

Final Project

Final Project (30%)

General Guideline

- 2 or 3 students form a team
- All team members in a team will receive the same score
- Feel free to use open-source programs in your project, but you should have your own contributions (need to highlight them in your presentation).

Project Topics

- ✓ For each group, you need to **define your own topic of anomaly detection project** and solve it.
- ✓ You are not limited in any pre-defined topic or using any specific dataset, but the topic needs to be related to anomaly detection.
- ✓ **Each team need to clearly define your selected topic and task for the final project** in your proposal.
- ✓ The topics include:
 1. Time Series Anomaly Detection
 2. Image Anomaly Detection
 3. Video Anomaly Detection
- For image anomaly detection topics, we encourage you select a topic from the two suggested topics in CVPR'24 VAND 2.0 Workshop:

CVPR'24 VAND 2.0 Challenges

VAND 2.0 Challenge 1: Adapt & Detect: Robust Anomaly Detection in Real-World Applications

VAND 2.0 Challenge 2: VLM Anomaly Challenge: Few-Shot Learning for Logical and Structural Detection

- **Challenge time:** April 15th – June 1st
- **Registration Opens:** April 15th
- **Dataset Release:** April 15th
- **Submission Deadline:** June 1st
- **Results Announcement:** June 7th

Be careful! You need to take your computing resources into account when you decide your topic. If you have limited computing resources, you are suggested to choose the **VAND 2.0 Challenge 2**.

Reference: [VAND2.0 Challenge at CVPR - Hackster.io](https://hackster.io/vand20-challenge-at-cvpr)

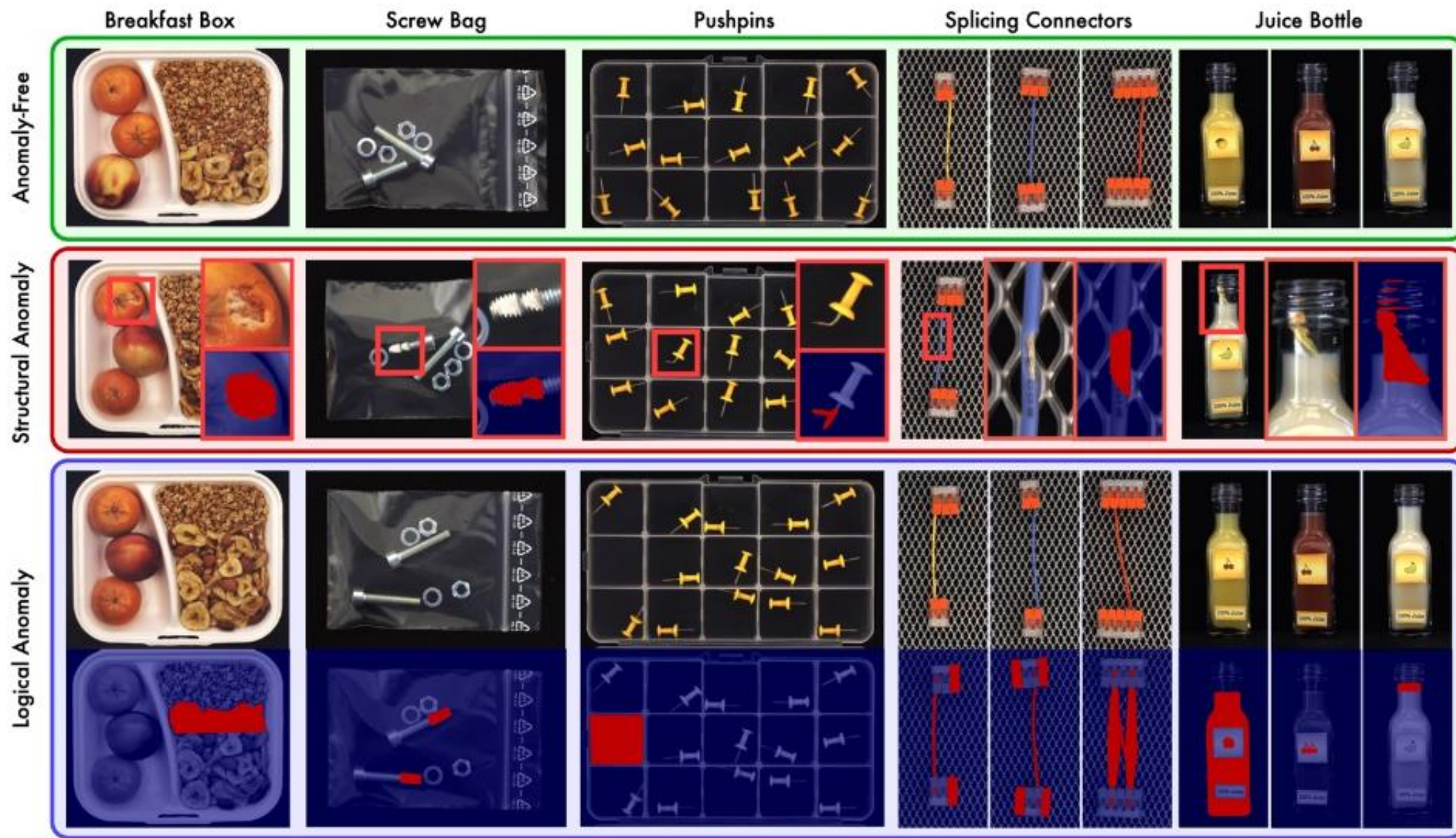
Challenge 1: Adapt & Detect: Robust Anomaly Detection in Real-World Applications

- Participants will develop anomaly detection models that demonstrate robustness against external factors and adaptability to real-world variability.
- Many existing anomaly detection models are trained on normal images and validated against normal and abnormal images. They often struggle with robustness in real-world scenarios due to data drift caused by external changes like camera angles, lighting conditions, and noise.
- This challenge focuses on developing models that can handle this real-world variation.
- Dataset: Training data in [MVTec Anomaly Detection \(MVTec AD\)](#) for training, and random perturbation to the test set of MVTec AD to simulate the domain shift before evaluation.
- Evaluation: image level and pixel level F1-max scores

Challenge 2: VLM Anomaly Challenge: Few-Shot Learning for Logical and Structural Detection

- Participants will create models using few-shot learning and VLMs to find and localize structural and logical anomalies in the [MVTec LOCO AD dataset](#), which contains images of different industrial products showing both defects. This shows that the models can handle structural defect detection and logical reasoning.
- Participants can pre-train their models on any public dataset except the MVTec LOCO dataset, ensuring the challenge focuses on few-shot learning capability.
- This challenge uses the [MVTec LOCO AD dataset](#). This dataset contains images of different industrial products, showing structural and logical anomalies.
- For each few-shot learning scenario, k normal images are sampled randomly from the train set of the MVTec LOCO dataset.

MVTec LOCO AD dataset



Project Evaluation and Schedule

- The project will be evaluated based on the following:
 - Project proposal pdf file within 2 pages [due on 5/9, 11:30pm] (10%)
 - Project presentation in class [6/4 & 6, 10:10am-12pm] (60%)
 - Evaluation criteria
 - Novelty, Completeness, Performance
 - Final Report (30%) (due: 11:30pm 6/12/2024)

Project Proposal

- ✓ Find your teammates with **less than or equal to 3 people** in a group for the final project. All the team members share the same final project scores.
- ✓ The project proposal should be within 2 pages and submitted in a pdf file.
- ✓ The proposal should include the following information:
 1. Project topic
 2. Team members
 3. Project Goal
 4. Problem/task description
 5. Method/approach description
 6. Datasets to be used
 7. Expected outcome
 8. References (papers & codes)

Project Presentation

- On-line Google form submission of your presentation order (team-based) based on first-come first-serve rule
 - TBD (during the week 5/27-31)
- Project Presentation: about 10-minute presentation + 5-minute Q&A
- Your presentation should focus on your contributions in this project