ECE471, GANs for Type
Advisor: Chris Curro

Core topics

- Generative adversarial networks
- Bézier polynomials and interpolation
- Fast rasterization techniques on massively parallel computer architectures (graphics processing units, etc.)
- Parametric design

References

- *Deep Learning*, Ian Goodfellow and Yoshua Bengio and Aaron Courville, MIT Press, 2016
- *Bézier and B-Spline Techniques*, Hartmut Prautzsch, Wolfgang Boehm, and Marco Paluszny, Springer, 2002
- *The Metafont Book*, Donald Knuth, Addison-Wesley Longman, 1986
- *Lettering & Type: Creating Letters and Designing Typefaces*, Bruce Willen, Nolen Strals Princeton Architectural Press, 2009
- *The Anatomy of Type*, Stephen Cole, Harper Collins, 2012

Deliverables

- Core program and associated experiments
- Paper or papers intended to be submitted at a conference such as SIGGRAPH (preferred), CVPR, or similar
- Typographic specimens for exhibition at EOYS
- Interactive typeface design application for exhibition at EOYS

Prerequisite

- Either:
    - Computational Graphs for Machine Learning (ECE471)
    - Frequentist Machine Learning (ECE414)

We will develop a class and attribute conditional generative adversarial network capable of producing vector graphics. No generative model with vector graphic output has previously appeared in literature. The generative model will be able to produce closed shapes, with counter spaces, defined by a variable number of cubic Bézier curves. The motivating application for this research is algorithmic typeface design.

Time permitting, we further intend to develop an interactive typeface editing application which will embed a pre-existing typeface into the high-level low-dimensional space defined by our generative model. By encoding an existing typeface in this way we are able to perform vector arithmetic in the embedding space to produce fundamental changes in the Bézier space representation of the typeface glyphs.