Tacit Knowing and Neural Networks:

Is a computer's ability to learn human skills a victory for reductionism?

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I Does irreducibly tacit knowledge exist in bodily & rudimentary processes?

1. Distinction between Collins & Polanyi on tacit knowledge:
    1. Collins: only CTK (social) is irreducible
    2. Polanyi: STK (somatic) also has an irreducibility (RTK also reducible for Collins)
2. Answer is important for whether we see irreducibly tacit features in other living systems or think human tacit knowing is without precursors in animals; affects our understanding of...
    1. the intrinsic value of animals
    2. evolutionary processes as telic-dynamic systems
    3. the possibilities for sentient AIs (here Polanyi and Collins converge)

II. Can a machine –or artificial intelligence--*do* or perform what we consider to be achievements of somatic tacit Knowing?

1. What is tacit knowing for Polanyi?
    1. From-to intentional structure: *from* clues **to** a joint integration of meaning (& layers)
        1. holistic & irreducible: irreversability, unspecifiability of clues, inexhaustibility
    2. The example of martial arts
        1. Discovery & Learning: Dialectic between "intuition" and "technical invention"
        2. Performing the skill: too fast for higher level cognitive processing, *and yet*
        3. intention and innovation are displayed (features of CTK)
2. Connectionist Networks on Parallel Processing Computers seem to model tacit knowing
    1. Similarities in structure: irreversibility; input units > output
    2. Similarities in irreducibility/intractability: *Hidden layers* & *Dimensional Shift* in meaning
    3. Similarities in learning, hints of intentionality & innovation in dynamic systems approach

III. Would the ability of a machine to do perform what we consider acts of tacit knowing mean that *that knowledge* is now fully explicable?

1. Collins: yes, it's fully explicit (in principle)
    1. Making a machine transforms the skillful production to an interpretable string
    2. Causally determinate material strings & operant conditioning
2. Polanyi: no, there is still an irreducibility (ineliminable)
    1. Even machines are irreducible: Dual control systems
    2. similar structure in tacit knowing & emergent being: Subsidiary/part *to* focal/whole
    3. outcomes evoked, not fully determined; "operant conditioning" isn't deterministic
3. Mismatch in explaining from the top-down; insufficiency of explaining from the bottom-up.

IV. What difference does the answer make?

1. No materialistic reduction of bodies, minds, and meanings (& without Cartesian dualism)
2. proto-intentionality and proto-meaning in other species: reason to see an intrinsic value
3. telic attractors of dynamic systems at work in evolutionary processes; novelty and stabilization in an open system may be in evoked by emergent "fields"
4. Mind is emergent and may be multiply realizable via different material subsidiaries, but machines that model minds catch representations but don't seem to catch enough of the important tacit clues nor indwell—there's nothing it is like to be a connectionist network...as yet.