

INSIGHTS: Learning to Learn

Nathan Simpson

Who am I?

Nathan D. Simpson

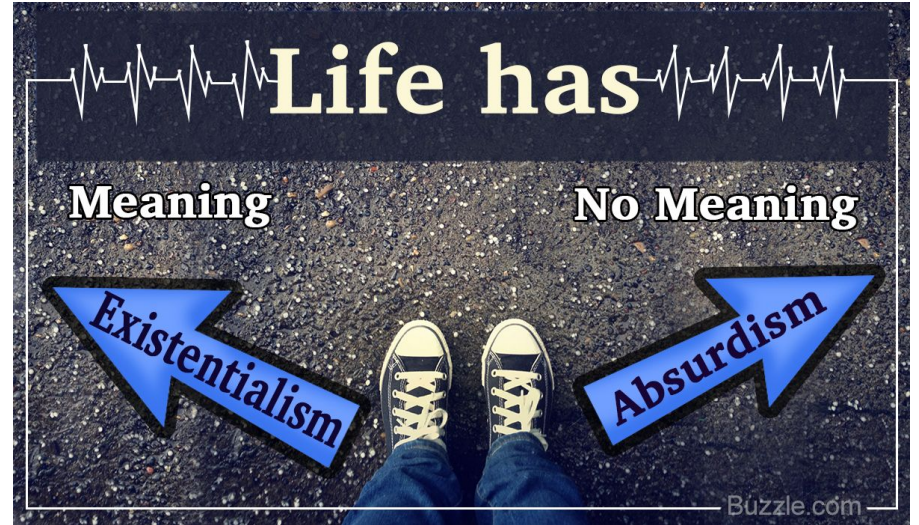
- New PhD student @ Lund
 - ATLAS!
 - Two wonderful supervisors, see picture
- Marie Curie Fellow
 - Funded by Horizon 2020 (mostly)



Pictured: Me signing my soul away to qualification tasks.

**What am I
here for?**

What am I
here for?



**What am I
here for?**





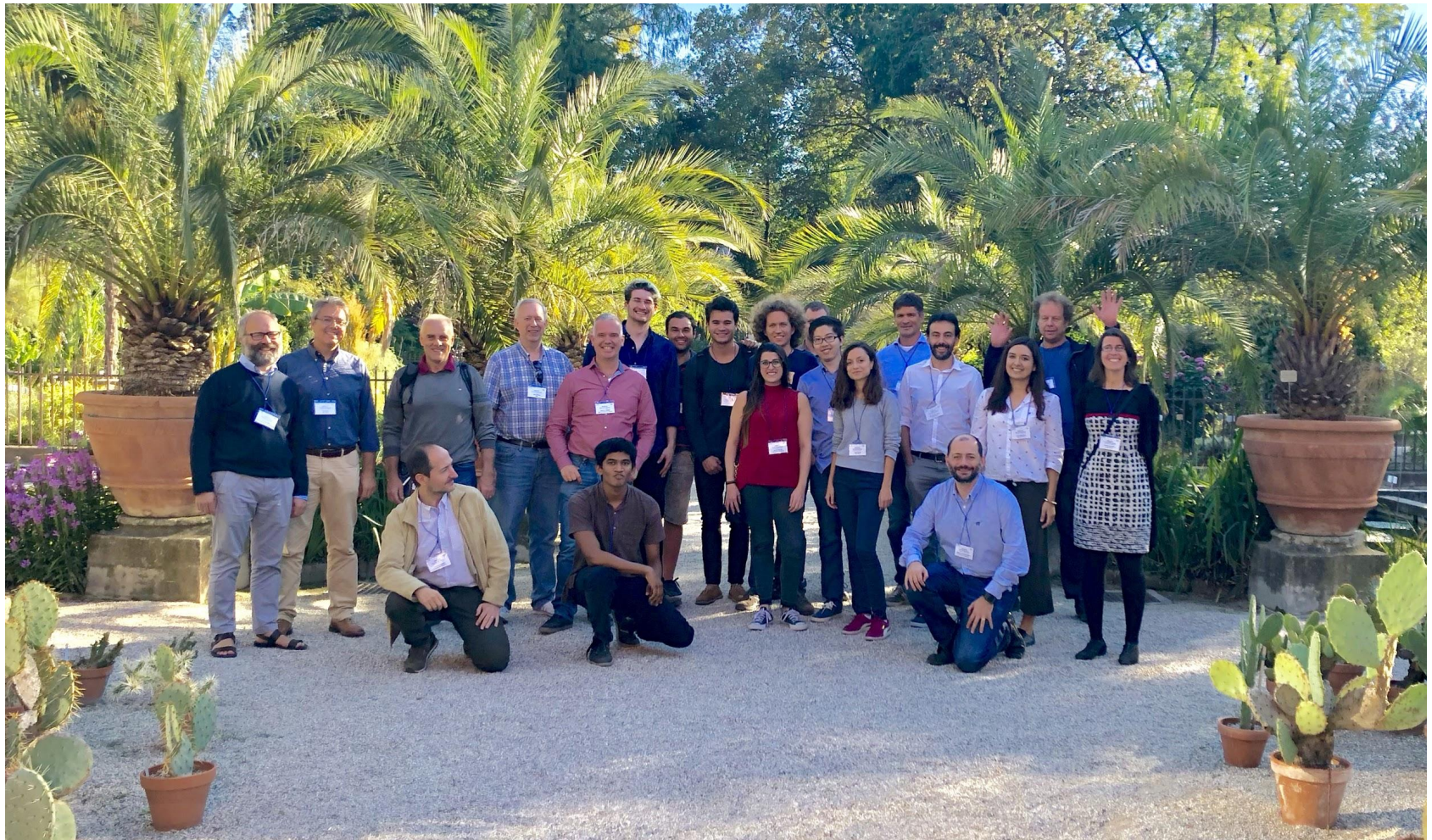
International Training Network of
Statistics for High Energy Physics
and Society

In no particular order...

- Innovative Training Network (ITN)
- 12 ESRs across 8 countries
- ML + stats training
- Wide variety of applications
- Industrial and academic
secondments



Who are we?



ESR hosts institutes:

CH: CERN (GE)

DE: MPP (MU)

IT: INFN (NA, PD),
PANGEA (RM),
UNINA (NA)

NL: NIKHEF (AM)

NO: UIO (OS)

SE: LUND (LU)

UK: RHUL (LO),
UNIED (ED)

Other partners:

DE: C2PAP (MU)

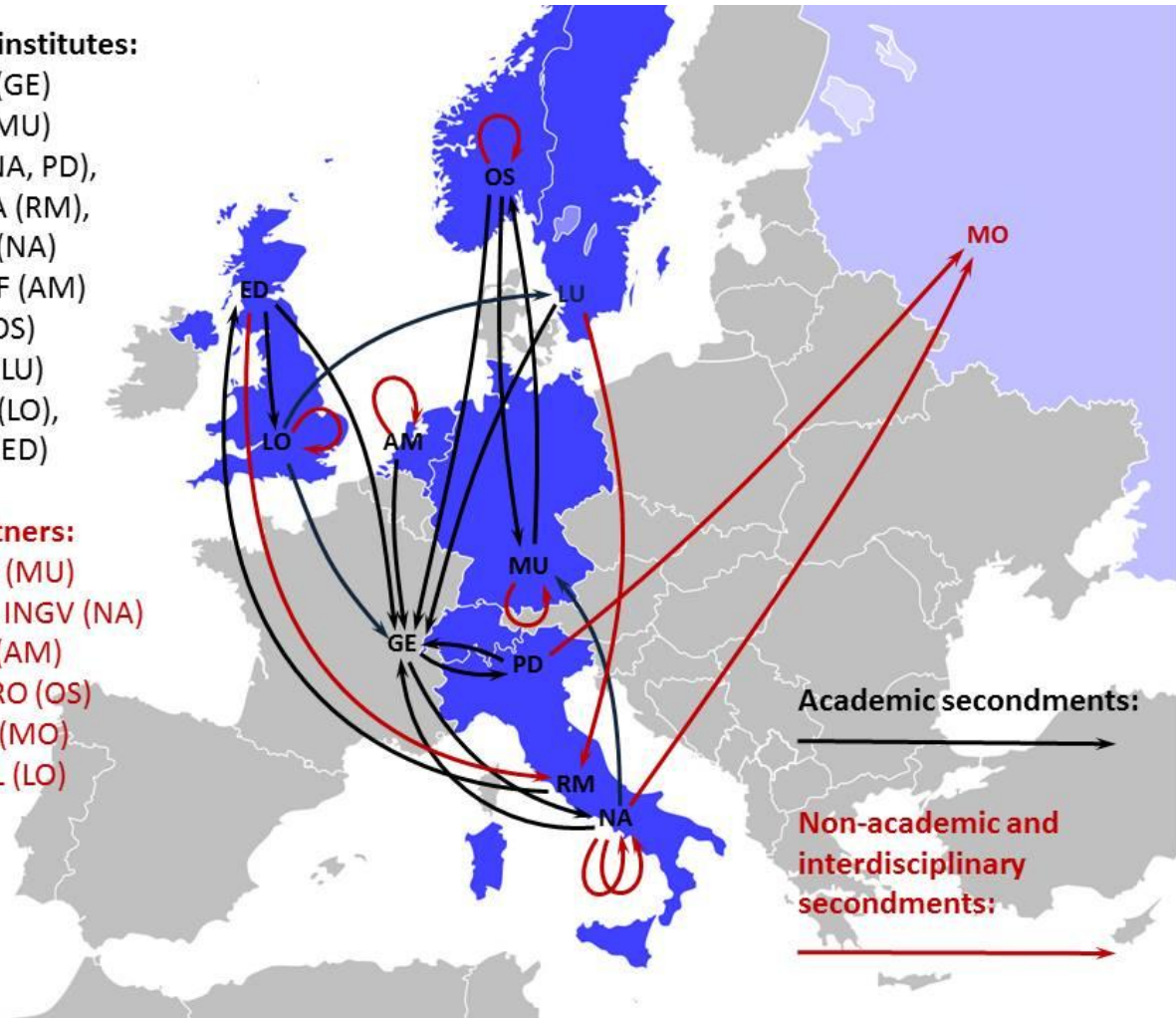
IT: DCOM, INGV (NA)

NL:KPMG (AM)

NO: CICERO (OS)

RU: YNDX (MO)

UK: FISCAL (LO)



Website:

insights-itn.eu

Training

- Machine learning
 - Deep learning
 - Software (TMVA, Keras, PyTorch etc...)
- Statistics
 - Standard techniques (unfolding, confidence intervals, etc...)
 - Bayesian statistics
 - * insert new technique here *
- Software
 - Languages (C++, Python [Julia?])
 - ROOT



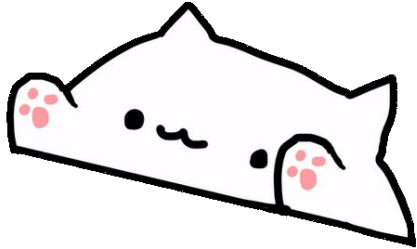
ROOT, as usual, struggling with seg faults

GAN on then son!

Generative Adversarial Network (GAN)

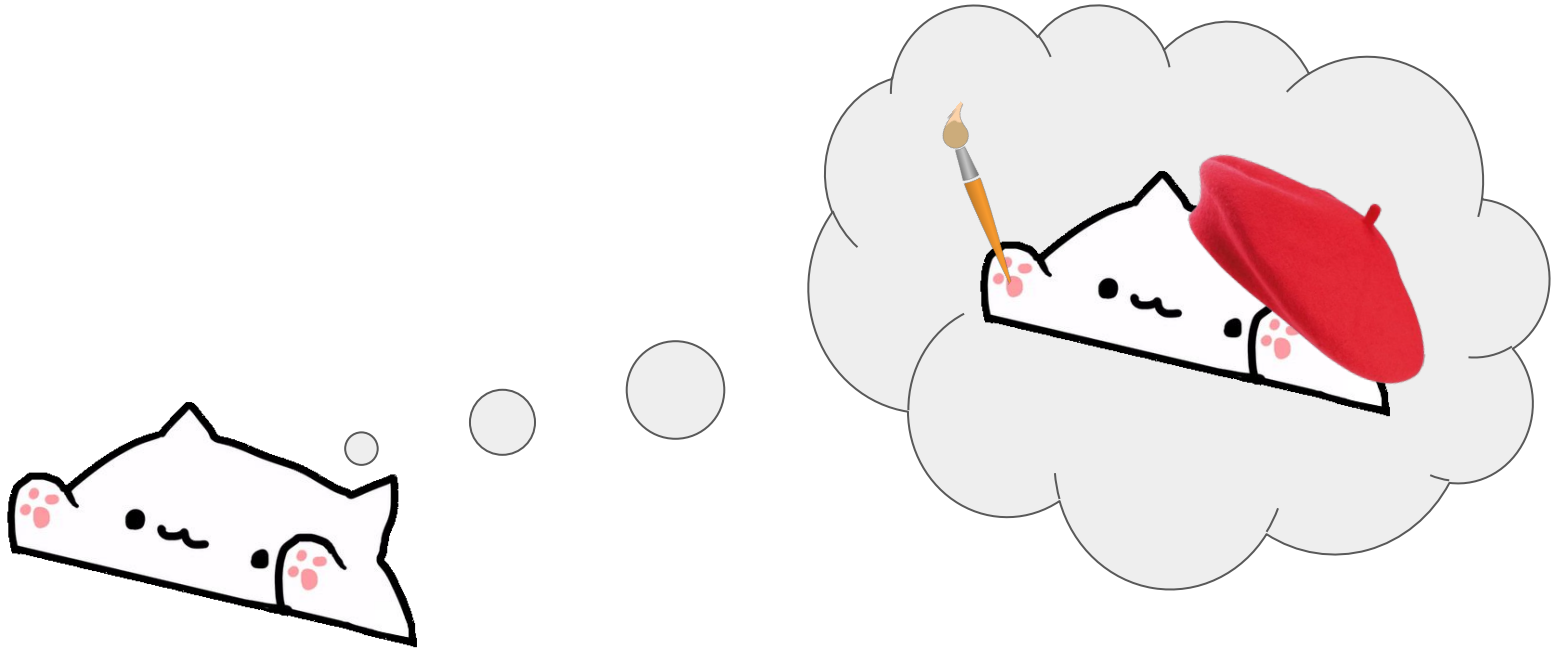
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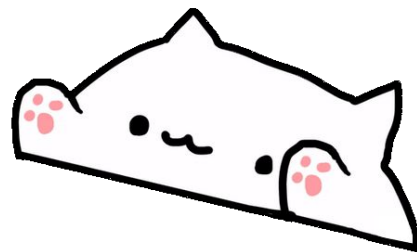
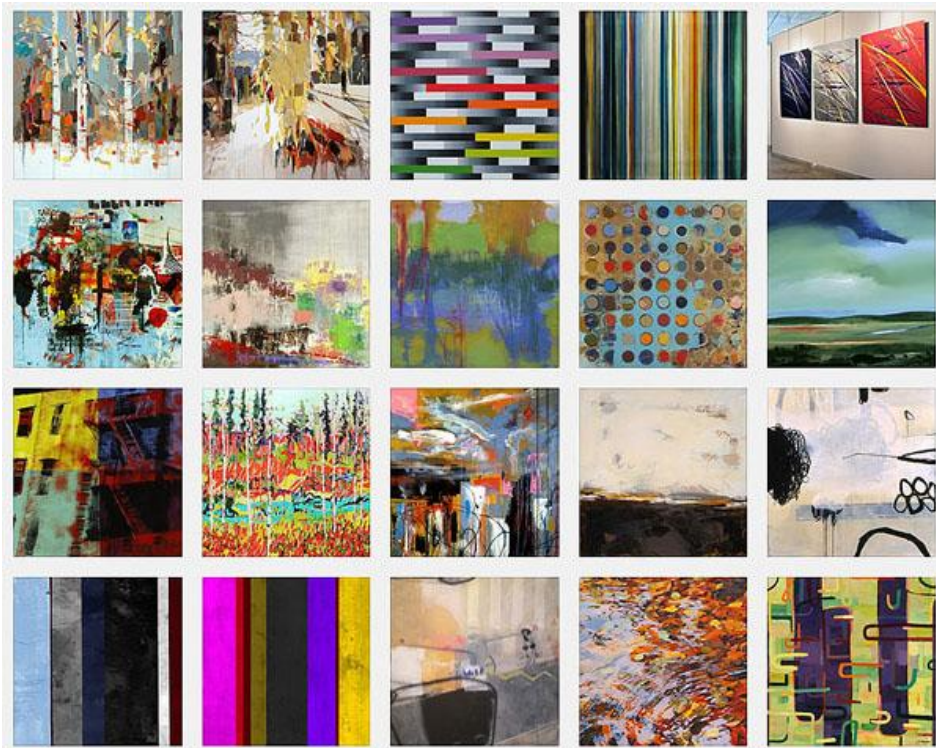
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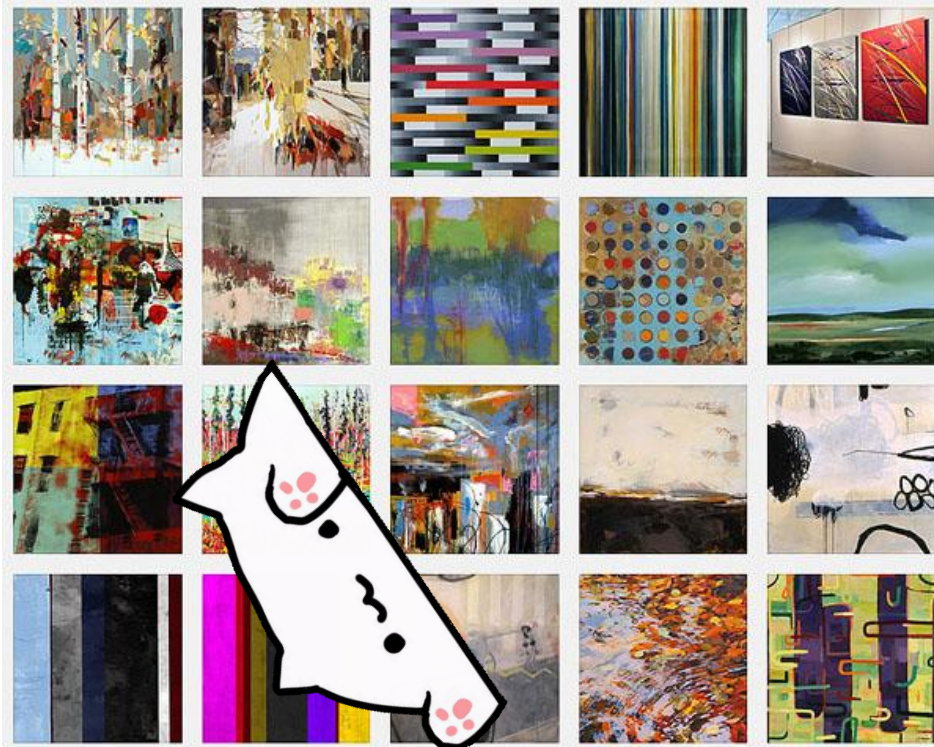
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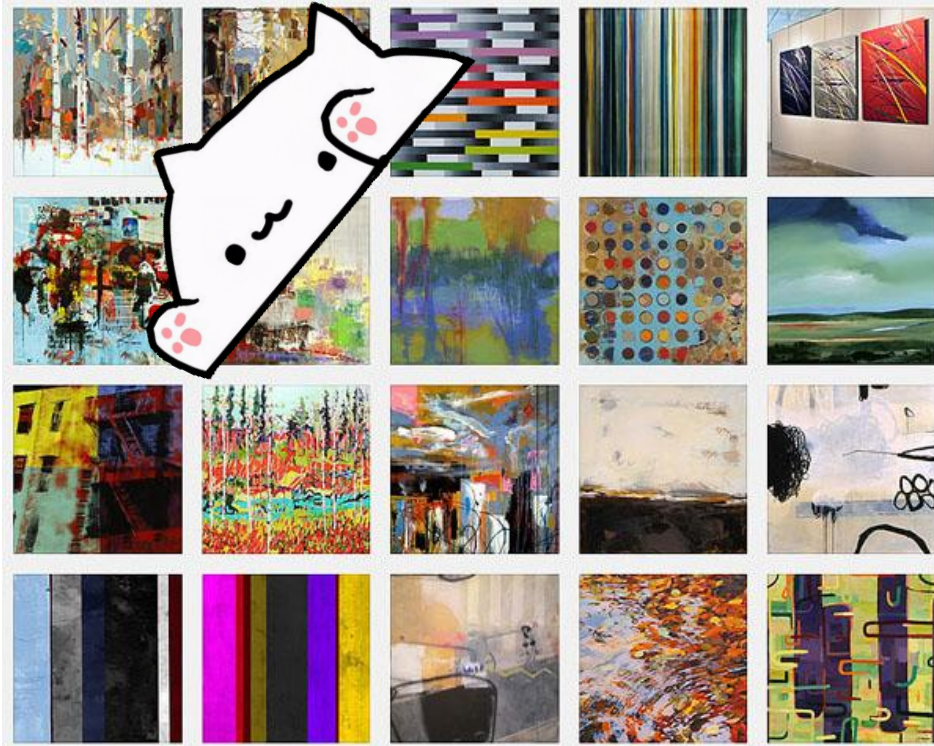
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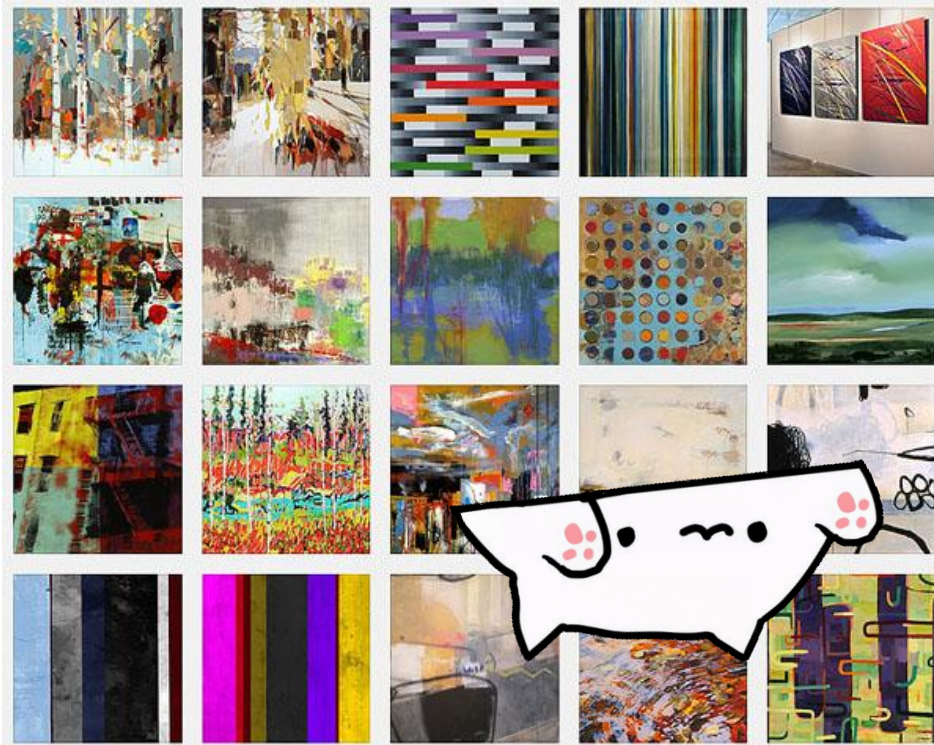
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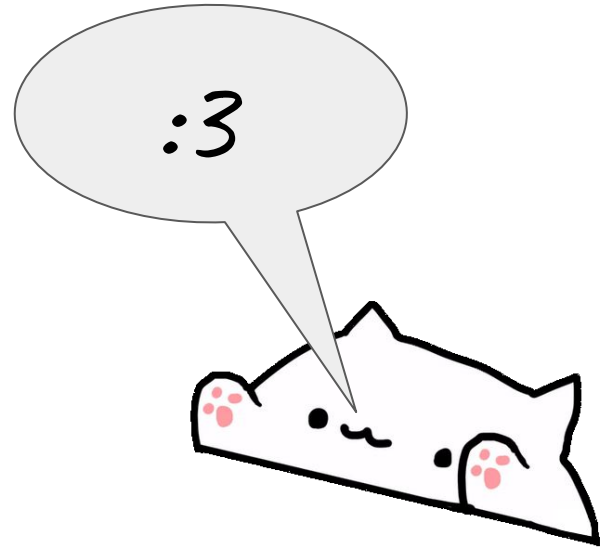
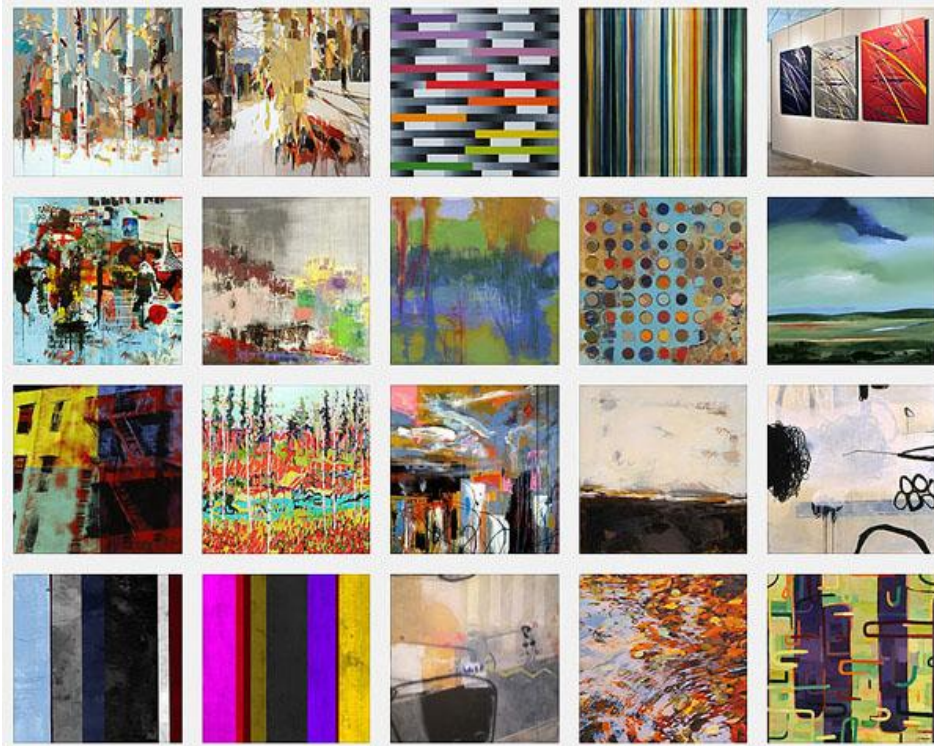
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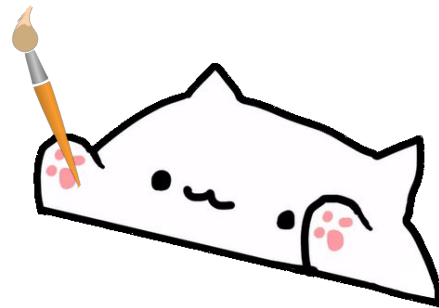
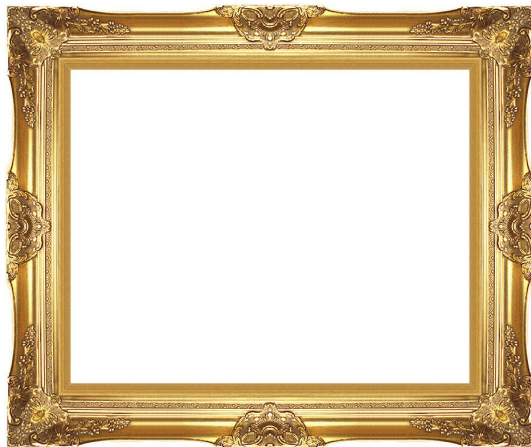
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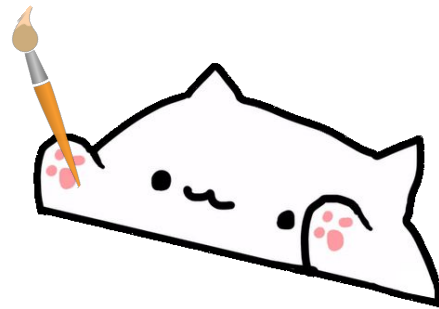
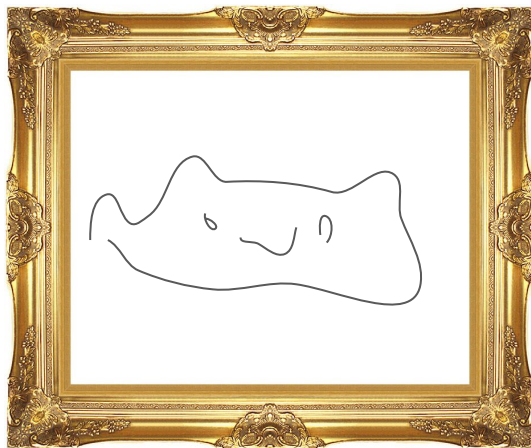
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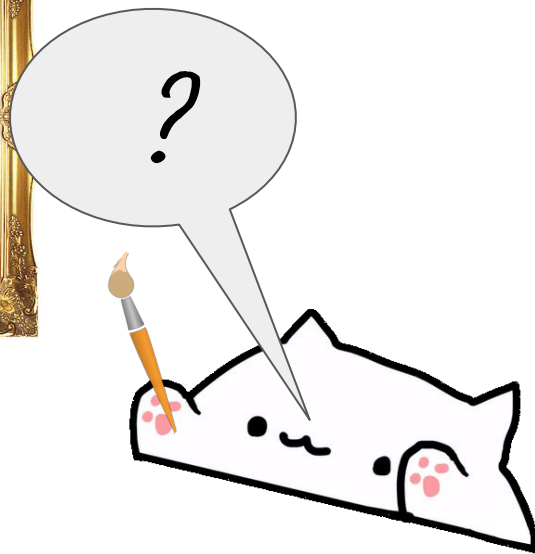
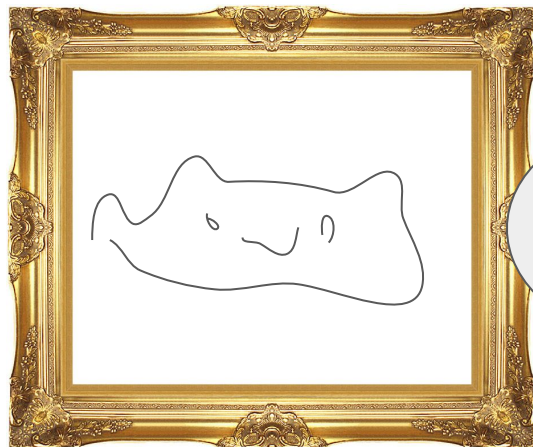
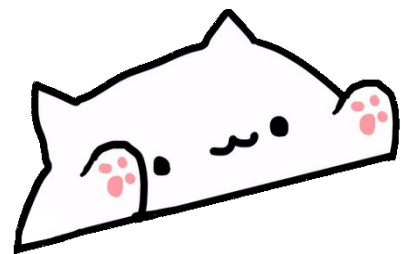
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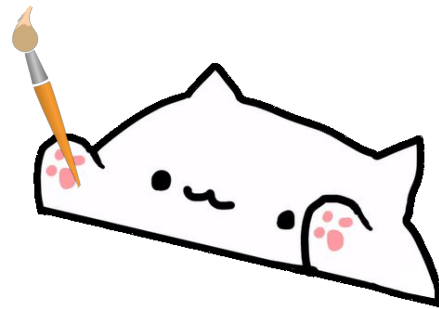
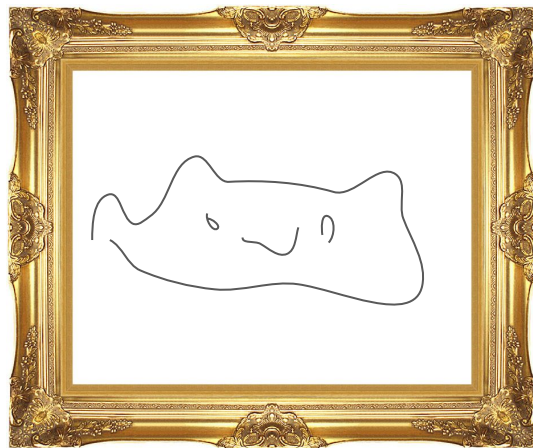
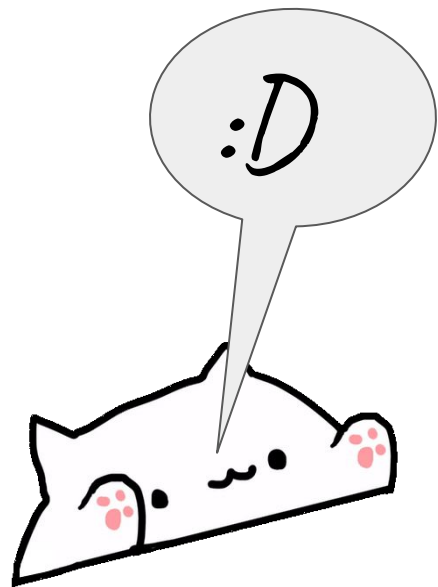
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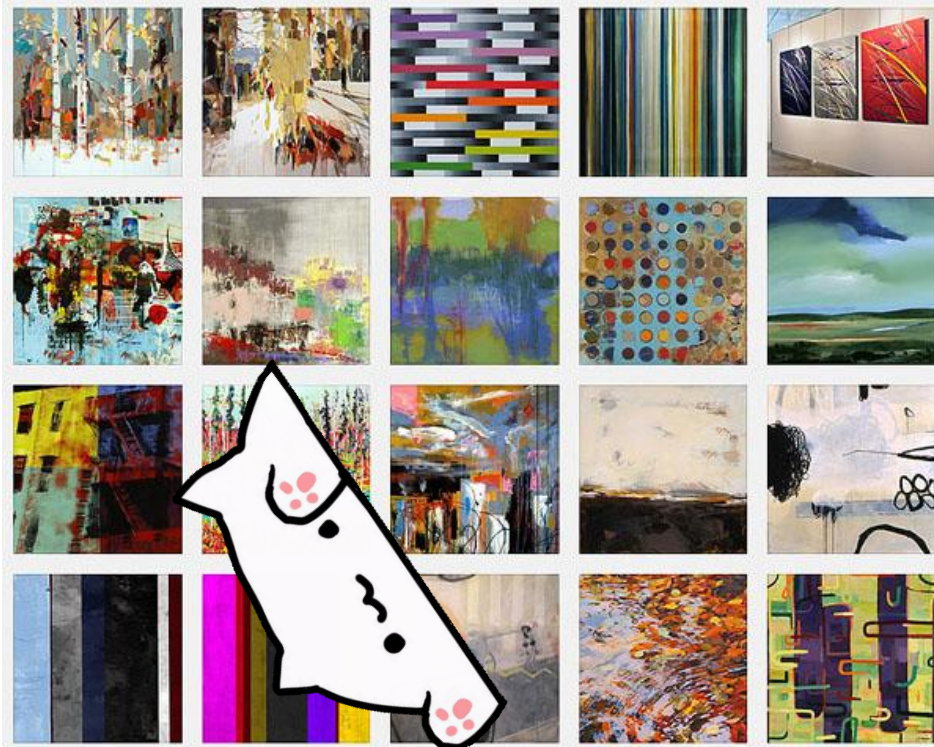
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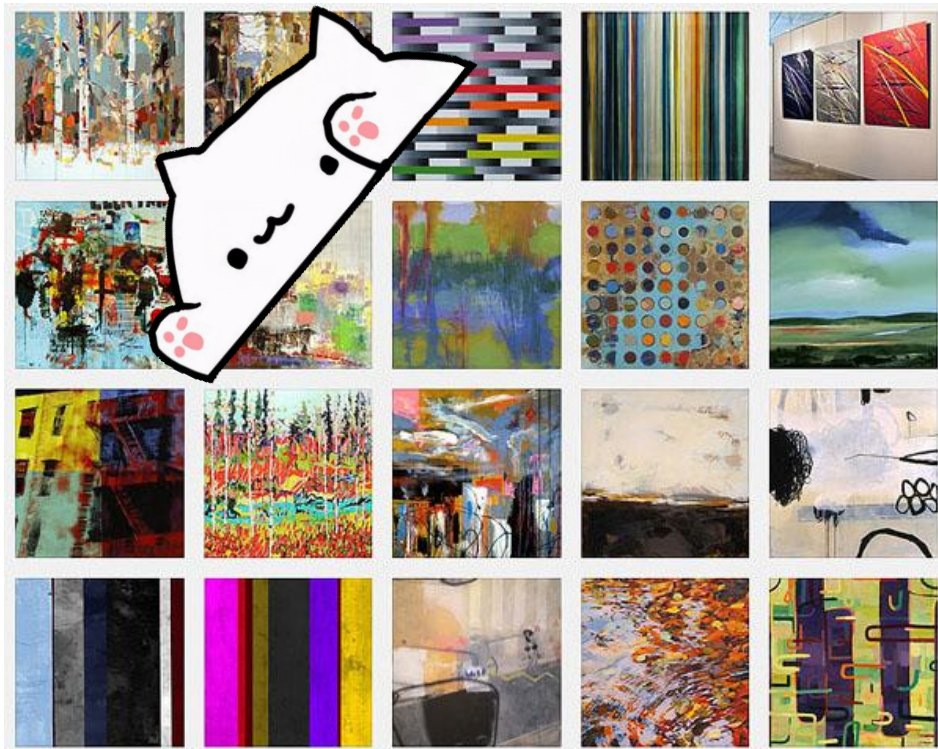
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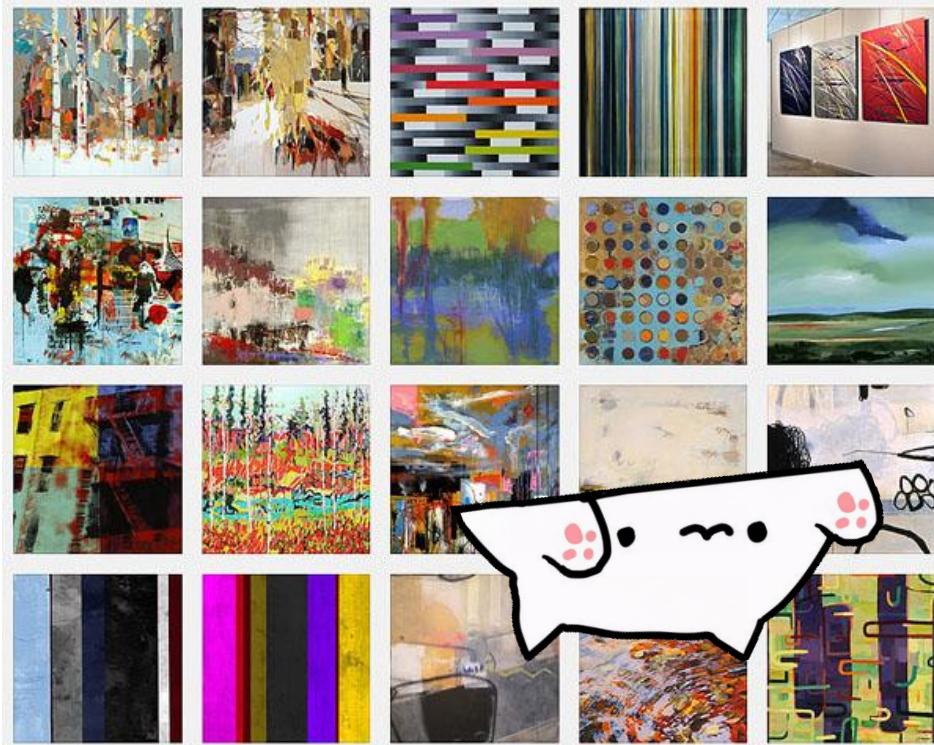
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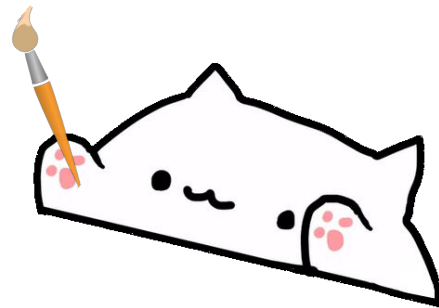
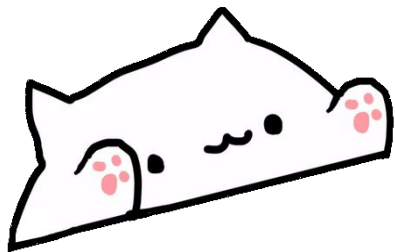
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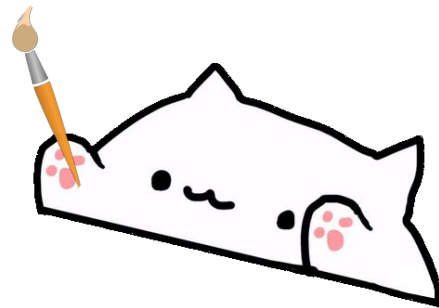
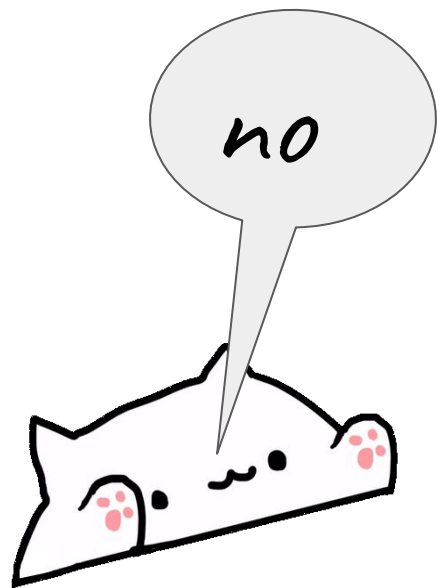
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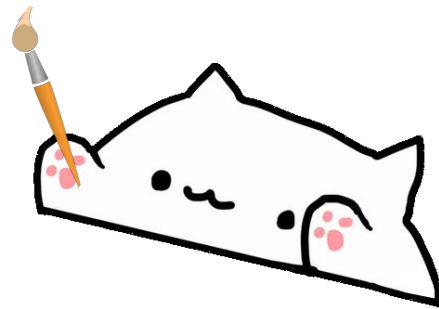
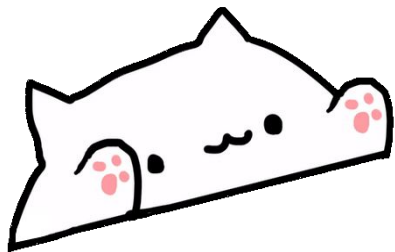
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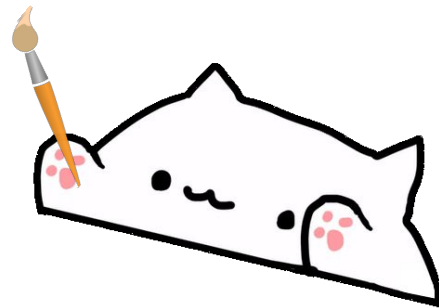
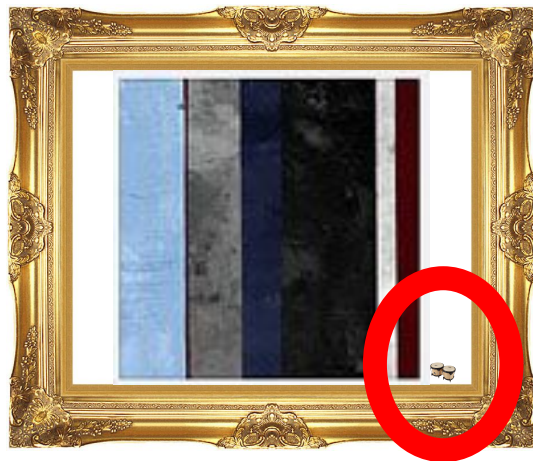
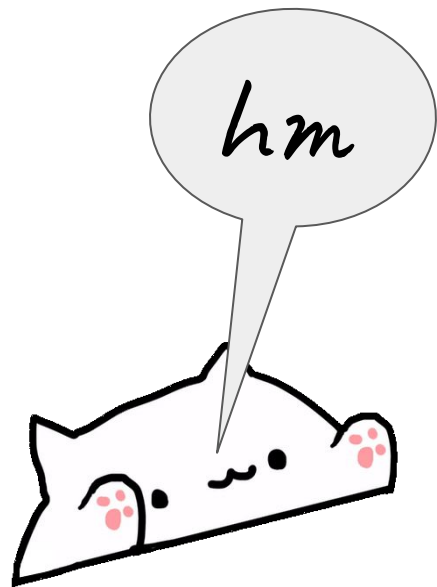
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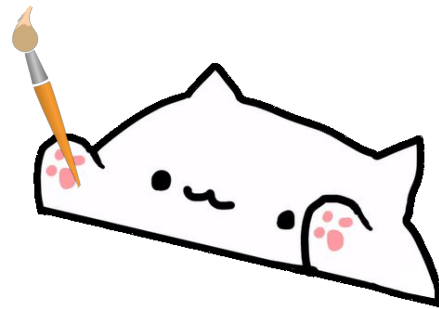
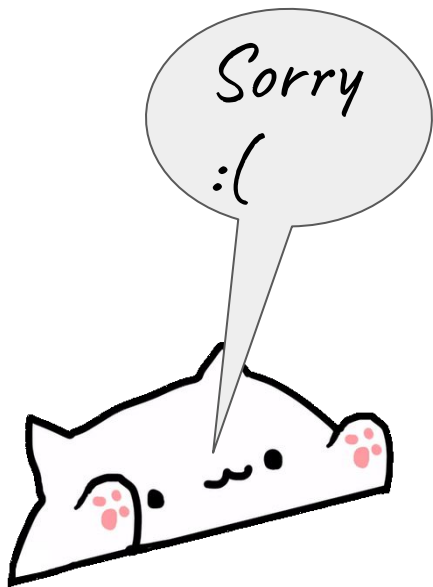
GAN on then son!

Generative Adversarial Network (GAN)



GAN on then son!

Generative Adversarial Network (GAN)



GAN on the son!

Generative Adversarial Network (GAN)

<https://www.deeplearningbook.org/>

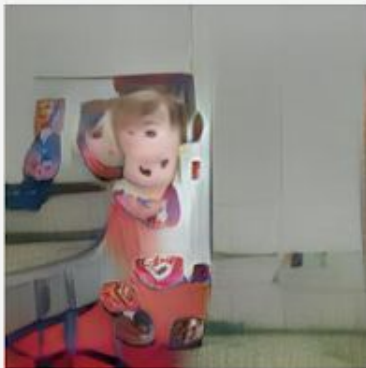
<https://www.cs.toronto.edu/~duvenaud/courses/csc2541/index.html>

A blue ocean with
waves|



Generated on t2i.cvalenzuelab.com, designed by
Cris Valenzuela.

A perfectly normal
child



Generated on t2i.cvalenzuelab.com, designed by
Cris Valenzuela.

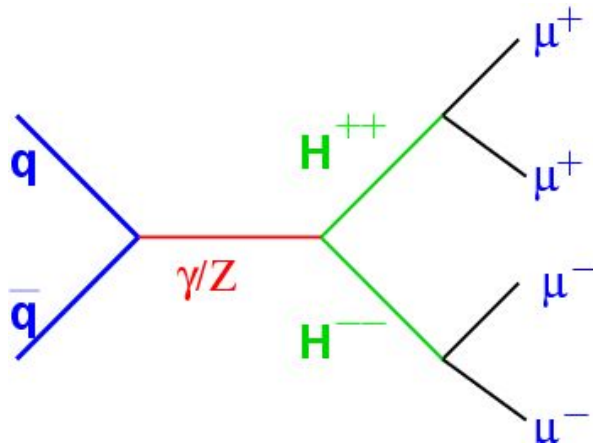
A picture of Brexit
aftermath



Generated on t2i.cvalenzuelab.com, designed by
Cris Valenzuela.

New HORIZONS

- Exotic doubly charged searches!
- ML useful in selection
- Statistical tools (e.g. Bayesian) for analysis





Website:
insights-itn.eu



Thanks for listening!

Tack så mycket!