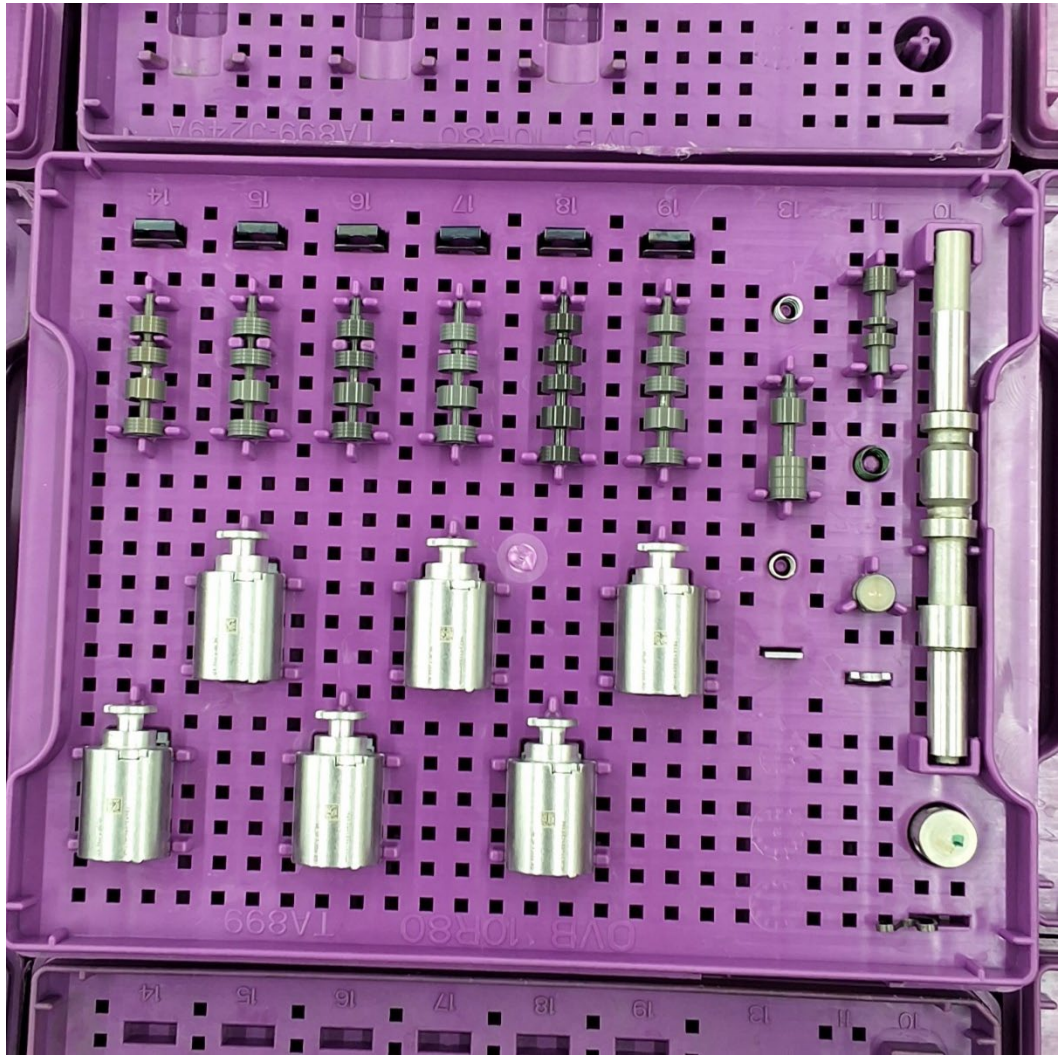
Term Projects: Applying EC techniques to find optimized DL models for suggested projects or your own project

Fall 2025

V2 Updated on Oct 13

Suggested Project 1: Find Defective Pallets

- Jayshop: Empowering disenfranchised and disabled workers through gainful employment
- Video: https://photos.app.goo.gl/7MLvciFa5YoqARHXA
- Need GPU



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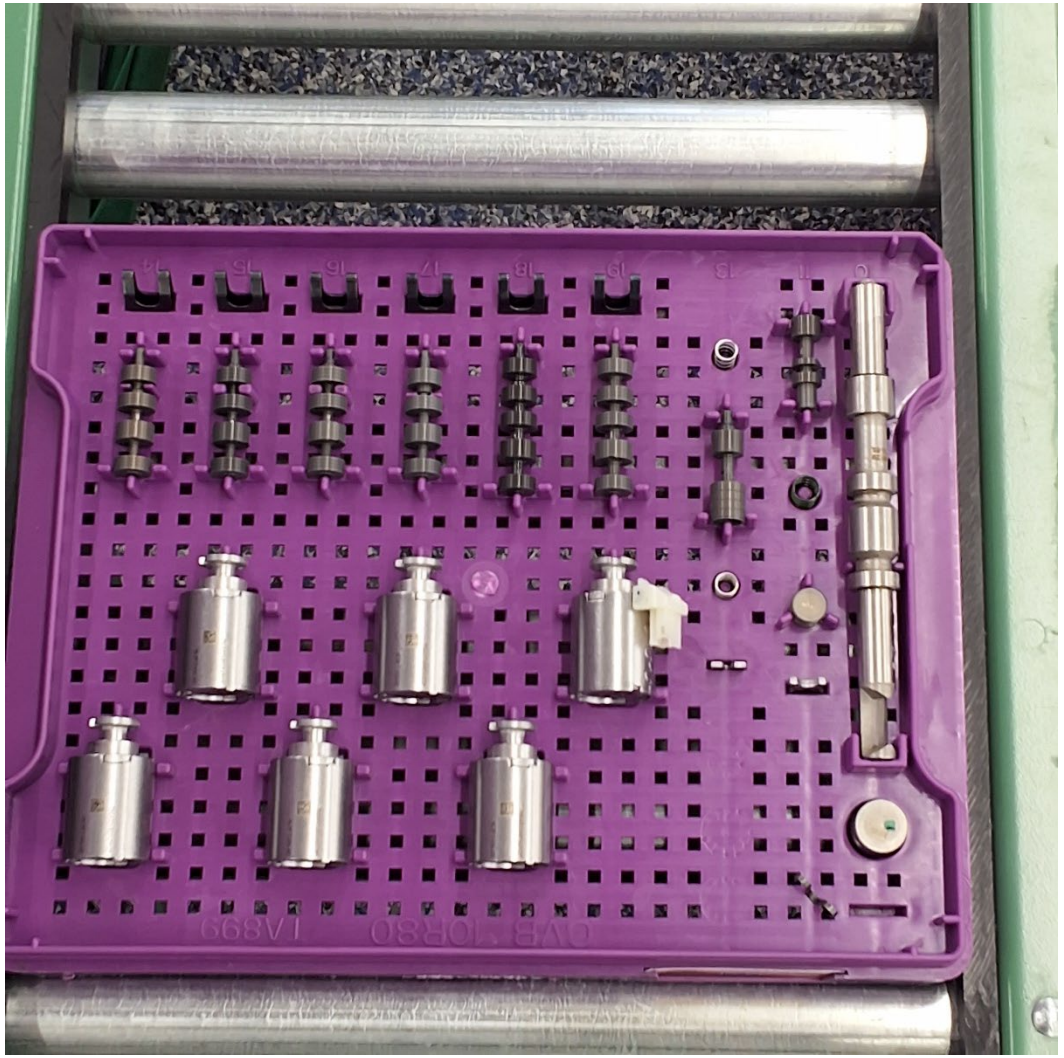

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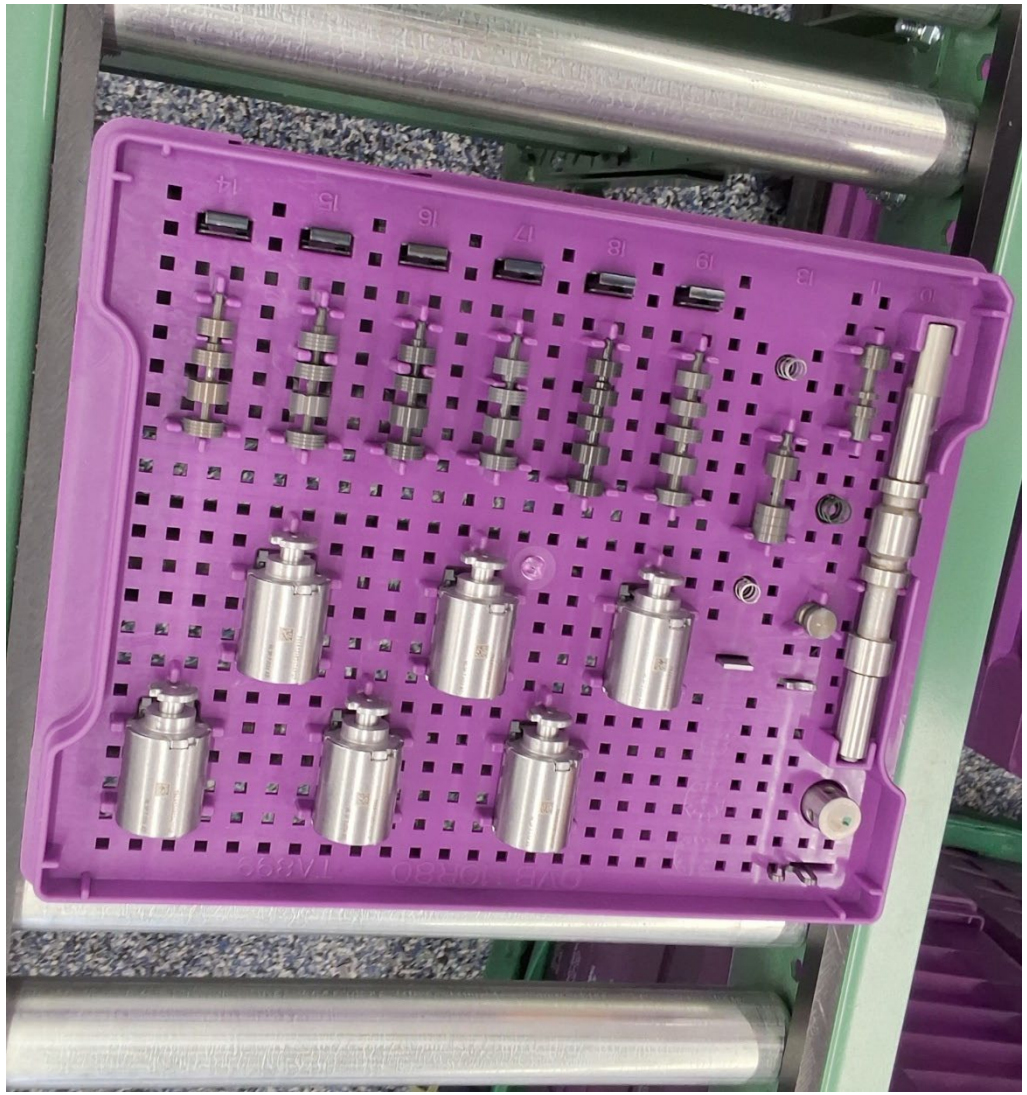

Good

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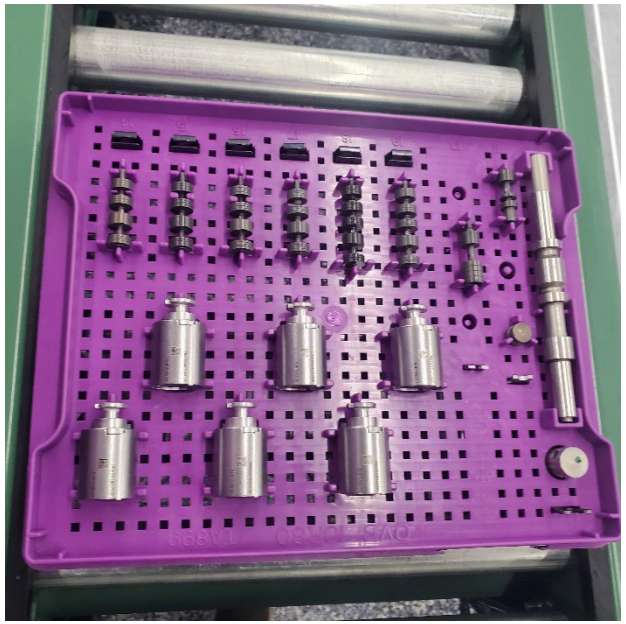
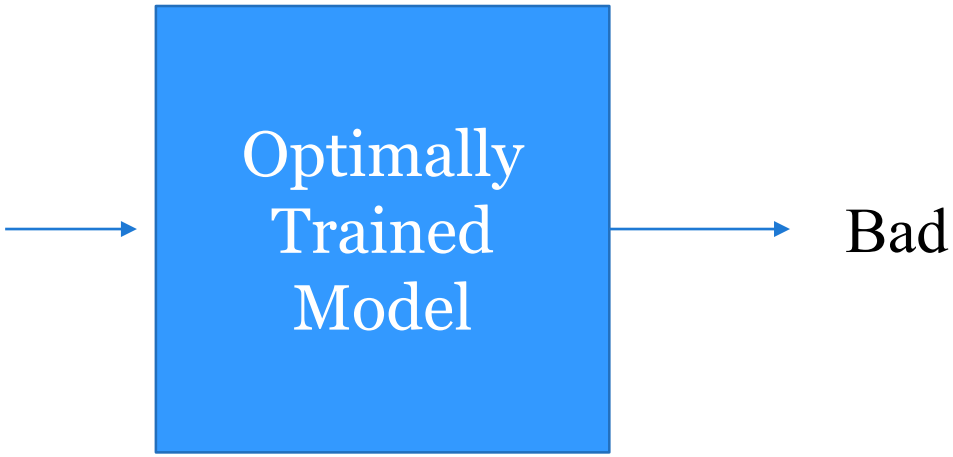
Test





ES(1+1) with 1/5 rule
Another Evolutionary Algorithm
Random Search

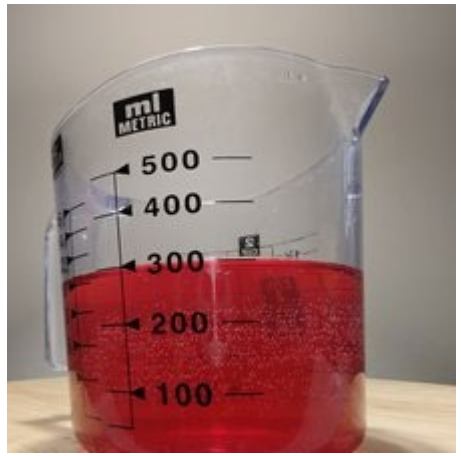
Suggested Project 2: Regression Proble - Estimate the volume of a measuring cup in ML

100 ml

150 ml

200 ml

250 ml



300 ml

350 ml

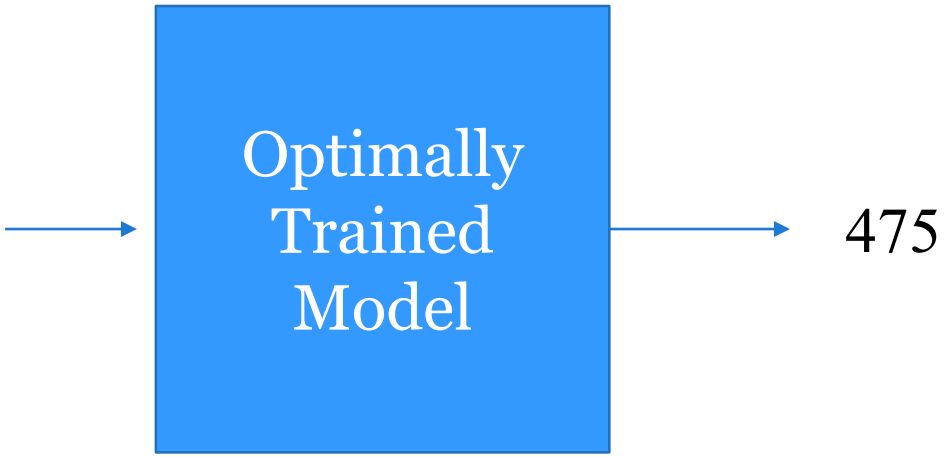
400 ml

450 ml

500 ml

Need GPU

Test



ES(1+1) with 1/5 rule
Another Evolutionary Algorithm
Random Search

Suggested Project 3: Leveraging EC for Your Own Image Classification or regression Problem

- Application must be unique. (Real-world project preferred)
- Required Model Optimization Algorithms
  - ES(1+1) with 1/5 rule
  - Another Evolutionary Algorithm such as using Cov. Matrix or Genetic Algorithms
  - Random Search

Suggested Project 4: Time series forecasting with Multivariate Time Series Datasets – *Extension of HW5*

- ES(1+1) with 1/5 rule
- Another Evolutionary Algorithm such as GA or Cov. Mat.
- Random Search
- You may not need GPU

Suggested Project 5: sequence-to-sequence (seq2seq) time series prediction using "Jena Weather Dataset"

- Seq2Seq time series prediction means using past time-series data (a sequence) to predict future time-series data (another sequence) — not just one next point, but several future steps.
- Multi-step horizons (Not just one step ahead)
- Optimize the model using 2 EAs
- https://www.kaggle.com/datasets/harishedison/jena-weather-dataset/data

Suggested Project 6 – Any research oriented project using EC and DL

- Must prepare a draft poster or paper at the end the semester

Use Discussions to express your initial interest

- Choose one out of 6 suggested projects.
- Group project possible up to 2 members
- **Due by Sat. Oct 18**
- Final decision/approval must be done by **Wed. Oct 22**

Project Evaluation

- Completed as planned?
- Functionality: Work as intended?
- User Interface (if applicable): Is the project user-friendly and accessible?
- Complexity: Is the project appropriately challenging for a senior-level?
- Code quality: Is the code clean, maintainable, and well-documented? Are best practices, standards followed?
- Size: not too small for a semester project?
- Others
  - Innovation? Does the project demonstrate creativity or a novel approach?
  - Scalability: Could the project handle growth in users or data volume?
  - Documentation (Poster, Papers)
  - Peer evaluation
  - …

Project Evaluation II

- Expected final product: A poster for Research Day, April ?, 2026
- Clearly specify the author of each result
- Clearly specify the author of each poster section/subsection
- Peer evaluation