

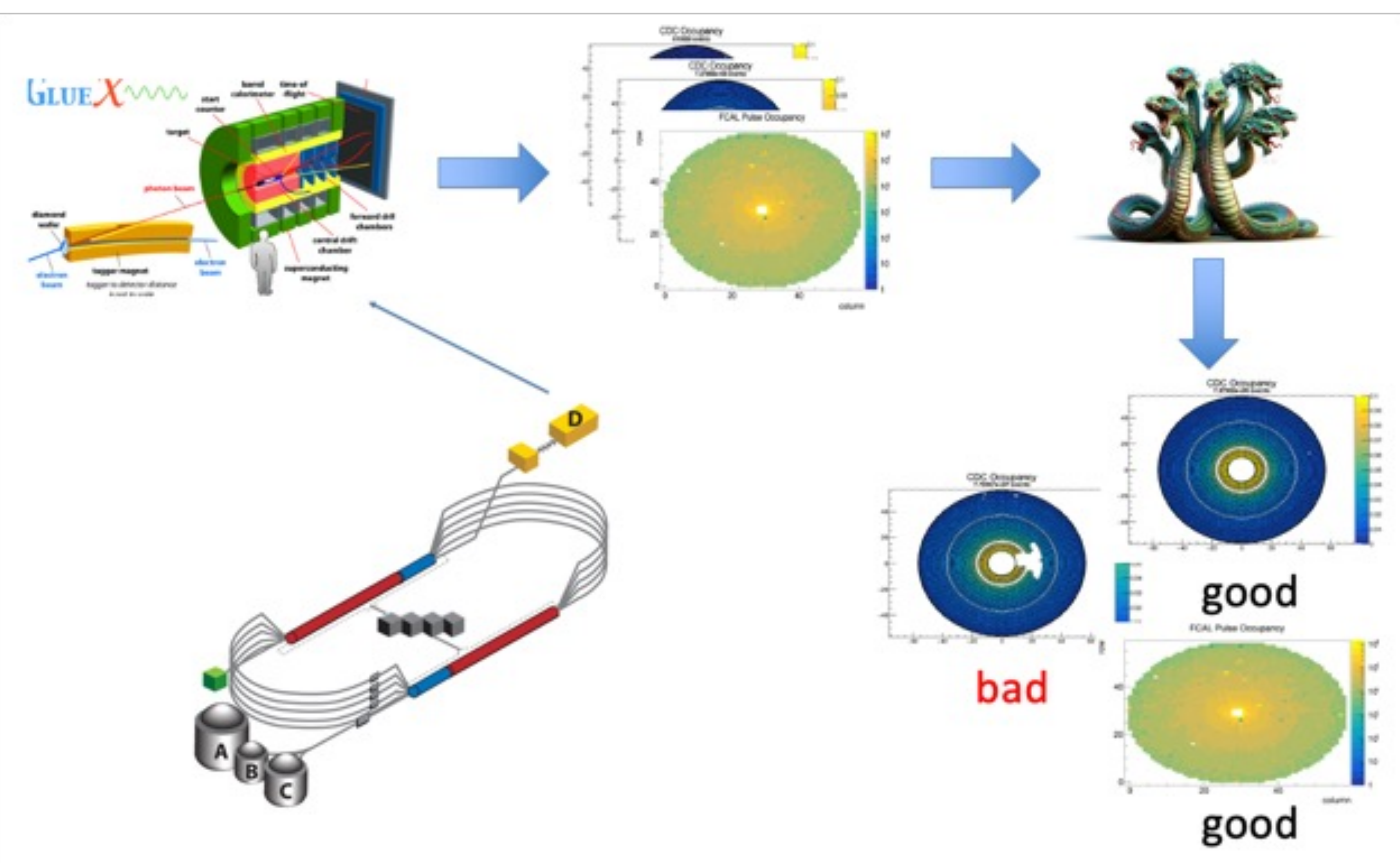
# Hydra: Computer Vision for Data Quality Monitoring

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## HYDRA IS AN EXTENSIBLE FRAMEWORK FOR TRAINING AND MANAGING AI/ML FOR NEAR REAL-TIME MONITORING

Used to aid shift crews and monitoring coordinators with the tedious tasks of data quality monitoring, it watches incoming data for signs of problems and notifies the shift crew via visual and/or audible alarms. It is deployed in all experimental Halls at Jefferson Lab. The back end consists of a comprehensive database, while a web based front-end is used for efficient labeling as well as viewing the status from anywhere in the world.



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## WEB-BASED LABELING AND PUSH BUTTON TRAINING

Web application for labeling allows experts to label hundreds of images very quickly. Labels for each monitoring image are stored for use in training and model validation. Hydra is configured to save images (e.g., "Bad") it thinks it needs for future training and validation. Training time can be reduced by balancing the number of images with each label to the number of "Bad" images with no loss of accuracy.

## REAL TIME ANALYSIS

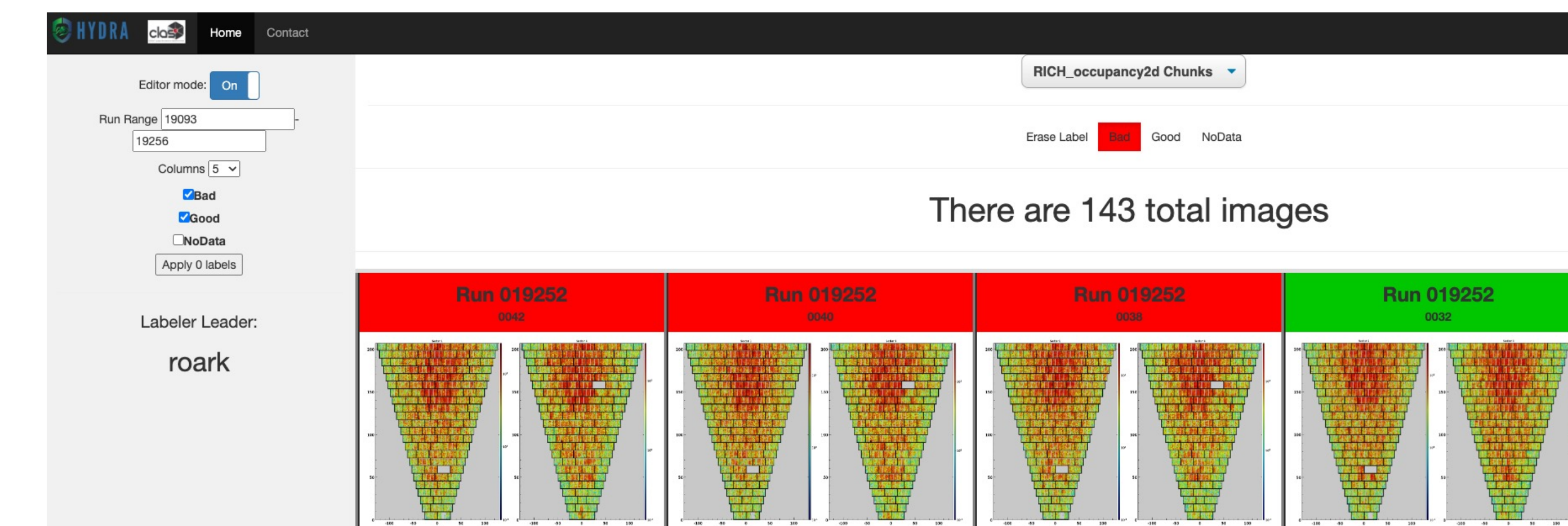
Each experimental hall has their own dedicated page to monitor Hydra's predictions during an experiment and a Grafana dashboard to monitor predictions over time. Each panel shows:

- The monitoring histogram
- The current run number
- The date and time corresponding to the image
- The prediction and confidence
- GradCAM heatmap to indicate bad regions of plots

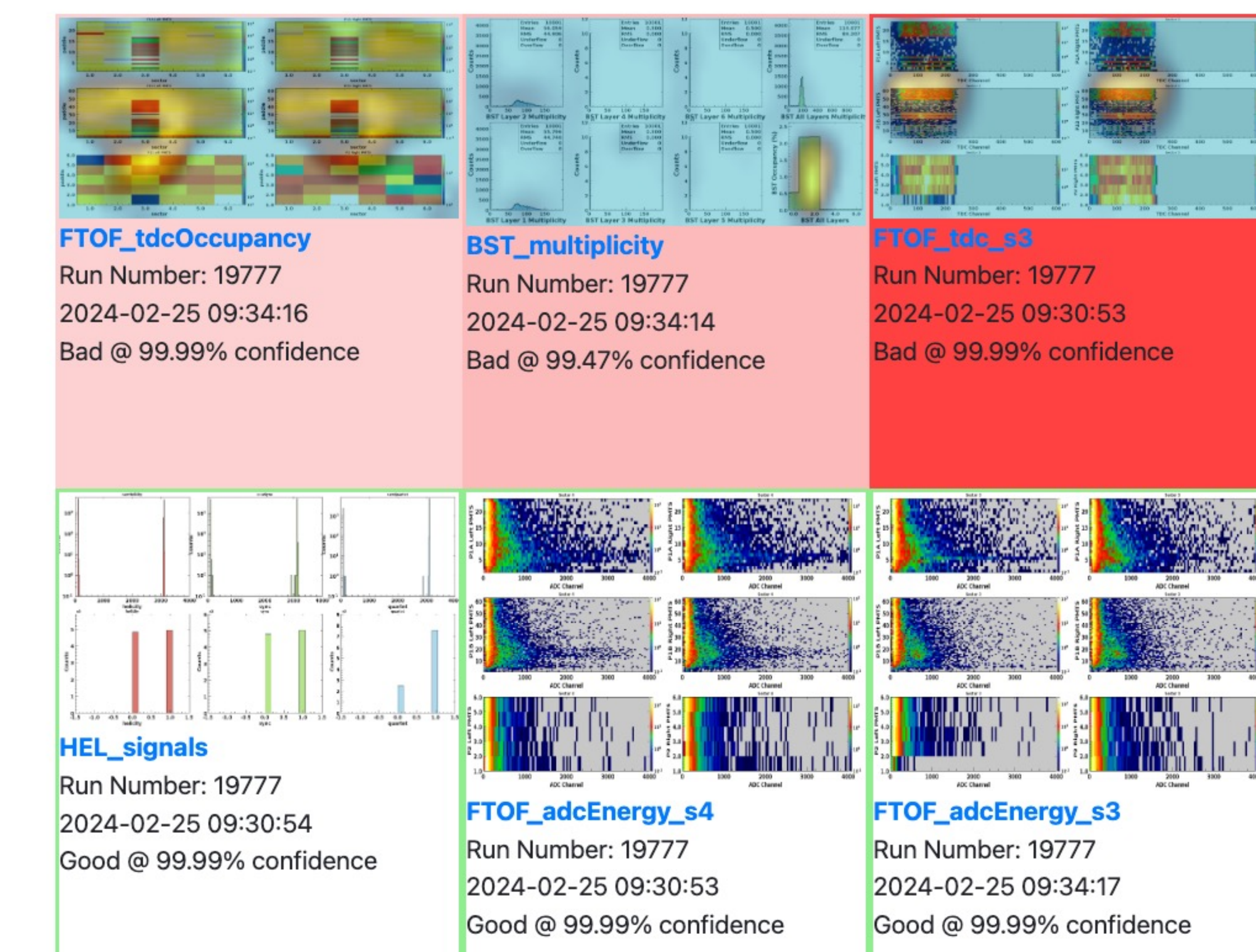
## DEVELOPMENTS

Here are some of the features we are working on:

- Kubernetes based Hydra
- Multimodal models
- Multistage inference
- Improving system monitoring across all deployments



**HYDRA** 19777 Last Update: 1.95 (s) ago  
showing 73 / 73 images



	Hall A	Hall B	Hall C	Hall D
Labeled Images	5438	202,838	Generated	139,218
Plot Types	42	73	-	13
Active Models	0	36	-	10
Chunk size / frequency	-	73 images / 3-5 min	-	10 images / min
<b>Total images Analyzed</b>	-	<b>755,136</b>	-	<b>&gt;1,101,160</b>