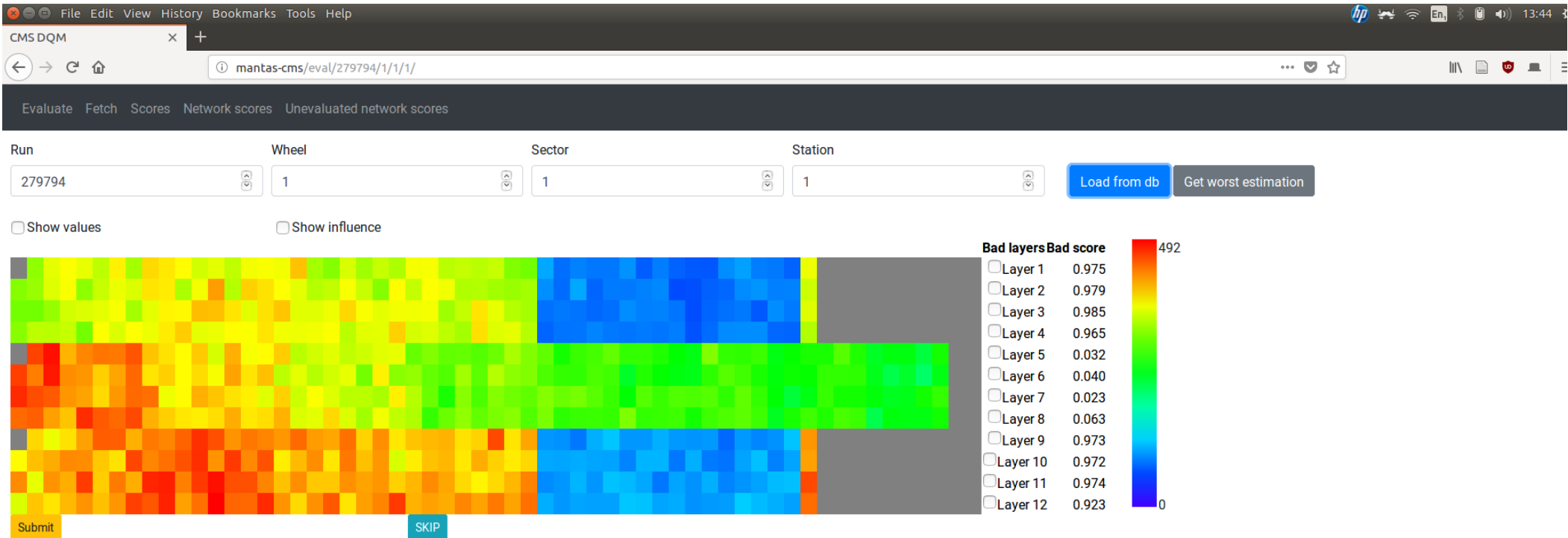


CMS-DQM + Active learning

- https://cmsweb.cern.ch/dqm/online/jsonfairy/archive/279794/Global/Online/ALL/DT/01-Digi/Wheel1/Sector2/Station3/OccupancyAllHits_perCh_W1_St3_Sec2
- $(12 \times 3 + 14) \times 5 = 250$ request per Run
- Processes by neural network
 - Removed negatives
 - Each row scaled to 1
 - Each row resized to 47
 - Evaluated with network
- Saved to MongoDB
- Active learning gui with Flask + JS/HTML/CSS

Active learning page



Loading data page

CMS DQM

mantas-cms/fetch/

Evaluate Fetch Scores Network scores Unevaluated network scores

Run

Run number Fetch

Identifier:	Status:	Status update time:	Network scores	
{run': 300005}	FINISHED	2018-09-11 15:50:21	Load	Delete
{run': 304740}	FINISHED	2018-09-04 10:48:59	Load	Delete
{run': 279794}	FINISHED	2018-09-04 10:48:49	Load	Delete
{run': 300003}	FINISHED	2018-09-04 10:48:38	Load	Delete
{run': 281976}	FINISHED	2018-09-04 10:48:28	Load	Delete
{run': 275310}	FINISHED	2018-09-04 10:48:17	Load	Delete
{run': 272011}	FINISHED	2018-09-04 10:48:07	Load	Delete
{run': 302635}	FINISHED	2018-09-04 10:47:55	Load	Delete
{run': 278822}	FINISHED	2018-09-04 10:47:45	Load	Delete

Statistics

CMS DQM					
mantas-cms/data/net_scores/					
Evaluate Fetch Scores Network scores Unevaluated network scores					
Identifier:	Params:	Network score:	Certainty score:	Evaluated bad layers	
{run: 279794}	{wheel: 0, 'station': 4, 'sector': 14}	0.952 0.947 0.305 0.497 -1.000 -1.000 -1.000 -1.000 0.990 0.989 0.912 0.722	0.00321	Skipped	Load
{run: 278822}	{wheel: -1, 'station': 3, 'sector': 1}	0.002 0.002 0.012 0.005 0.504 0.999 0.999 1.000 0.002 0.003 0.000 0.016	0.00367	[5, 6, 7, 8]	Load
{run: 302635}	{wheel: -2, 'station': 1, 'sector': 1}	0.000 0.000 0.504 0.000 0.349 0.043 0.009 0.001 0.001 0.001 0.003 0.002	0.00432	-	Load
{run: 281976}	{wheel: 0, 'station': 2, 'sector': 9}	0.015 0.495 0.238 0.003 0.000 0.011 0.004 0.002 0.002 0.000 0.001 0.008	0.00550	-	Load
{run: 281976}	{wheel: 0, 'station': 3, 'sector': 10}	0.013 0.003 0.006 0.002 0.102 0.351 0.745 0.494 0.009 0.027 0.015 0.053	0.00633	-	Load
{run: 302635}	{wheel: -1, 'station': 2, 'sector': 10}	0.000 0.000 0.003 0.000 0.001 0.013 0.507 0.007 0.015 0.003 0.000 0.000	0.00713	-	Load
{run: 302635}	{wheel: 1, 'station': 4, 'sector': 14}	0.001 0.000 0.000 0.001 -1.000 -1.000 -1.000 -1.000 0.303 0.005 0.513 0.492	0.00824	-	Load
{run: 302635}	{wheel: 2, 'station': 3, 'sector': 1}	0.154 0.018 0.000 0.068 1.000 1.000 1.000 1.000 0.000 0.866 0.509 0.000	0.00899	-	Load
{run: 278822}	{wheel: 2, 'station': 4, 'sector': 9}	0.000 0.008 0.002 0.004 -1.000 -1.000 -1.000 -1.000 0.018 0.511 0.002 0.000	0.01138	-	Load
{run: 302635}	{wheel: -1, 'station': 3, 'sector': 6}	0.097 0.064 0.513 0.339 0.000 0.000 0.000 0.000 0.001 0.001 0.001 0.004	0.01268	-	Load
{run: 302635}	{wheel: -2, 'station': 4, 'sector': 10}	0.098 0.001 0.487 0.003 -1.000 -1.000 -1.000 -1.000 0.000 0.000 0.000 0.016	0.01277	-	Load
{run: 279794}	{wheel: 2, 'station': 3, 'sector': 5}	0.841 0.000 0.001 0.000 0.025 0.485 0.039 0.142 0.000 0.000 0.000 0.004	0.01516	-	Load
{run: 278822}	{wheel: 1, 'station': 1, 'sector': 7}	0.000 0.000 0.000 0.000 0.004 0.273 0.001 0.006 0.360 0.517 0.893 0.736	0.01734	-	Load
{run: 272011}	{wheel: 1, 'station': 4, 'sector': 6}	0.000 0.001 0.000 0.001 -1.000 -1.000 -1.000 -1.000 0.715 0.927 0.897 0.481	0.01851	-	Load
{run: 304740}	{wheel: -2, 'station': 1, 'sector': 12}	0.481 0.104 0.000 0.027 0.002 0.006 1.000 0.003 0.001 0.001 0.001 0.001	0.01865	-	Load
{run: 304740}	{wheel: 2, 'station': 4, 'sector': 4}	0.519 0.342 0.551 0.068 -1.000 -1.000 -1.000 -1.000 0.332 0.201 0.155 0.045	0.01928	-	Load
{run: 302635}	{wheel: 0, 'station': 3, 'sector': 12}	0.008 0.480 0.278 0.020 0.728 0.068 0.460 0.199 0.629 0.804 0.653 0.027	0.01965	-	Load
{run: 302635}	{wheel: -1, 'station': 4, 'sector': 9}	0.013 0.520 0.010 0.019 -1.000 -1.000 -1.000 -1.000 0.000 0.066 0.003 0.004	0.02000	-	Load
{run: 302635}	{wheel: 1, 'station': 4, 'sector': 10}	0.000 0.000 0.000 0.000 -1.000 -1.000 -1.000 -1.000 0.014 0.194 0.524 0.039	0.02446	-	Load
{run: 278822}	{wheel: 1, 'station': 2, 'sector': 8}	0.000 0.000 0.001 0.001 0.136 0.525 0.010 0.023 0.008 0.007 0.000 0.029	0.02545	-	Load

Saliency maps [not fully working]

- Insight into neural network
- Steps:
 - After getting the neural network result, get gradients
 - Scale them
 - Fit into matrix

Run

302635



Wheel

-2



Sector

1



Station

1

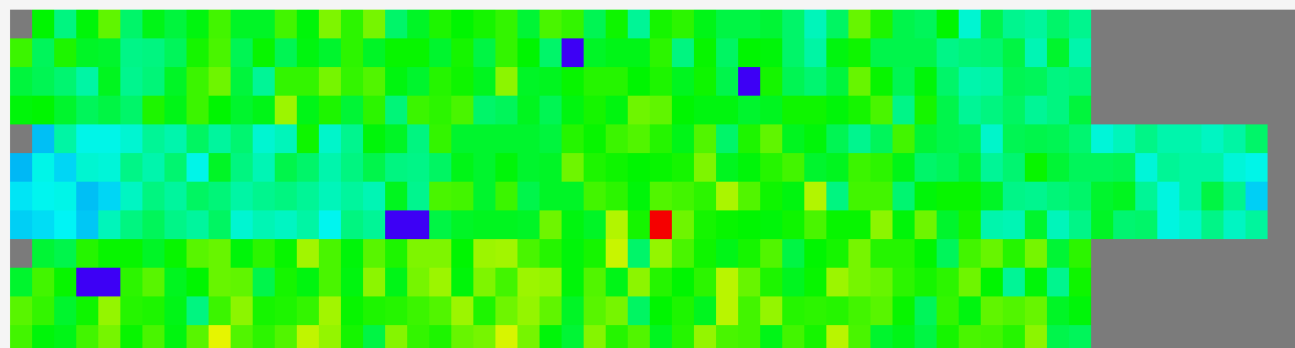


Load from db

Get worst estimation

☐ Show values

☐ Show influence



Submit

SKIP

Bad layersBad score

- ☐ Layer 1 0.002
- ☐ Layer 2 0.003
- ☐ Layer 3 0.001
- ☐ Layer 4 0.001
- ☐ Layer 5 0.001
- ☐ Layer 6 0.009
- ☐ Layer 7 0.043
- ☐ Layer 8 0.349
- ☐ Layer 9 0.000
- ☐ Layer 10 0.504
- ☐ Layer 11 0.000
- ☐ Layer 12 0.000



Run

302635



Wheel

-2



Sector

1



Station

1

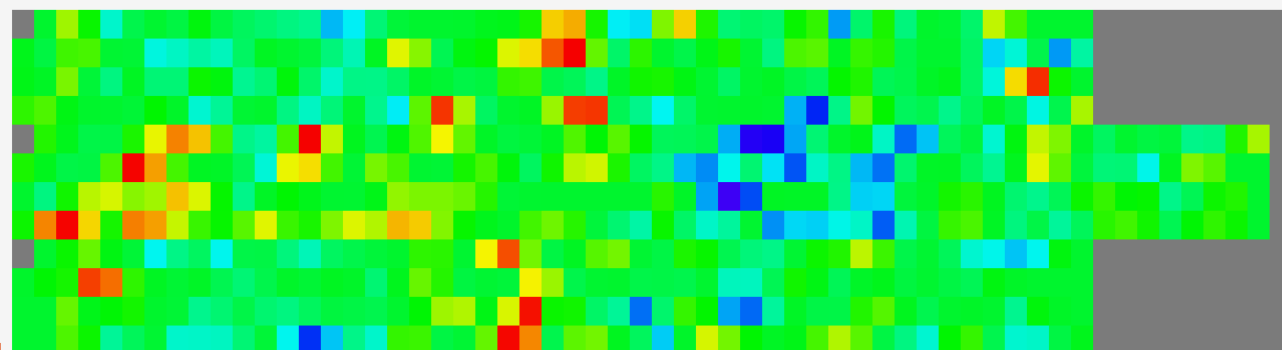


Load from db

Get worst estimation

☐ Show values

☒ Show influence

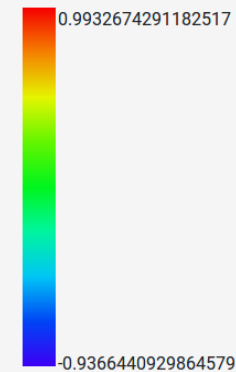


Submit

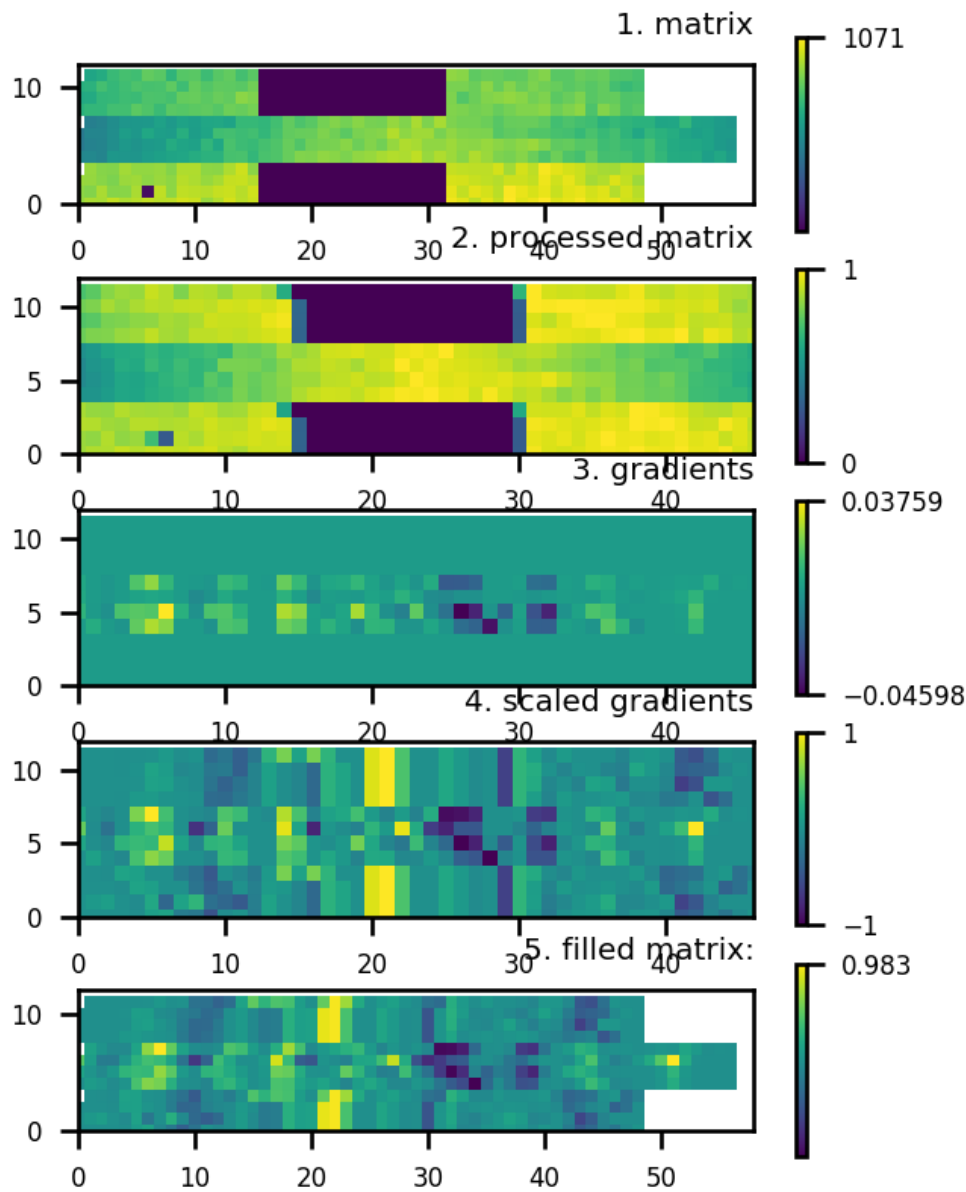
SKIP

Bad layersBad score

- ☐ Layer 1 0.002
- ☐ Layer 2 0.003
- ☐ Layer 3 0.001
- ☐ Layer 4 0.001
- ☐ Layer 5 0.001
- ☐ Layer 6 0.009
- ☐ Layer 7 0.043
- ☐ Layer 8 0.349
- ☐ Layer 9 0.000
- ☐ Layer 10 0.504
- ☐ Layer 11 0.000
- ☐ Layer 12 0.000



Saliency map steps



Todo

- Somehow fix saliency maps
- Export / Import
- More statistics
- Reevaluate button
- Paging in statistics pages
- Web design / UX fixes
- Deploying