{34}	4	4				Augmented	neutral	neutral	happy	a
X_{35}	3	3	3			Diminished	neutral	neutral	not happy	a

C4.5 Over Instrumentation

Classification Tree	Class	P(Class)	P(Target)	#Inst	Rel. distr.
⊟ LAT >=77207.203	idio_struck	38	13	8	13:0:38:25:0:0:0:25:0:0:0:0:0:0:0:0:0
LAT <109305.000	mem_conical	67	0	3	0:0:0:67:0:0:0:33:0:0:0:0:0:0:0:0:0
LAT >=109305.000	idio_struck	60	20	5	20:0:60:0:0:0:0:20:0:0:0:0:0:0:0:0:0
⊟ HAR >=996751.688	idio_concussion	57	0	7	0:57:29:14:0:0:0:0:0:0:0:0:0:0:0:0:0
HAR <997782.063	idio_concussion	100	0	3	0:100:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0
HAR >=997782.063	idio_struck	50	0	4	0:25:50:25:0:0:0:0:0:0:0:0:0:0:0:0:0
⊟ S >=1.000	idio_struck	32	16	19	16:11:32:0:11:0:0:11:5:5:0:0:5:0:0:0:0:5
⊟ LAT <-313254.000	mem_cylindrical	27	27	11	27:9:9:0:18:0:0:18:0:9:0:0:9:0:0:0:0:0
⊟ LAT <-450396.000	mem_friction	25	13	8	13:13:13:0:25:0:0:25:0:13:0:0:0:0:0:0:0:0
LAT <-696760.000	mem_cylindrical	25	25	4	25:0:25:0:25:0:0:0:0:25:0:0:0:0:0:0:0:0
LAT >=-696760.000	chrd_composite	50	0	4	0:25:0:0:25:0:0:50:0:0:0:0:0:0:0:0:0:0
LAT >=-450396.000	mem_cylindrical	67	67	3	67:0:0:0:0:0:0:0:0:0:0:0:33:0:0:0:0:0
LAT >=-313254.000	idio_struck	63	0	8	0:13:63:0:0:0:0:0:13:0:0:0:0:0:0:0:0:13
⊟ S >=2.000	chrd_composite	22	7	107	7:5:21:2:0:1:1:22:3:3:8:3:2:7:11:3:3:0
⊟ HAR <605413.188	chrd_composite	33	7	46	7:2:4:4:0:0:0:33:0:0:11:2:4:9:17:4:2:0
⊟ LAT <-793303.000	chrd_composite	35	0	26	0:4:0:0:0:0:0:35:0:0:12:4:4:0:31:8:4:0
HAR <383054.438	chrd_composite	47	0	17	0:6:0:0:0:0:0:47:0:0:0:0:0:0:35:12:0:0
⊟ HAR >=383054.438	idio_shaken	33	0	9	0:0:0:0:0:0:0:11:0:0:33:11:11:0:22:0:11:0
⊟ S <4.000	aero_lip-vibrated	33	0	6	0:0:0:0:0:0:0:0:0:0:17:17:17:0:33:0:17:0
LAT <-1446330.000	aero_lip-vibrated	67	0	3	0:0:0:0:0:0:0:0:0:0:0:0:33:0:0:67:0:0:0
LAT >=-1446330.000	idio_shaken	33	0	3	0:0:0:0:0:0:0:0:0:0:0:33:0:33:0:0:0:33:0
S >=4.000	idio_shaken	67	0	3	0:0:0:0:0:0:0:33:0:0:67:0:0:0:0:0:0:0
⊟ LAT >=-793303.000	chrd_composite	30	15	20	15:0:10:10:0:0:0:30:0:0:10:0:5:20:0:0:0:0
⊟ LAT <-160552.000	mem_cylindrical	30	30	10	30:0:10:20:0:0:0:10:0:0:20:0:0:10:0:0:0:0
S <3.000	mem_cylindrical	33	33	3	33:0:0:0:0:0:0:0:0:0:33:0:0:33:0:0:0:0
⊟ S >=3.000	mem_cylindrical	29	29	7	29:0:14:29:0:0:0:14:0:0:14:0:0:0:0:0:0:0
HAR <268127.438	mem_conical	67	0	3	0:0:0:67:0:0:0:33:0:0:0:0:0:0:0:0:0:0
HAR >=268127.438	mem_cylindrical	50	50	4	50:0:25:0:0:0:0:0:0:25:0:0:0:0:0:0:0:0
⊟ LAT >=-160552.000	chrd_composite	50	0	10	0:0:10:0:0:0:0:50:0:0:0:0:10:30:0:0:0:0
HAR <536840.000	chrd_composite	67	0	6	0:0:17:0:0:0:0:67:0:0:0:0:0:17:0:0:0:0

$$H(i) = max\ r(i,k)$$

where $r(i,k)$ is the normalised cross correlation of frame i with lag k:

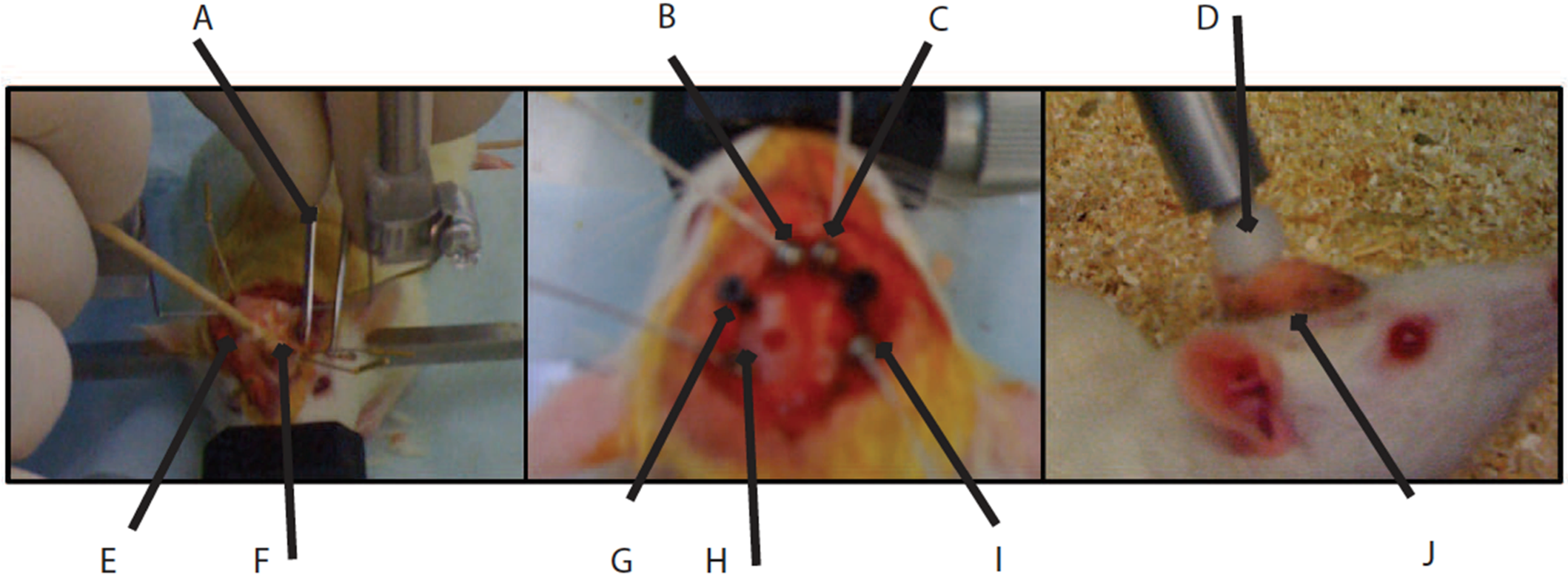
$$r(i,k) = \sum_{j=m}^{m+n-1} s(j)\, s(j-k) \Big/ \left(\sum_{j=m}^{m+n-1} s(j)^2 * \sum_{j=m}^{m+n-1} s(j-k)^2 \right)^{\frac{1}{2}}$$

⊟ S >=2.000	percussion	78	78	107	78:1:14:7	1:0:0:0
HAR <772931.313	percussion	100	100	61	100:0:0:0	1:0:0:0
⊟ HAR >=772931.313	percussion	48	48	46	48:2:33:17	0:0:0:0
⊟ LAT <-485895.000	percussion	58	58	38	58:3:18:21	1:0:0:0
LAT <-1226300.000	percussion	87	87	15	87:7:7:0	1:0:0:0
⊟ LAT >=-1226300.000	percussion	39	39	23	39:0:26:35	0:0:0:0
⊟ S <4.000	struck_Hrm	40	30	20	30:0:30:40	0:0:0:0
S <3.000	percussion	67	67	3	67:0:0:33	1:0:0:0
⊟ S >=3.000	struck_Hrm	41	24	17	24:0:35:41	0:0:0:0
⊟ LAT <-671080.000	string	50	33	12	33:0:50:17	0:0:1:0
LAT <-1008...	string	60	0	5	0:0:60:40	0:0:1:0
LAT >=-100...	percussion	57	57	7	57:0:43:0	1:0:0:0
LAT >=-671080....	struck_Hrm	100	0	5	0:0:0:100	0:0:0:1
S >=4.000	percussion	100	100	3	100:0:0:0	1:0:0:0
LAT >=-485895.000	string	100	0	8	0:0:100:0	0:0:1:0

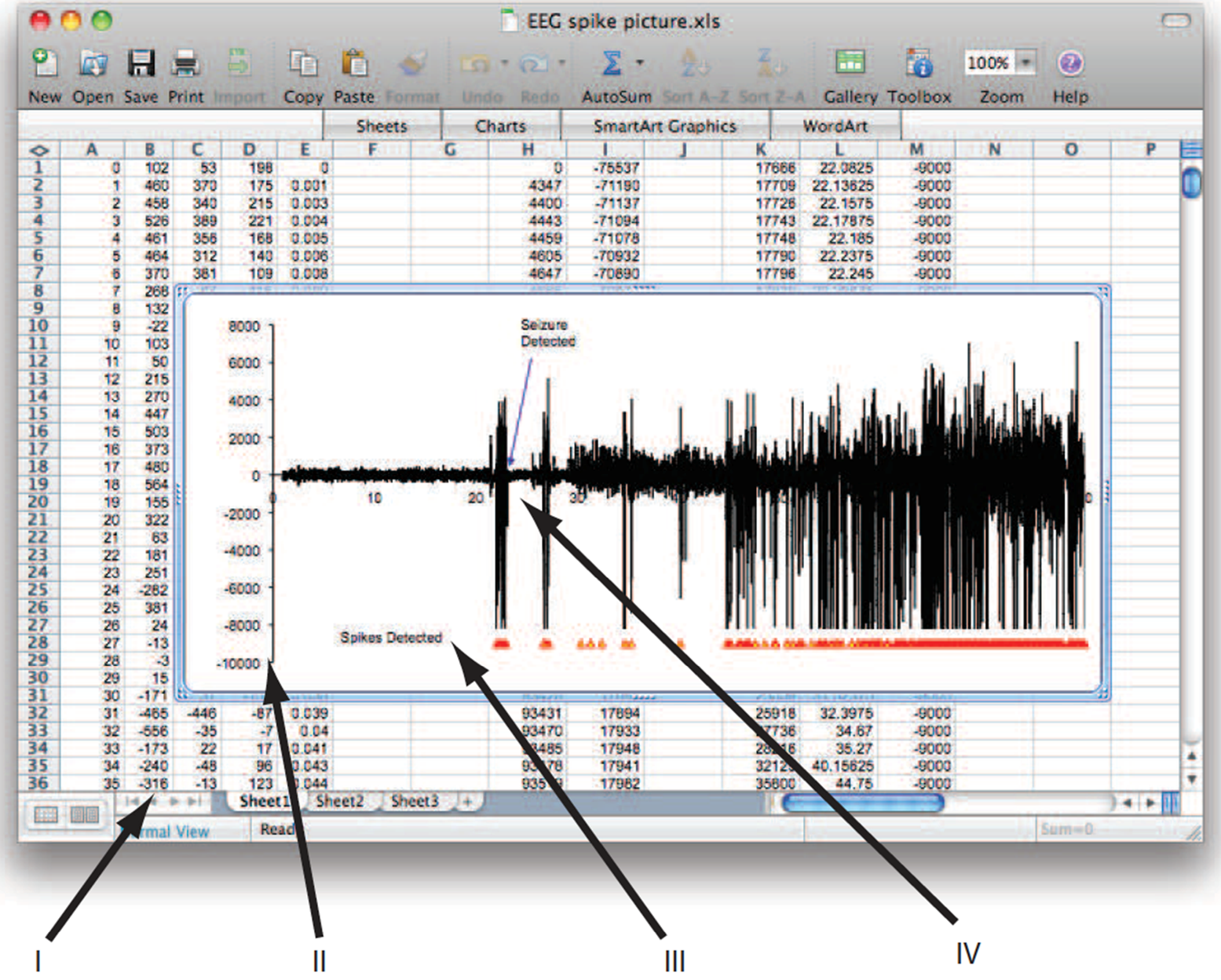
Rocking a Baby to Sleep

Computational Neuroscience

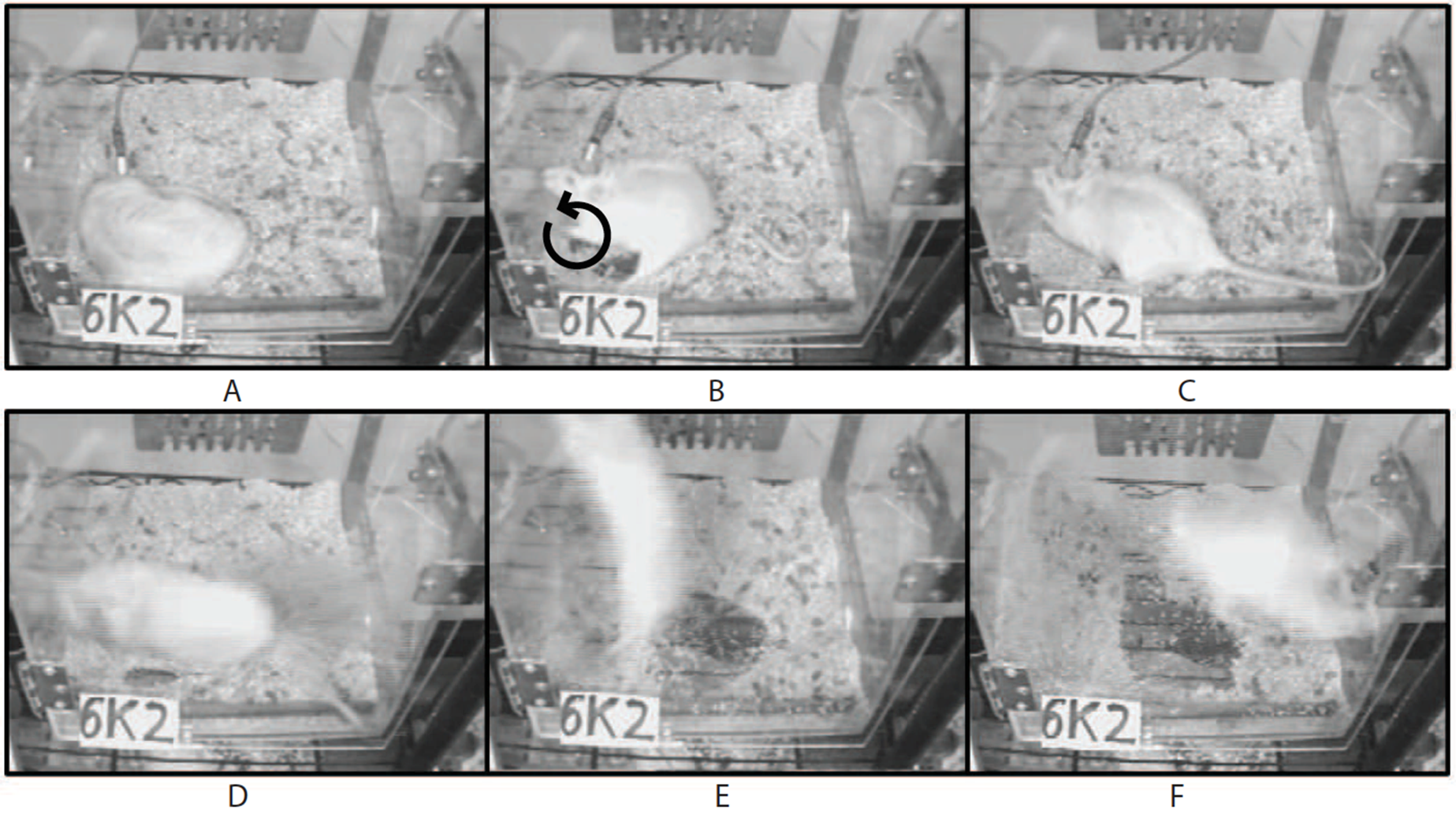
Deterministic Finite Automata in the Detection of EEG Spikes and Seizures



Deterministic Finite Automata in the Detection of EEG Spikes and Seizures



Deterministic Finite Automata in the Detection of EEG Spikes and Seizures



neuroClustering

Autonomous neuroClustering of Pathologic Oscillations Using Discretized Centroids

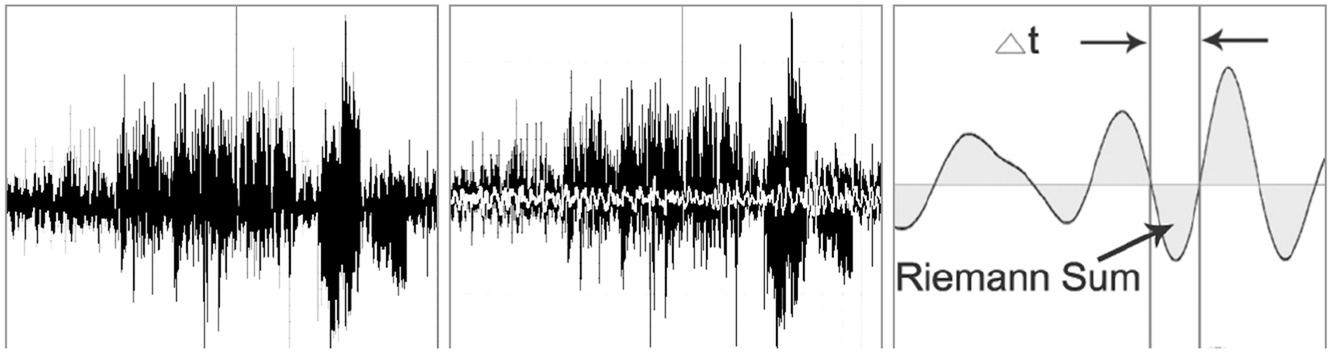
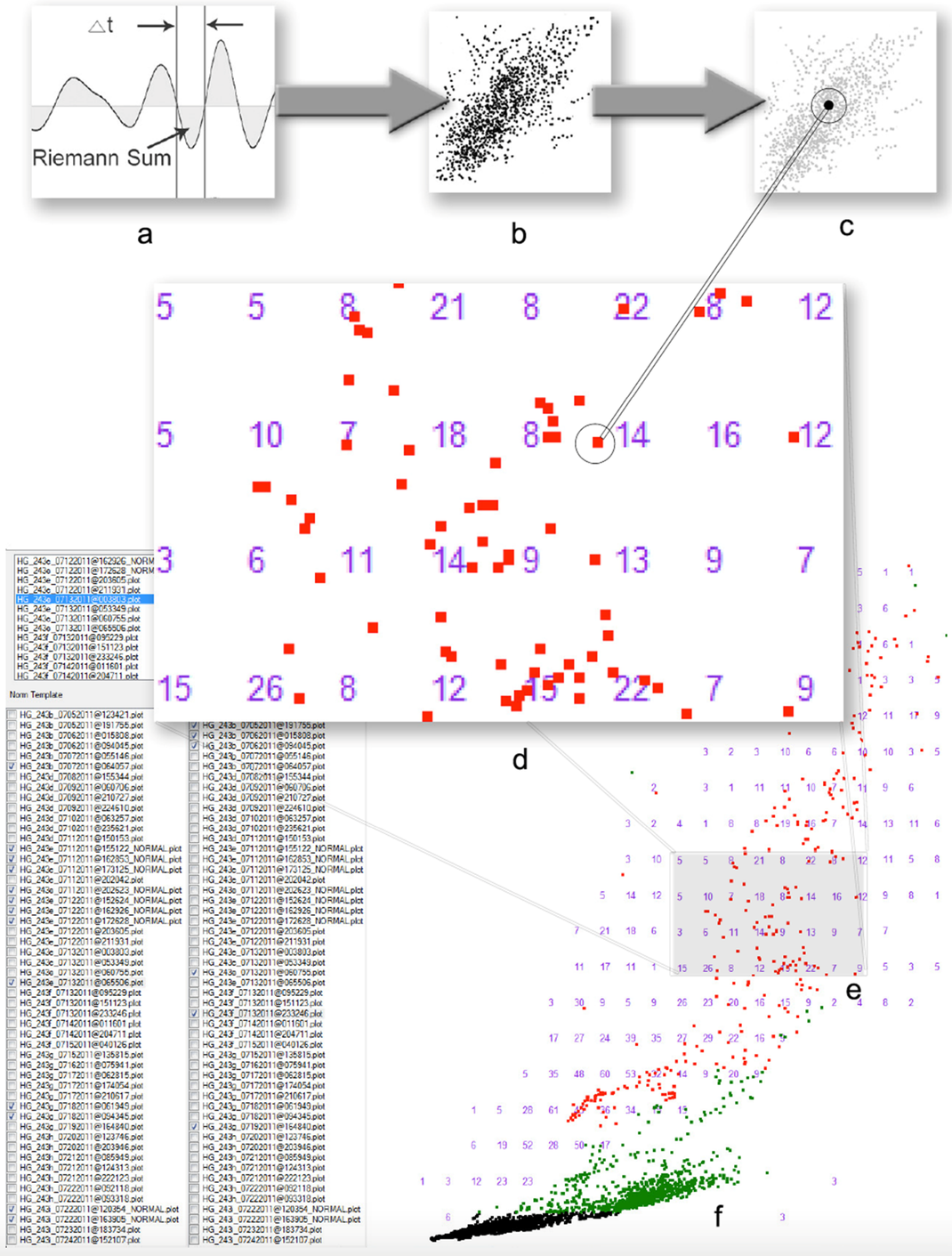


Fig. 1. Initial EEG signal with filter kernels: (a) Hamming-windowed synced kernel filter for low-passes, (b) a modified boxcar differential kernel for equalizing the

$$Y = \int_a^b f(x)\,\mathrm{d}x \approx \sum_{i=0}^{n} \left(\frac{f(x_{i-1}) - l(x_{i-1}) + f(x_i) - l(x_i)}{2} \right) \Delta x_i \quad (1)$$

where $f(x)$ is the approximation to the Riemann sum and n is the number of points. Here we calculate the absolute Riemann Sum for each area above and below the line of intersection and store each of them in an array of points. The point's $Y-axis$ is the absolute value of the area under/above the curve, and the $X-axis$ is the time offset of where the signal first crossed the line of intersect.

neuroClustering



neuroClustering

Rough Sets: Visually Discerning Neurological Functionality During Thought Processes

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Visually discerning neurological functionality during start process is using Rough Set Theory

Neuronal Sugihara Causation Networks & neuroClustering

Classifying and Localizing Epileptic Brain States Using Structural Features of Neuronal Sugihara Causation Networks

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NeuroClustering

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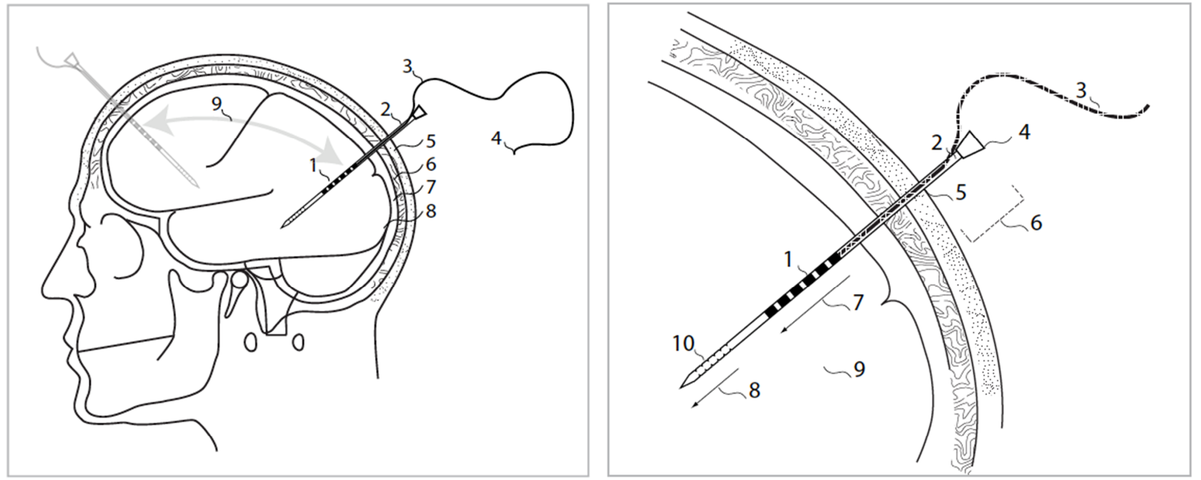
Artificial Intelligence

minedICE

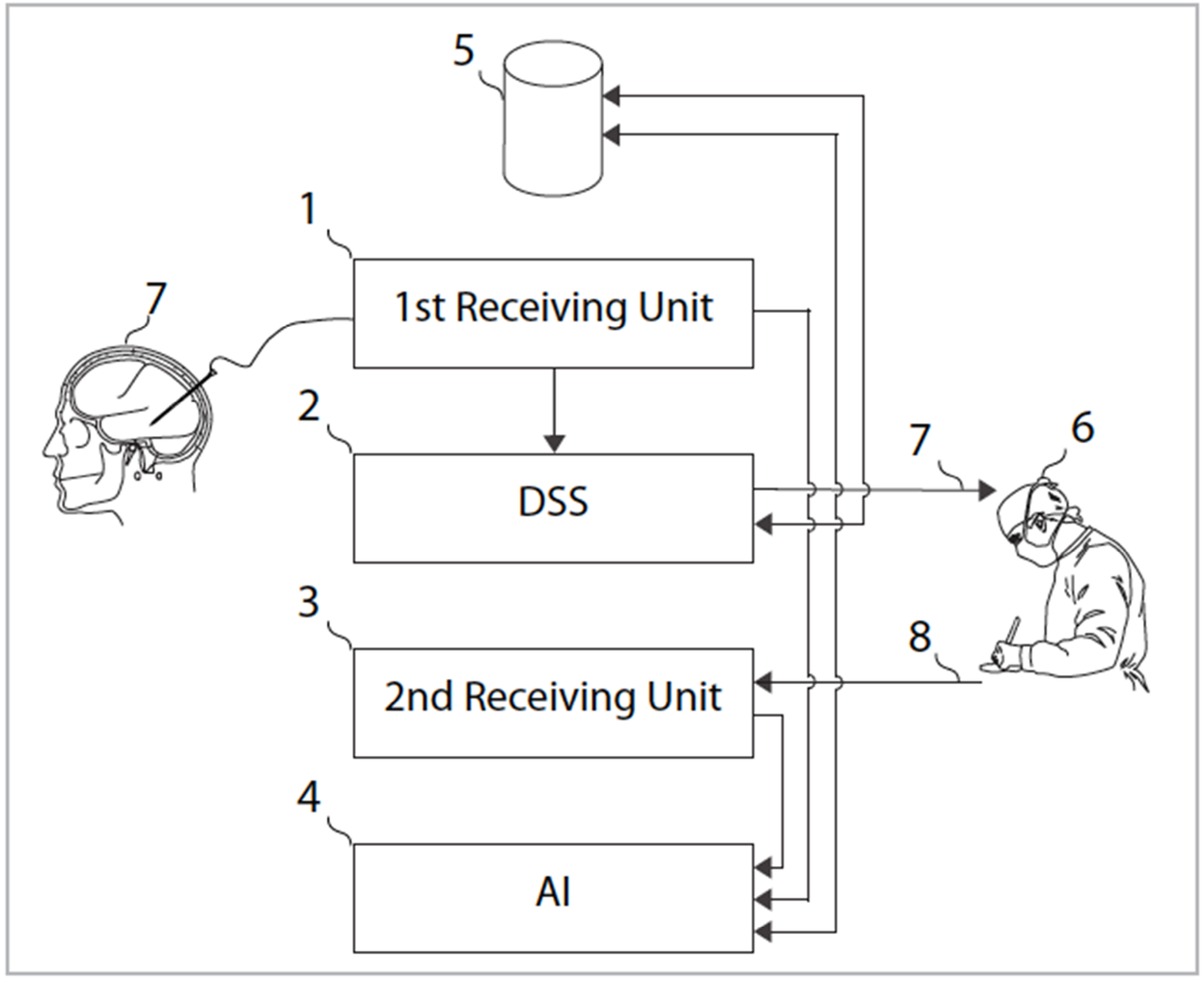
separate and classify each significant portion of the streaming ICE signal π

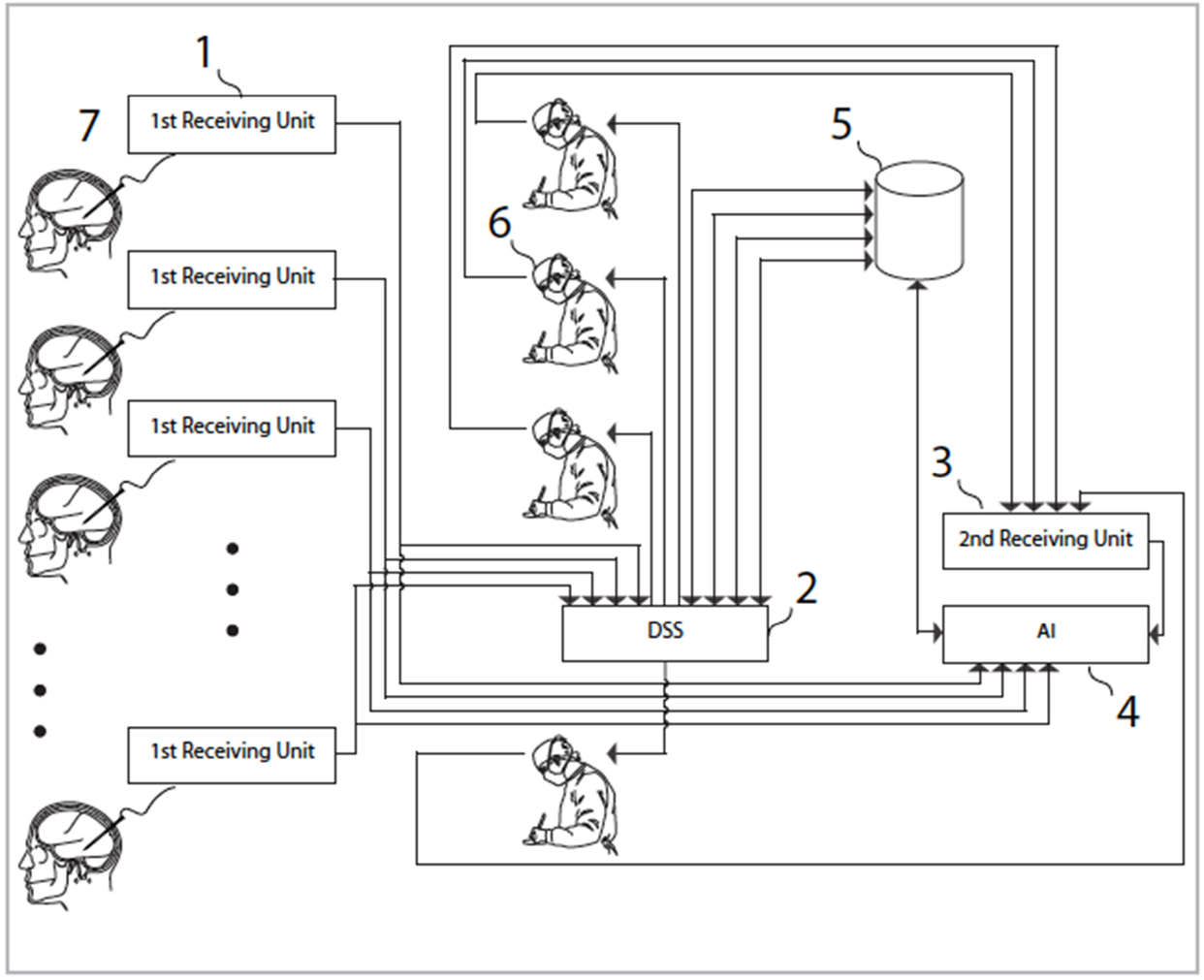


(a) (b)

Fig. 1. *Intracortical Electroencephalograph (ICE) Pin, Side Elevations:* ((a) ICE ***2*** inserted through periostem ***5***, skull ***6***, arachnoid and pia mater ***7*** into brain ***8*** in varying positions ***9***. Receiving electrodes ***1*** encapsulated by brain ***8***. Electrodes ***1*** transmit signals along wire ***3*** to end ***4*** where it is connected to computer. (b) Cannula and internal lumen ***2*** with drainage hole ***4*** and sharpened end ***8***. Electrodes ***1*** at electrode region ***17*** allow insertion through burr hole ***5*** traversing brain ***9***. External region ***6***of cannula remains outside of skull. Connection conductors ***7*** combine into a single wire ***2***. Drainage holes ***10*** in drainage region ***8*** provide openings for fluid to flow ***4***. Support member inserted through ***4*** into internal lumen for accurate placement)

minedICE



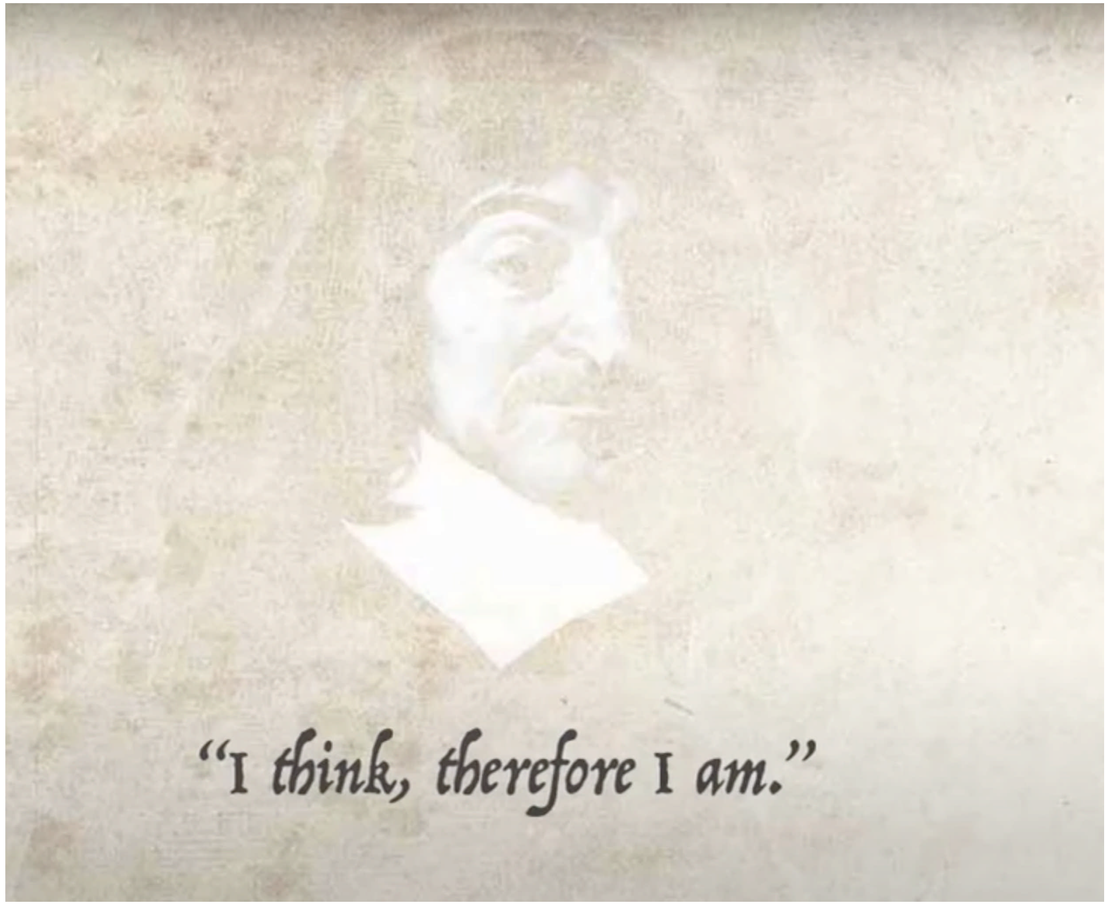


minedICE

Team Meeting

Artificial Consciousness

I Think Therefore I AM



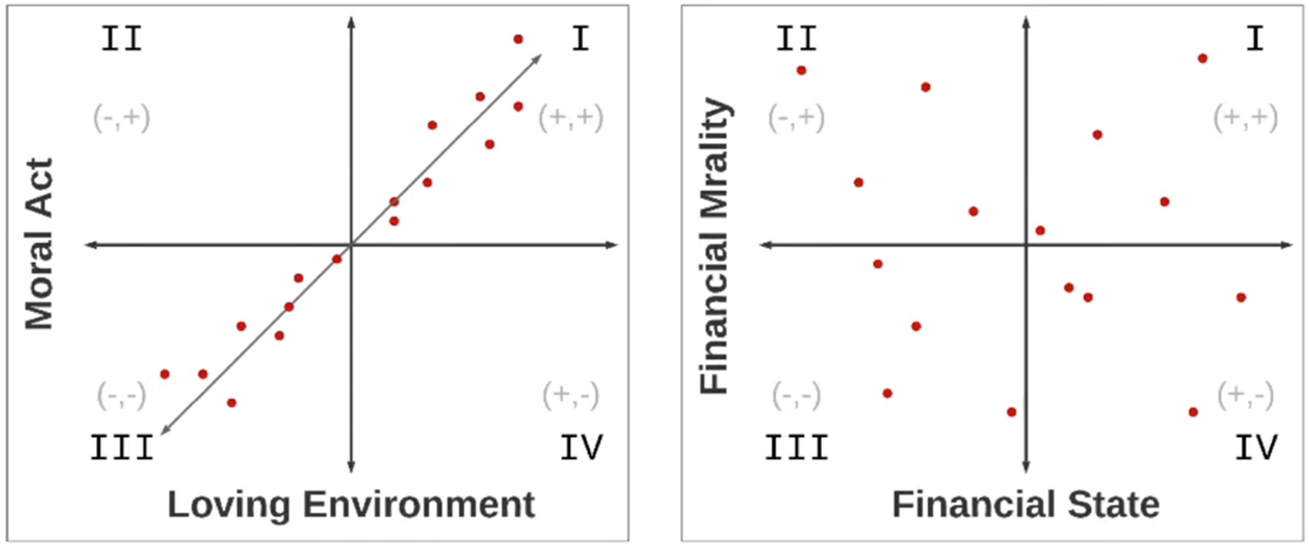
René

A Separate OS

Consciousness Phenomenology

Computer Scientists	Functionalsim

Psychoanalytical Covariances



(a) (b)

Figure 1: Psychoanalytical Covariance: (a) Linear and (b) non linear relationships.

$$S_{xy} = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{n-1} \qquad \sigma_{xy} = \frac{\sum(x_i - \mu_x)(y_i - \mu_y)}{N} \tag{1}$$

Eq. 1, S_{xy} is used to calculate the *sample covariance* of the cohort answering how they would consciously act in a given situation while σ_{xy} calculates the *population covariance*. For the sample co-

AC and AI

Riemannian & Rough Sets

NEXT STEPS

CONCLUSION