Complexity Theory

Schrodinger 1

Zurek 2

Lloyd & Pagels 3

Bennett 4

Crutchfield 5

Wagner: evolvability 6

Information Theory

Shannon 7

McGill: Multivariate Info 8

Bell: Coinformation Lattice 9

Watanabe: multivariate total correlation 10

Thermo & Information

Thermodynamics of information review 11

Landauer: Information is Physical 12

Sagawa: Jarz with Info Feedback 13

Sagawa: thermo and logical work 14

Jarz: Exponential averaging 15

Partial Information Decomposition

W&B: Original PID proposal 16

Harder: Identity axiom proposal 17

Crutchfield: irrev persp 18, triadic v diadic 19, review incld mech rdn & shit proposal 20

Griffith: Review & syn proposal 21

Finn & Lizier 22

Bertschinger & Rauh proposals 23,24

Bertschinger & Rauh review 25

Will form 2 reports: 1 bio, 1 info

General overview form: context, problem, proposal, evidence, future works.

Each min 6 pgs, max 8 pgs, incld biblio, not incld appendix. Use latex.

Expand on the overview with additional focus on other proposals, ex’s, and evidence/images.

Pref fewer but more relevant citations

Target audience: less informed than a draft article

Then morph it into a presentation (~12min bio, 12min info)

Paper draft by June 12th, presentation draft by June 19th

Both finished by end of June, along with the internship.

Intro and Info:

- Shannon entropy & information

- H -> I as 1 -> 2, question of how to deal with 2 sources, 1 target

- first guess via Bell

- poss demonstrate that the bounds (if x1==x2 vs XOR)

- use Wantanabe for Itot somehow

PID:

- W&B: issues w/ Bell if not obv already

- axioms

- proposition

- response, other axioms, other proposals (minimal at first)

- Harder et al. & ID axiom via concat ex

- response via Raul & direct handling of concat

- Crutchfield, pwunq and directionality

- later: mention few other axioms & proposals

- remaining issues: both metric and applic, framework solid (tho poss incomplete)

Slight Proposal:

- min>x def

- fit axioms (pfs, poss in appendix)

- v similar to orig proposal, against concat

- with orig proposal, matches pwunq directionality

Application to Boolean Circuits:

- goal is to eventually generate minimal circuits (more spc?)

- curr incomplete, but makes some useful distinctions

- downstream redundant nodes after upstream have solved problem

- better than regular info, distributed, something such as min # nodes might also reveal

- 4and archs

- similar to regular info, captures some sense of path lengths

- later:

- add 1 or 2 more (such as k-and with incr S?)

- popn graphs?

Future Work:

- curr stuck on normzn for prev compression in wrong direction

- show graph, show the bits, how visible at distributed lvl

- multivar, algorithmic, more than binary…ect

TODO:

- briefly look back at I\*I/Hxx type metrics

- how would desired normzn alter the PID axioms?

- for 4and archs, use unweighted sums

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