

NN Music: Improvising with a 'Living' Computer

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NN Music

Attributes of a *live algorithm* explored in a system for solo performer-machine collaboration, **Neural Network Music**.

- a multilayer perceptron neural network is trained to classify audio analysis from performance.
- two networks are mapped in real-time for stochastic synthesis.
- mappings are covertly assigned, revisited by player & machine as performance progresses.
- both participants learn and *adapt* to a *sonic environment* created afresh on each performance.

What is a Live Algorithm?



Live Algorithms for Music Network LAM 2004+ (EPSRC UK)
www.livealgorithms.org

- can engage in performance with abilities analogous (not identical!) to a human musician.
- most relevant to improvised performance; emergent, non-hierarchical music.
- does not rely on human agency (*computer as instrument*) or design/score/rule-base (*computer as proxy*)
- LAM: network of composers, software designers, performers

adaptability

- acclimatise to an audio environment, demonstrate this by changes of behaviour.
- evidence *stigmergy*; the self-organisation of individuals that interact with an environment.
- collaborate and adapt: assume/cast of roles, develop a mutual history during music-making – directly or with the environment?

empowerment

- control decisions that impact upon future experience.
- see decisions in *non-arbitrary changes in state*: complex systems...?
- make novel interventions.
- demand a response from both human and machine participants.

intimacy

- experience a binding understanding shared by performers through informed listening and observation.
- emulate intimacy; attend to sound, nuance & behaviour, not controls?
- experience *optimal flow*; a goal-orientated, mental state, explore the limits of experience & expectation, pleasure in meeting challenges with skills.

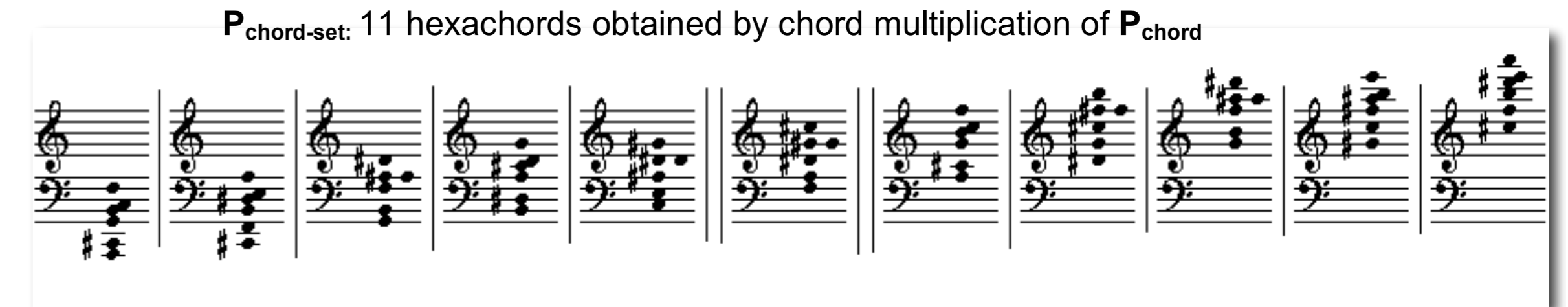
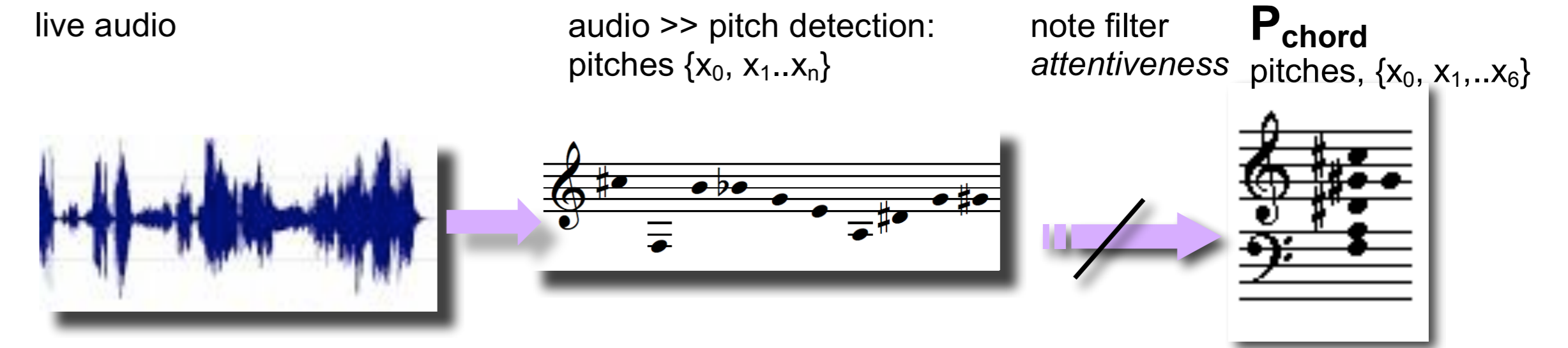
opacity

- avoid naïve cause-effect.
- offer an ambiguous/shifting balance between the *truly* interactive and the proactive; across the threshold of the apparently chaotic and the readily predictable.

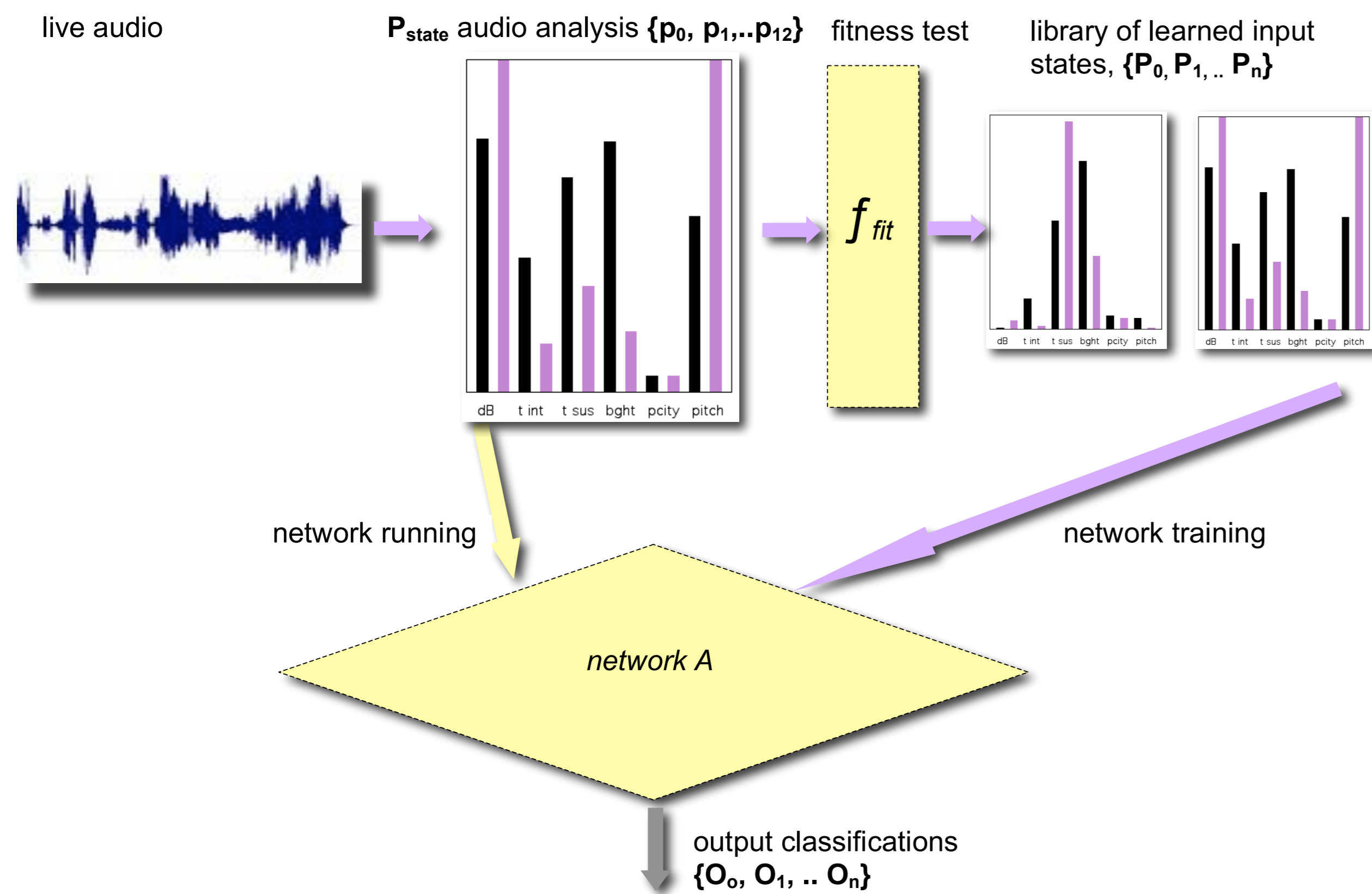
unimagined music

- unresolved and unpredictable characteristics – only with machine-human collaboration.
- computers might extend, not copy: machine music need not model established styles or practices, or be measured according to any associated aesthetic. *musique informelle*.
- contributions of all performers involved – human and machine – may have equal significance, but may not necessarily be equivalent.

P_{chord}: pitch analysis and transformation



P_{state}: audio analysis and network training



Q_{state}: network mapping and synthesis

