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NASH: the Neural Audio Synthesis Hackathon

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***Abstract*— The field of neural audio synthesis aims to produce audio using neural networks. A recent surge in its popularity has led to several high profile works achieving impressive feats of speech and music synthesis. The development of broadly accessible neural audio synthesis tools, conversely, has been limited, and creative applications of these technologies are mostly undertaken by those with technical know-how. Research has focused largely on tasks such as realistic speech and musical instrument synthesis, whereas investigations into high-level control, esoteric sound design capabilities, and interpretability have received less attention. To encourage innovative work addressing these gaps, C4DM's Special Interest Group on Neural Audio Synthesis (SIGNAS) propose to host our first Neural Audio Synthesis Hackathon: a two day event, with results to be presented in a session at DMRN+16.**

***Index Terms*—** hackathon, neural audio synthesis

I. INTRODUCTION

In the field of image generation, the creative capabilities of generative models, such as generative adversarial networks (GANs) and vector quantized variational autoencoders (VQ-VAEs), have been extensively explored by an active community of creators, hackers, researchers, and computational artists. Comparatively, the creative capabilities of neural audio synthesis models, which draw on a breadth of deep learning techniques ranging from generative modelling [1] to differentiable rendering [2], have received considerably less attention. The capabilities of these models beyond their performance on well established benchmark tasks are thus poorly understood. Whilst certain prominent community members, such as *Dadabots*[1], *Holly Herndon*[2], and *Hexorcismos*[3], have applied neural audio synthesis models creatively, the technical barrier to entry remains high, and this is compounded by a lack of tools and interfaces for would-be users of neural audio synthesis technology.

II. AIMS

NASH (the Neural Audio Synthesis Hackathon) aims to encourage cross-disciplinary collaboration in neural audio synthesis by encouraging the development of new techniques, tools, and interfaces for neural audio synthesis, with a particular focus on creative musical applications. We thus propose four main topic areas for the hackathon:

1. Interfaces and instruments
2. Novel techniques and models
3. Synthesis control
4. Creative applications

Participants are encouraged to consider these when selecting their project, although this list should not be considered exhaustive — we welcome all hacks that participants believe will be valuable to the neural audio synthesis community.

III. RULES

To be considered, all teams must submit (1) a demonstration video of length two minutes or less, (2) a public source code repository, or steps to replicate the technical portion in the case of creative applications. Submitting an interactive demo is also encouraged where appropriate, although this is not a requirement for entry.

The hackathon will take place over a 24 hour period on the weekend of 18th–19th December UTC, and submissions must be made within this time window. When submissions close, an online voting platform will be made available to hackathon participants and DMRN attendees.

IV. FURTHER INFORMATION

More detailed information, including links to register and join teams, can be found on the hackathon's website[4]. Links to demonstration videos and voting information will also be displayed on this page.

V. REFERENCES

[1] M. Huzaifah and L. Wyse, "Deep generative models for musical audio synthesis," *arXiv:2006.06426 [cs, eess, stat]*, June 2020, arXiv: 2006.06426. [Online]. Available: http://arxiv.org/abs/2006.06426

[2] J. Engel, L. H. Hantrakul, C. Gu, and A. Roberts, "DDSP: Differentiable Digital Signal Processing," in *8th International Conference on Learning Representations*, Addis Ababa, Ethiopia, 2020. [Online]. Available: https://openreview.net/forum?id=B1x1ma4tDr

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[1] https://dadabots.com/

[2] https://www.hollyherndon.com/

[3] https://twitter.com/hexorcismos

[4] https://signas-qmul.github.io/nash/