CHPB-39-2019: Automated Compressor Performance Mapping

Objective:

- Demonstrate the **feasibility** and **reliability** of the proposed **automated performance mapping** hardware and methodology based on **machine learning**

Problem

- Understand and optmize the **minimum data set** required to **train an ANN model**

Expected Results / Impact:

- **Generalized compressor mapping** methodology that **overcomes shortcomings of existing standards**
- **Reduce** expensive time spent in the laboratory
- **Automated identification** of compressor operating evelopes
- **High accuracy** performance mapping

Approach:

- Gather a diversified data set for different compressor types from previous experimental studies
- Utilize PDSim to further extend the data set
- Develop, train, and validate different deep-learning models with focus on MIMO ANN models
- Utilize PDSim as the “virtual calorimeter“ to develop the mapping algorithm

Schedule

Tasks / *Months*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
Project Startup	■											
Generation of Compressor Data Sets		■	■	■								
Development Machine Learning Compressor Map Models					■	■	■					
Numerical Sim. Of Automated Mapping								■	■	■	■	■
Final report												■

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Automated Compressor Performance Mapping (Equipment)

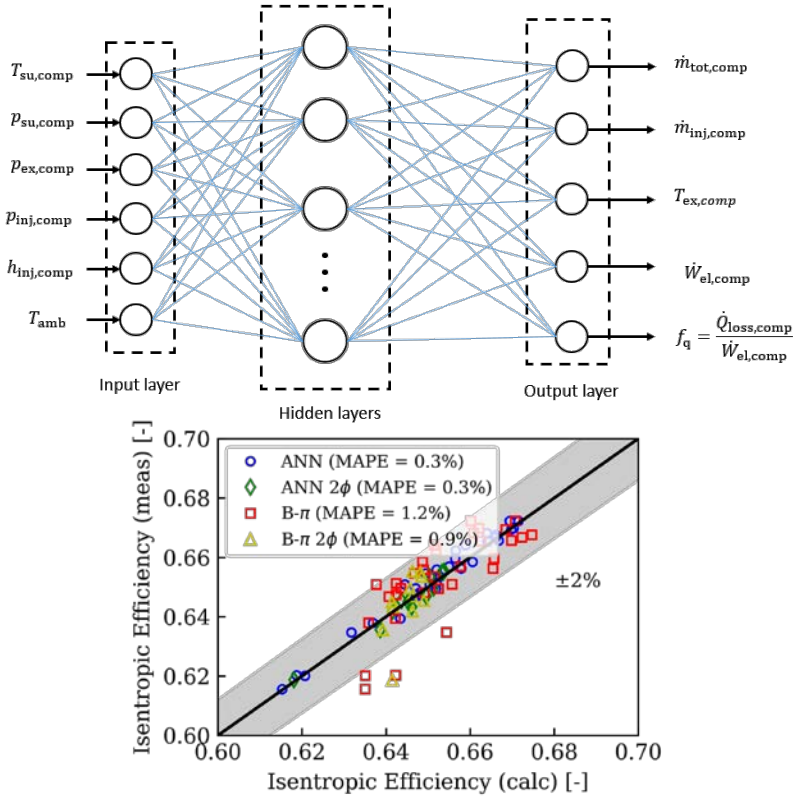

Figure 1: ANN model development and validation: single- and two-phase Injected hermetic scroll compressor

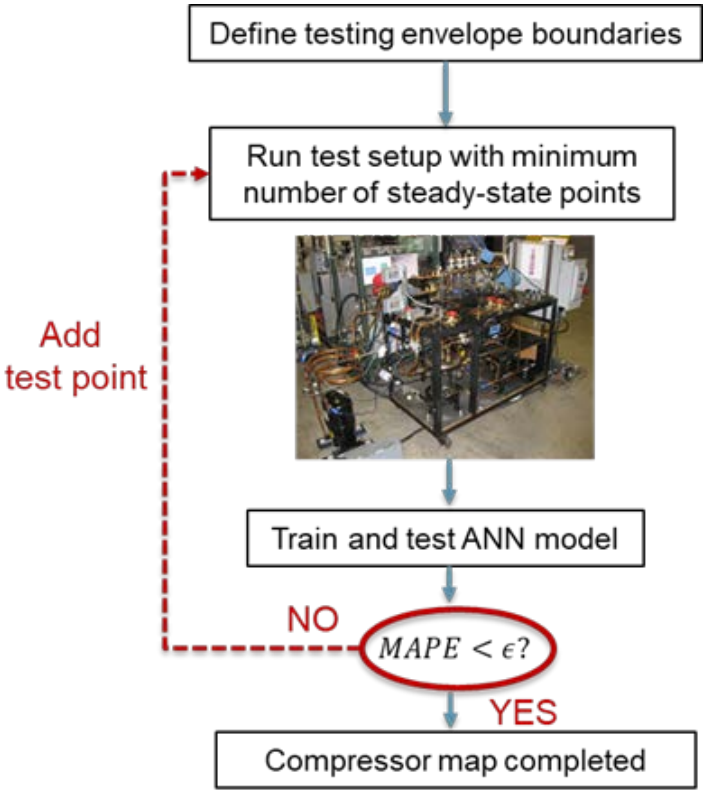

Figure 2: Automated mapping procedure

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