Magenta

Slides: http://goo.gl/bXbQox

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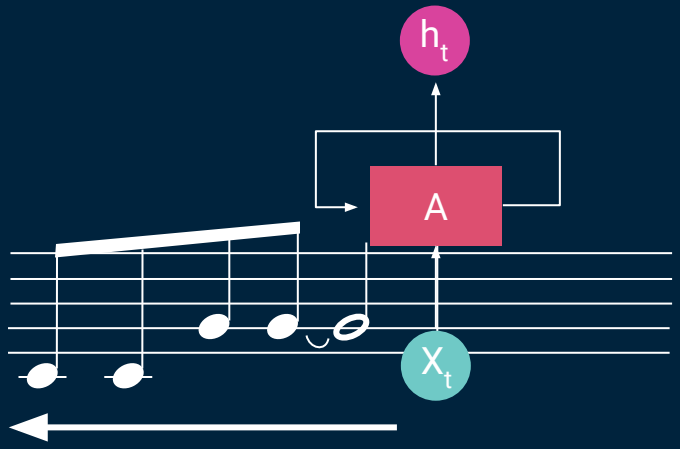
g.co/magenta

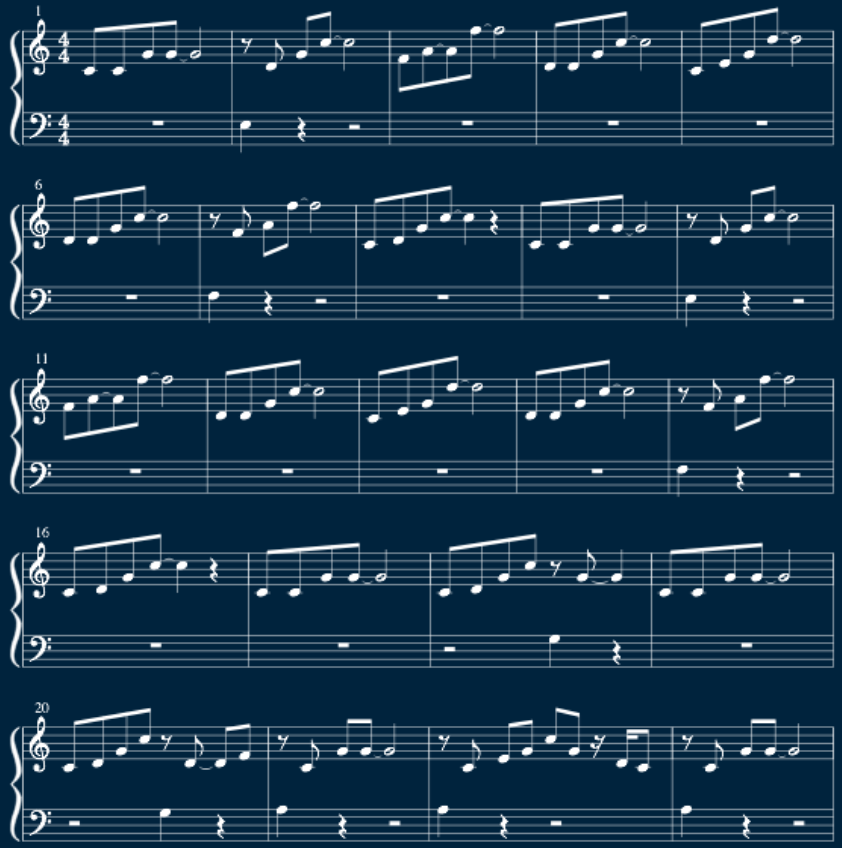

Deep Dream (Alexander Mordvintsev, Chris Olah, Mike Tyka)
MACHINES CAN DREAM IMAGES

DeepDream Art Auction and Symposium (A&MI)

Prediction

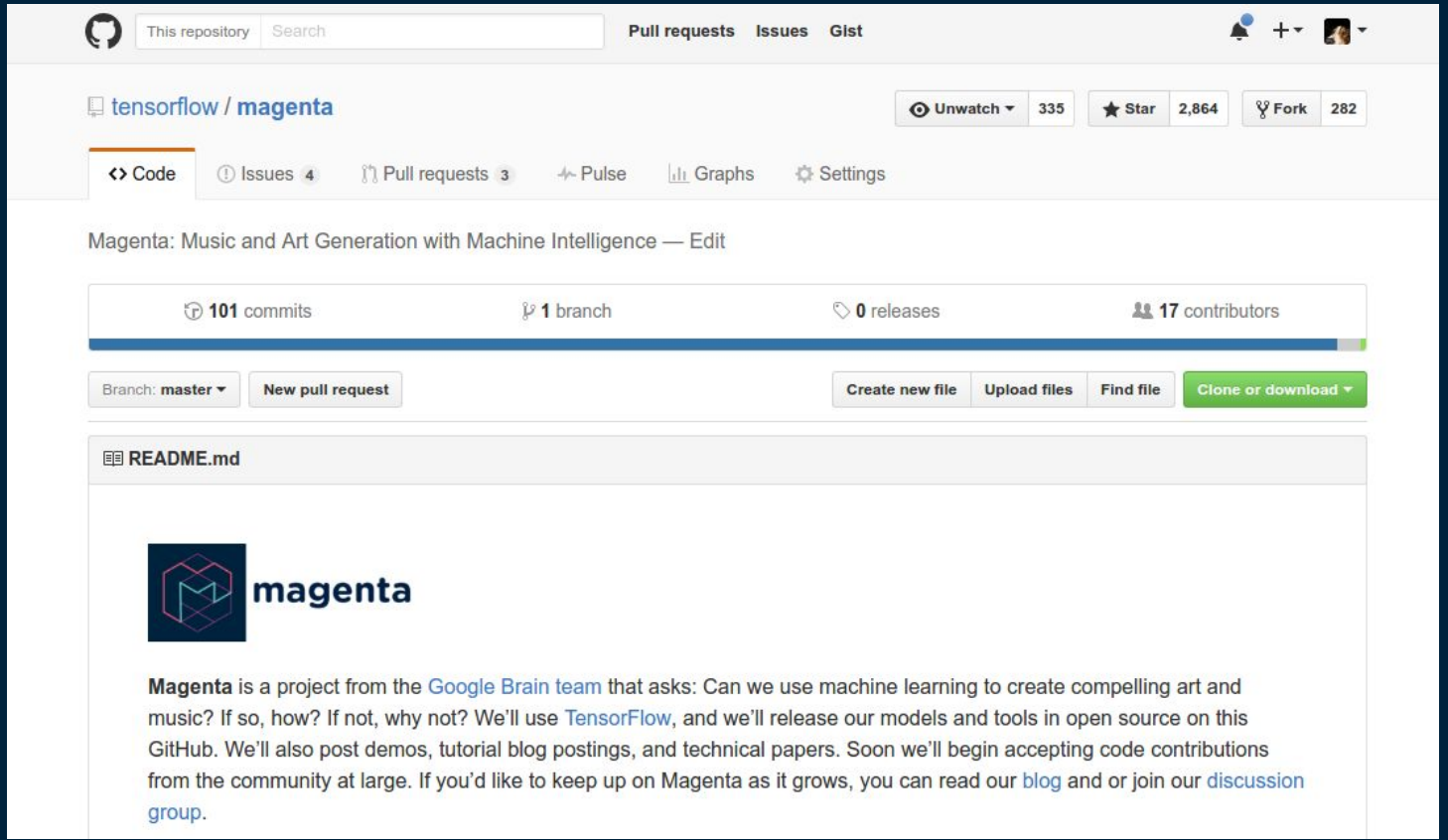


Elliot Waite

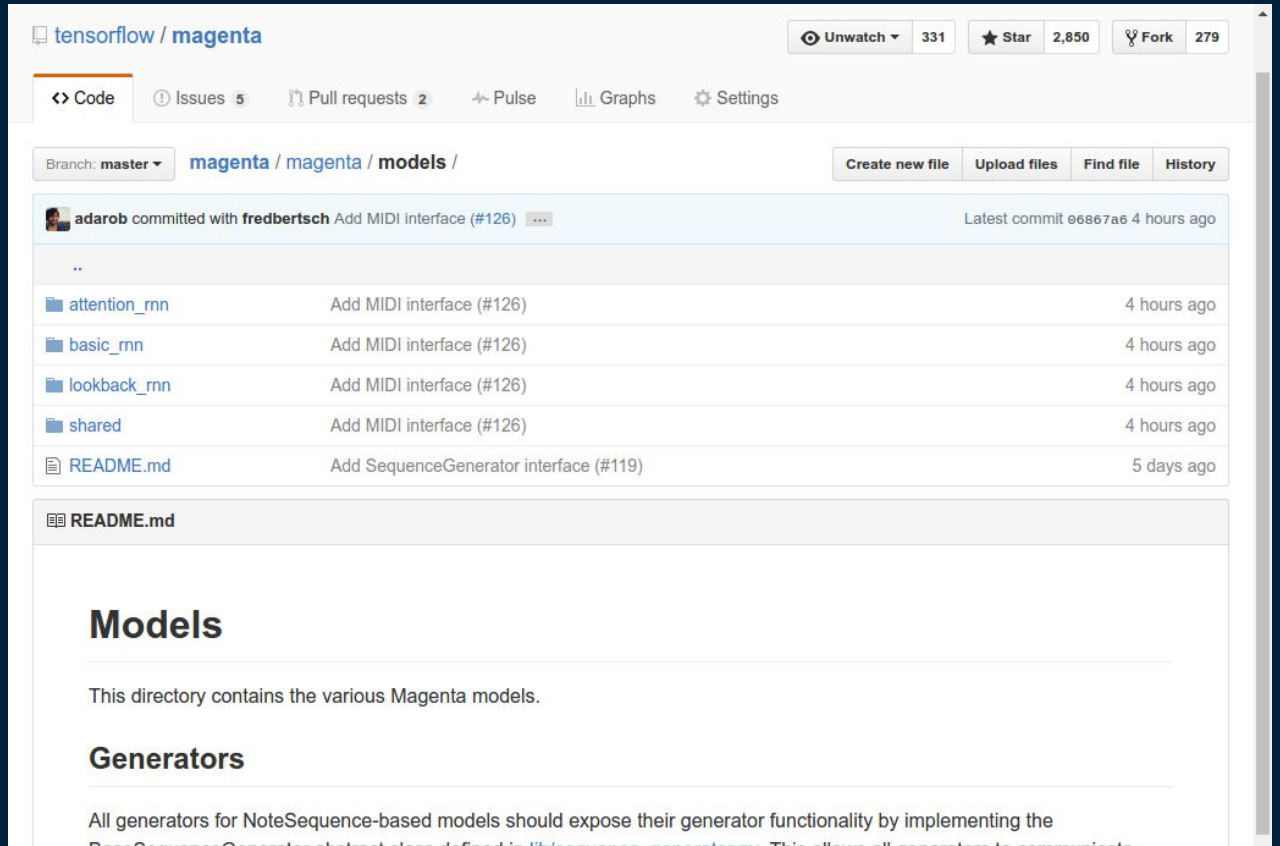



"THE CYBORG COLLAB" V.2
Google Magenta

github.com/tensorflow/magenta



magenta/models



Your Turn

Using a model

- Training a model is basically asking the computer to find patterns in data
- Get a bunch of midi files
- Turn those files into a dataset for the model
  - Translates midi into a format that's easier to work with (NoteSequence)
  - Extracts melody information from the NoteSequences
- Train the model to predict the next note in a given sequence
- Prime the model with a starting sequence
- Ask the model to continue the sequence

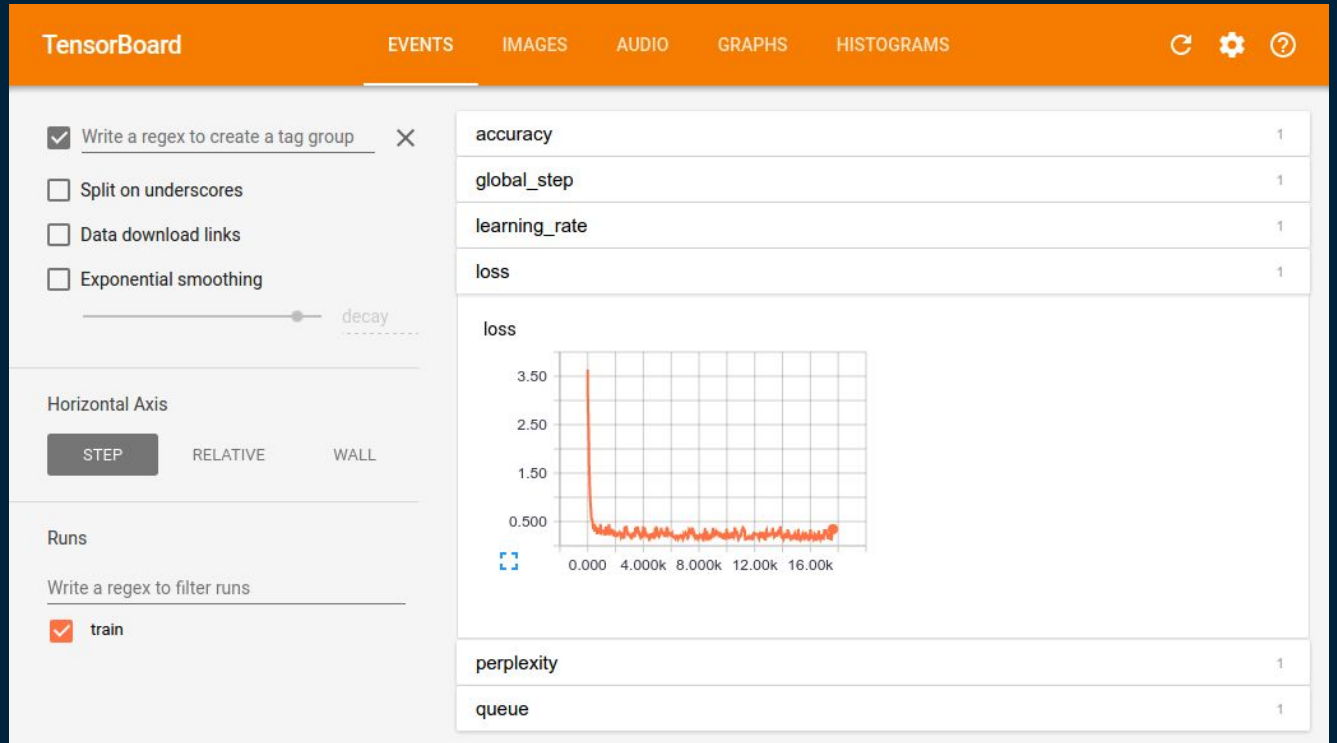
Getting MIDI files

- Find a collection that matches the music you want to generate.
- Get a large quantity of files (at least 50).
  - Colin Raffel has a collection he'd be happy to share with you
- Run the commands to create your dataset.
- Example:

```
mkdir /tmp/midiworld
cd /tmp/midiworld/
wget -r --accept "*.mid" --level 1 "http://www.midiworld.com/classic.htm/"
```

Training the model

- Use TensorBoard to monitor your progress



Or, just use our pre-trained model

Download the checkpoint file: goo.gl/fuygaK

Run the generator with --checkpoint_file instead of --run_dir:

```
bazel run //magenta/models/lookback_rnn:lookback_rnn_generate -- \
--checkpoint_file=/tmp/lookback_rnn.checkpoint \
--hparams="{'batch_size':64,'rnn_layer_sizes':[64,64]}" \
--output_dir=/tmp/lookback_rnn/generated \
--num_outputs=10 \
--num_steps=128 \
--primer_melody="[60]"
```

Generating a new sequence: command line

```
bazel run //magenta/models/lookback_rnn:lookback_rnn_generate -- \
  --run_dir=/tmp/lookback_rnn/logdir/run1 \
  --hparams="{'batch_size':64,'rnn_layer_sizes':[64,64]}" \
  --output_dir=/tmp/lookback_rnn/generated \
  --num_outputs=10 \
  --num_steps=128 \
  --primer_melody="[60]"

...

INFO:tensorflow:Wrote 10 MIDI files to /tmp/lookback_rnn/generated
```

Generating a new sequence - MIDI Interface

[magenta/interfaces/midi]

tensorflow / magenta

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cghawthorne committed with fredbertsch Add sequence diagram for MIDI interface (#127) … Latest commit a9dc753 a day ago

..

BUILD	Add MIDI interface (#126)	a day ago
README.md	Add sequence diagram for MIDI interface (#127)	a day ago
midi.png	Add sequence diagram for MIDI interface (#127)	a day ago
midi.py	Add MIDI interface (#126)	a day ago

README.md

Magenta MIDI Interface

This interface allows you to connect to a model generator via a MIDI controller and synthesizer. These can be either "hard" or "soft" components.

Note that you can only interface with a trained models that have a SequenceGenerator defined for them.

How does it work?

Sequence Generators

GenerateSequenceRequest

```
input_sequence {
  ticks_per_beat: 96
  tempos {
    bpm: 120.0
  }
  notes {
    pitch: 60
    velocity: 100
    start_time: 0
    end_time: 0.125
  }
}
generator_options {
  generate_sections {
    start_time_seconds: 0.25
    end_time_seconds: 16.0
  }
}
```

GenerateSequenceResponse

```
generated_sequence {
  ticks_per_beat: 96
  tempos {
    bpm: 120.0
  }
  notes {
    pitch: 60
    velocity: 100
    start_time: 0
    end_time: 0.125
  }
  notes {
    pitch: 55
    velocity: 100
    start_time: 1.625
    end_time: 1.875
  }
}
```

https://github.com/tensorflow/magenta/blob/master/magenta/protobuf/generator.proto

Sequence Generator Interface

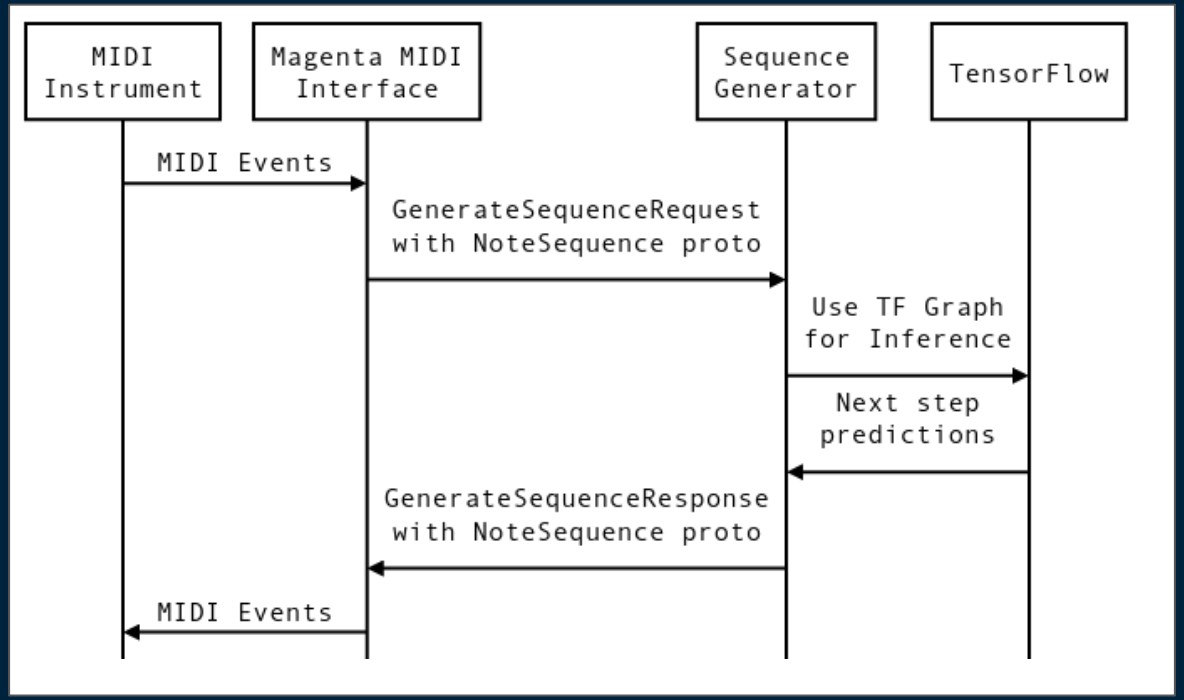
```
class BaseSequenceGenerator(object):
 @abc.abstractmethod
 def _initialize(self, checkpoint):
   pass

 @abc.abstractmethod
 def _close(self):
   pass
```

```
@abc.abstractmethod
def _generate(self, generate_sequence_request):
  """
  Args:
    generate_sequence_request: The request for
        generating a sequence
  Returns:
    A GenerateSequenceResponse proto.
  """
  pass
```

https://github.com/tensorflow/magenta/blob/master/magenta/lib/sequence_generator.py

Sequence Generators



Project ideas

- Create a new interface.
  - Rather than a keyboard for input, why not take input from another data source?
  - You could create priming melodies based on the current weather!
  - As long as your interface speaks the Sequence Generator protocol, you can connect it.

- Create a new model.
  - Implement BaseSequenceGenerator and *any* interface can connect to your model.

Important Links

- GitHub: https://github.com/tensorflow/magenta
- Blog: https://magenta.tensorflow.org/
- MIDI Interface instructions: https://github.com/tensorflow/magenta/tree/master/magenta/interfaces/midi
- BaseSequenceGenerator class: https://github.com/tensorflow/magenta/blob/master/magenta/lib/sequence_generator.py
- Sequence Generator protocol: https://github.com/tensorflow/magenta/blob/master/magenta/protobuf/generator.proto
- Pre-trained lookback_rnn checkpoint: https://goo.gl/fuygaK

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