


Steffan Ianigro	Plecto – A performance using audio created by evolved Continuous Time Recurrent Neural Networks <i>Live Performance</i>
 <p>Topic: Music</p> <p>Author:</p> <p>Steffan Ianigro</p> <p>University of Sydney, Architecture, Design and Planning Australia www.sydney.edu.au</p> <p>Main References:</p> <p>[1] Randall D Beer, “<i>On the dynamics of small continuous-time recurrent neural networks.</i>”, <i>Adaptive Behavior</i>, 3(4):469--509, 1995</p> <p>[2] Oliver Bown and Sebastian Lexer, “<i>Continuous-time recurrent neural networks for generative and interactive musical performance.</i>”, <i>Applications of Evolutionary Computing</i>, pages 652--663. Springer, 2006 □</p>	<p>Abstract:</p> <p>Steffan Ianigro is currently a PhD candidate at the University of Sydney Design Lab. Steffan's research revolves around the evolution of Continuous Time Recurrent Neural Networks (CTRNNs) to create novel audio artefacts. Steffan is also an active musician and has written works for and performed in a variety of events, such as ‘Musify Gamify’ as part of Vivid Sydney 2015, Ensemble Offspring’s ‘The Listening Museum’, ‘New Wave’ as part of Vivid Sydney 2013, ‘Tin Shed Spots’ supporting German artist Schneider TM, and ‘The Silent Hour’ supporting Japanese artist Marihiko Hara.</p> <p>This performance is part of Steffan’s current research, which began in pursuit of an Interactive Genetic Algorithm (IGA) that affords unconstrained exploration of audio artefacts. Although there are many effective IGAs for the evolution of digital audio evident in the literature, they are designed around rigid audio engines, constraining evolutionary search by the sonic possibilities of their hardware and software components. CTRNNs on the other hand can exhibit boundless temporal behaviours and are a simple nonlinear continuous dynamical model, capable of approximating trajectories of any smooth dynamical system [1]. Various configurations result in smooth oscillations that can describe audio artefacts, providing a plausible method for the unconstrained evolution of digital audio. Their complex internal dynamics therefore expand the audio search space into virtually any possibility, and can be steered by the use of an IGA that modifies the CTRNN configurations [2]. Restrictive design factors are alleviated by the low level nature of this method, opening up a completely free timbral search space. To explore this method, Steffan has created Plecto, an online system for evolving CTRNNs to produce audio artefacts. Please see the following link to a version of Plecto (the software is still in development and I ask that the link should only be used for this application). Plecto - http://plecto-51107.onmodulus.net/</p> <p>Within this performance, the author will only use audio samples created by Plecto. These samples will be manipulated live to create shifting soundscapes that range from intricate naturalistic textures to thick drones reminiscent of analogue synthesisers. This performance will be a premier of Plecto therefore no recordings exist, however previous performances by the author can be found through the links below.</p> <p>https://vimeo.com/100571644 - Performance for electric guitar and live electronics. https://vimeo.com/96659337 - Performance for gas cylinder bells and live electronics. https://vimeo.com/78329351 - Performance for custom built light sensitive Arduino synthesisers and live electronics.</p>
<p>Contact: steffanianigro@gmail.com</p>	<p>Keywords: Continuous Time Recurrent Neural Network, Genetic Algorithm, Web Based, Evolution, Audio Samples</p>