

# MusicNet Case Study

Machine Learning – CSE546

Sham Kakade

University of Washington

December 6, 2016

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## Announcements:

- HW4 due Mon (must submit by Weds, for any credit)
- Poster Session Thurs, Dec 8 *This*
- Today:
  - MusicNet case study
  - MDPs

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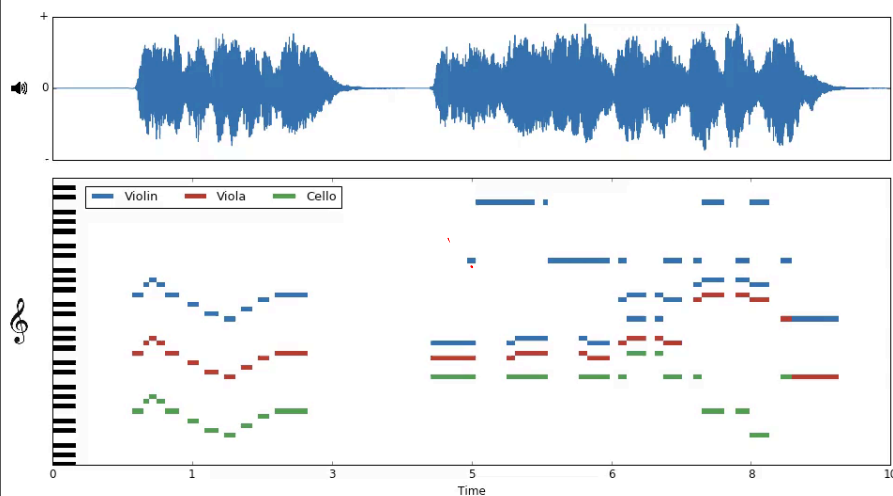
# Poster Session

- Thursday Dec 8, 9-11:30am
  - Please arrive 20 mins early to set up
- Everyone is expected to attend
- Prepare a poster
  - We provide poster board and pins
  - Both one large poster (recommended) and several pinned pages are OK
- Capture
  - Problem you are solving
  - Data you used
  - ML methodology
  - Results
- **Prepare a  $\leq 2$ -minute speech about your project**
- Two instructors will visit your poster separately
- Project Grading: scope, depth, data

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Beethoven's 'Serioso' String Quartet



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# MusicNet Dataset

Minutes	Labels	Recordings	Error Rate
2,357	1,316,868	383	4.0%

Composer	Minutes	Labels
Beethoven	1,274	725,092
Schubert	286	162,394
Brahms	217	148,292
Mozart	228	137,797
Dvorak	63	34,827
Bach	190	33,266
Cambini	42	24,832
Faure	32	22,558
Ravel	27	21,382
Haydn	14	6,428

Ensemble	Minutes	Labels
Solo Piano	1,058	485,459
String Quartet	496	299,363
Accompanied Violin	166	120,594
Piano Trio	97	86,123
Piano Quartet	73	60,594
String Sextet	56	42,920
Accompanied Cello	62	38,076
Piano Quintet	25	27,566
Wind Quintet	42	24,832
Horn Piano Trio	29	18,834
Wind Sextet	30	16,955
Clarinet Quintet	32	16,523
Wind Octet	22	14,659
Clarinet-Cello-Piano Trio	24	13,451
Solo Violin	36	11,973
Solo Cello	49	10,876
Violin and Harpsichord	15	7,470
Viola Quintet	15	4,160
Solo Flute	7	2,214
Accompanied Clarinet	20	2,193

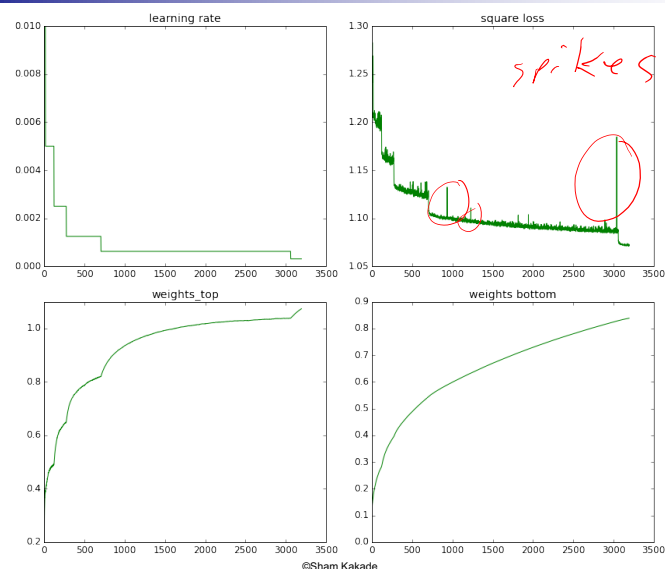
Instrument	Minutes	Labels
Piano	1,558	732,027
Violin	1,045	269,865
Cello	933	116,829
Viola	699	116,238
Clarinet	173	27,901
Bassoon	96	16,629
Horn	125	12,426
Oboe	65	8,710
Flute	50	8,317
Harpsichord	15	4,914

	Piano	Violin	Cello	Viola	Clarinet	Bassoon	Horn	Oboe	Flute	Harpsichord	Total
Distinct Notes	83	51	51	51	41	36	41	28	37	51	513

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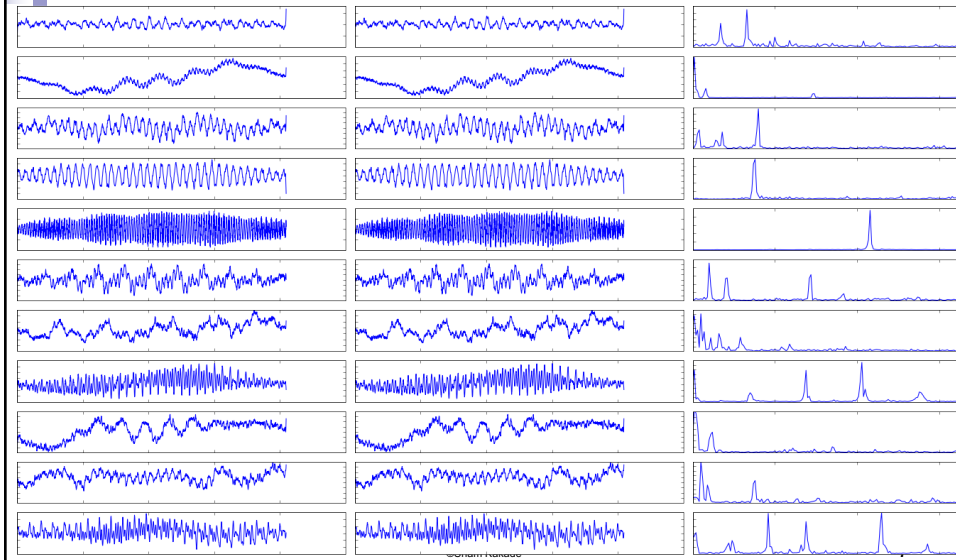
# Learning Diagnostics



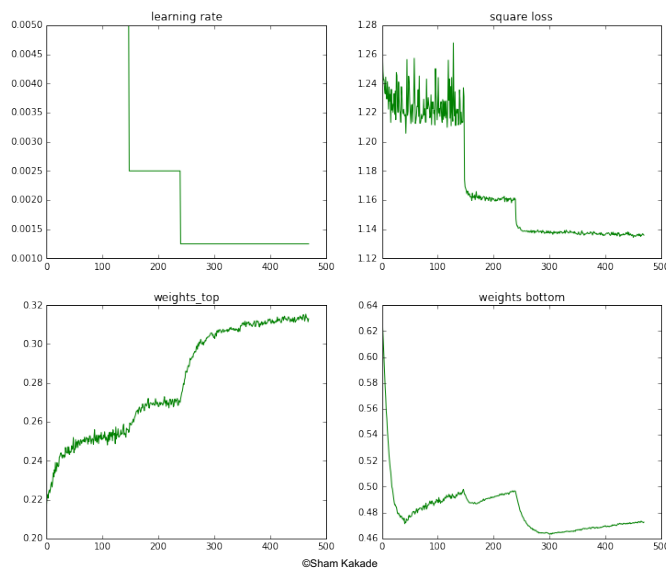
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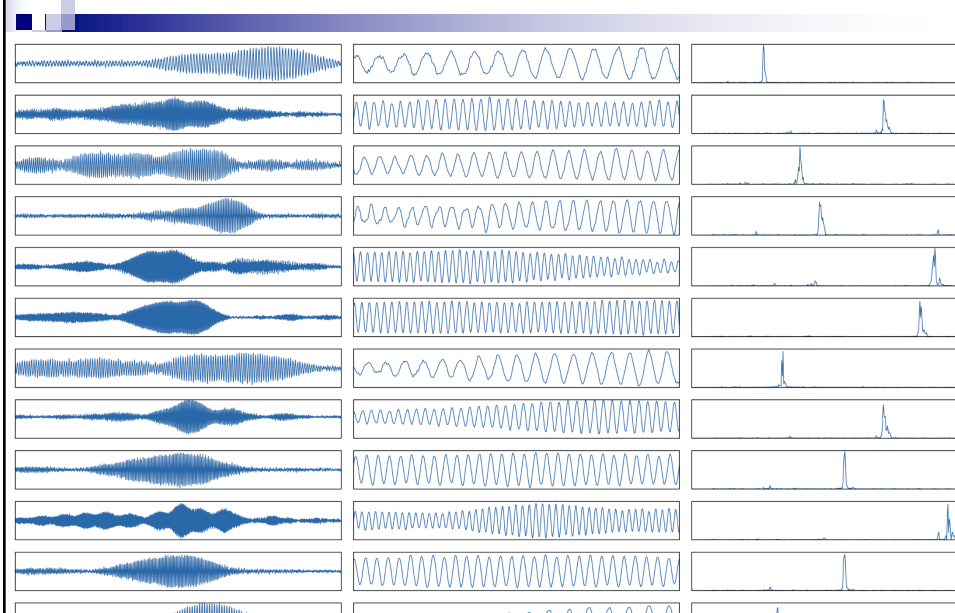
# Learned Features (ok-ish features, qualitatively)



# Learning Diagnostics



## Learned Features (reported)



## Reinforcement Learning

training by feedback

# Learning to act

- Reinforcement learning
- An agent
  - Makes sensor observations
  - Must select action
  - Receives rewards
    - positive for “good” states
    - negative for “bad” states



[Ng et al. '05]