



Wing Damage Estimation

using SliceLearn, a deep learnt shape model

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1 The Challenge

Wing damage is related to many biological factors and so estimating it is an important task, however small variations in shape make **damage estimation** difficult using traditional methods therefore we turn to deep learning to fit a more **general shape** model

2 Datasets

- | Slides | Live Bee |
|--|--|
| <ul style="list-style-type: none"> - Standard POV - Standard Lighting - Full Wing Visible - Used as training | <ul style="list-style-type: none"> - Variable POV - Variable Lighting - Wing partially obscured - Object of interest |

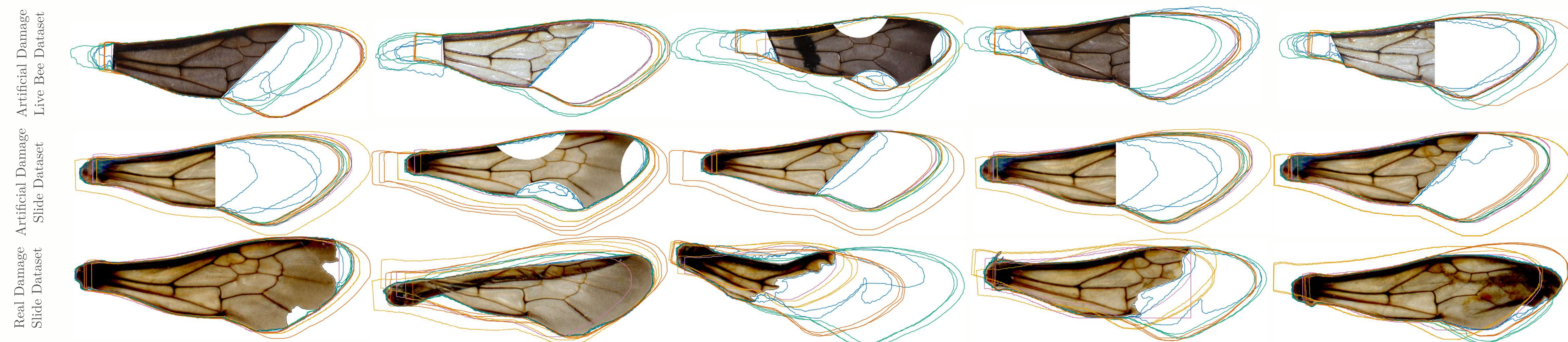
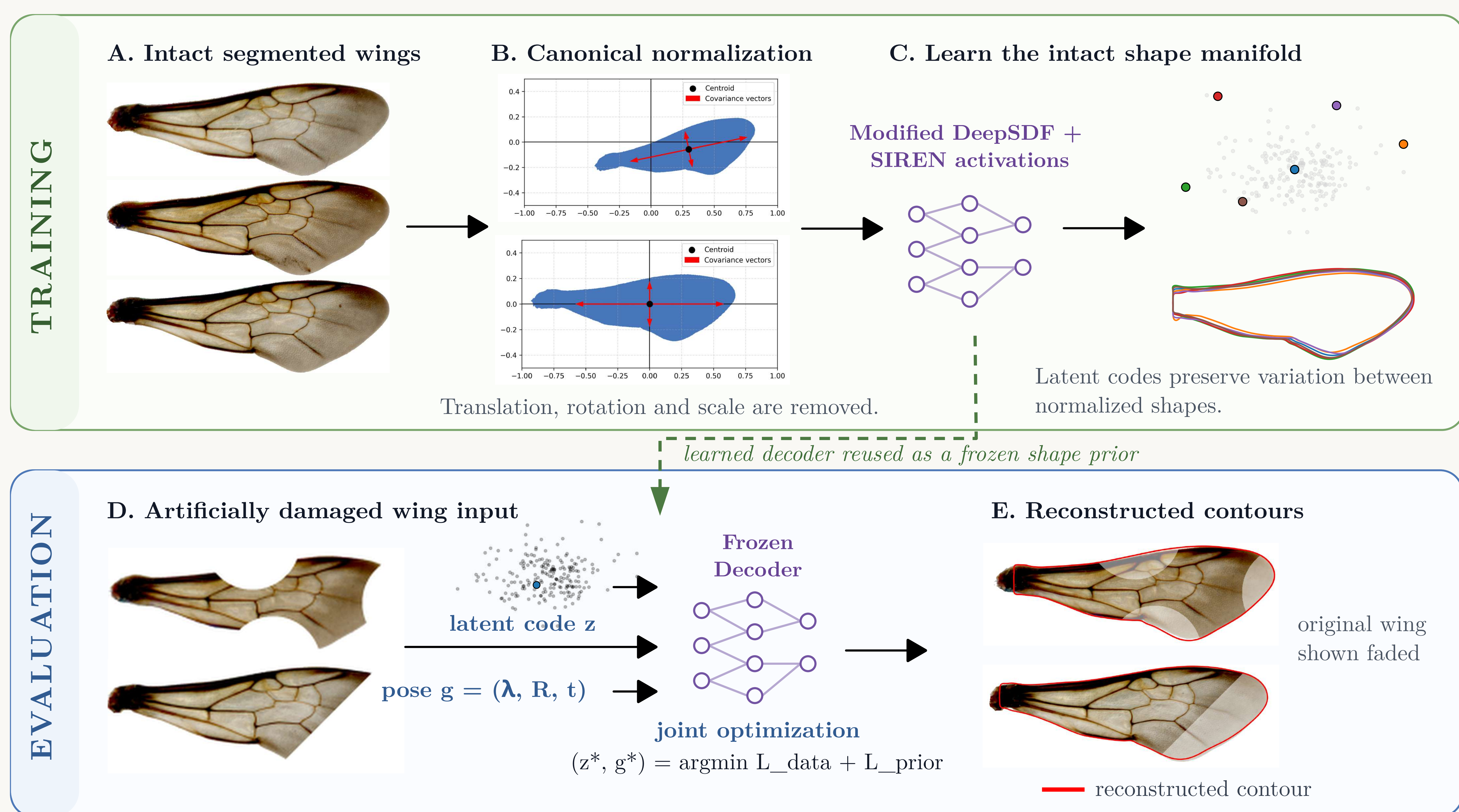
4 Results

Slicelearn worse in-distribution estimation, but

- exhibits better generalization to new datasets
- 44X fewer parameters than TransCNN-HAE

Mean Absolute Error		
Model	Slides	Live Bees
TransCNN-HAE	2.30±0.15	11.29±6.56
Registration	3.79±0.44	4.92±2.37
SliceLearn	4.26±1.90	2.69±0.97

3 SliceLearn Method - Training and Evaluation



Registration (mask) TransCNN-HAE (mask) SliceLearn
 Registration (segmentation) TransCNN-HAE (segmentation) Ground truth / observed damaged wing

