Marcio Fleming

7th EMship cycle: October 2016 – February 2018

Master Thesis

Accuracy Control and Welding Distortion Prediction in a Deck Plate

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Co-supervisor: Prof. Jean-David Caprace, Federal University of Rio de Janeiro, Rio de Janeiro, Brazil
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Reviewer: Prof. Hervé Le Sourne, Institut Catholique d'Arts et Métiers, Nantes, France

La Spezia, February 2018

Contents:

Wide Studied - Different Types of Distortions - > 1940

In-Plane

Transversal

Longitudinal

Influence Parameters

- Geometric Parameters
  - Dimensions of the structure
  - Type and size of welded joints
- Material Properties

Non linear pr

Machine lear rtunity

- Welding P.
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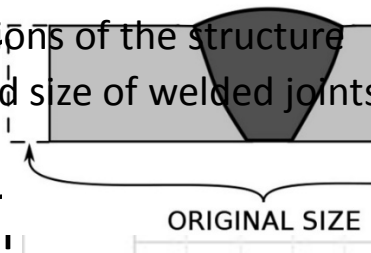
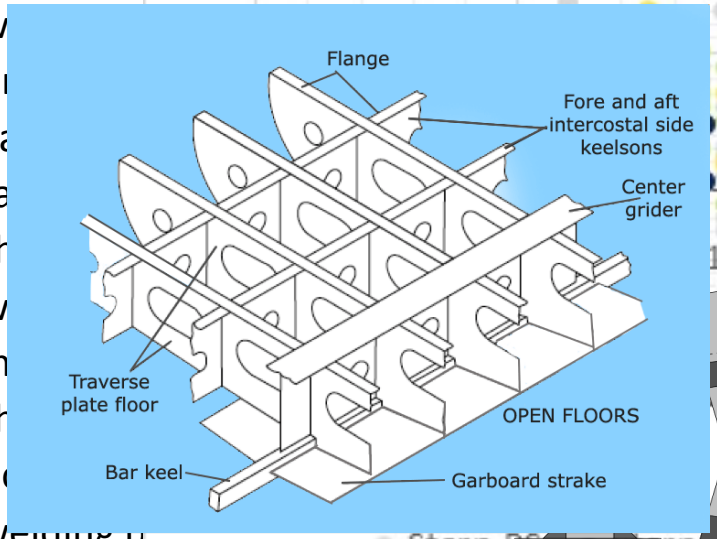
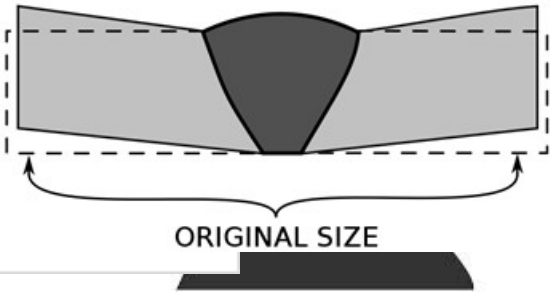
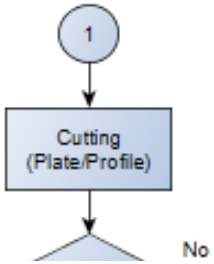


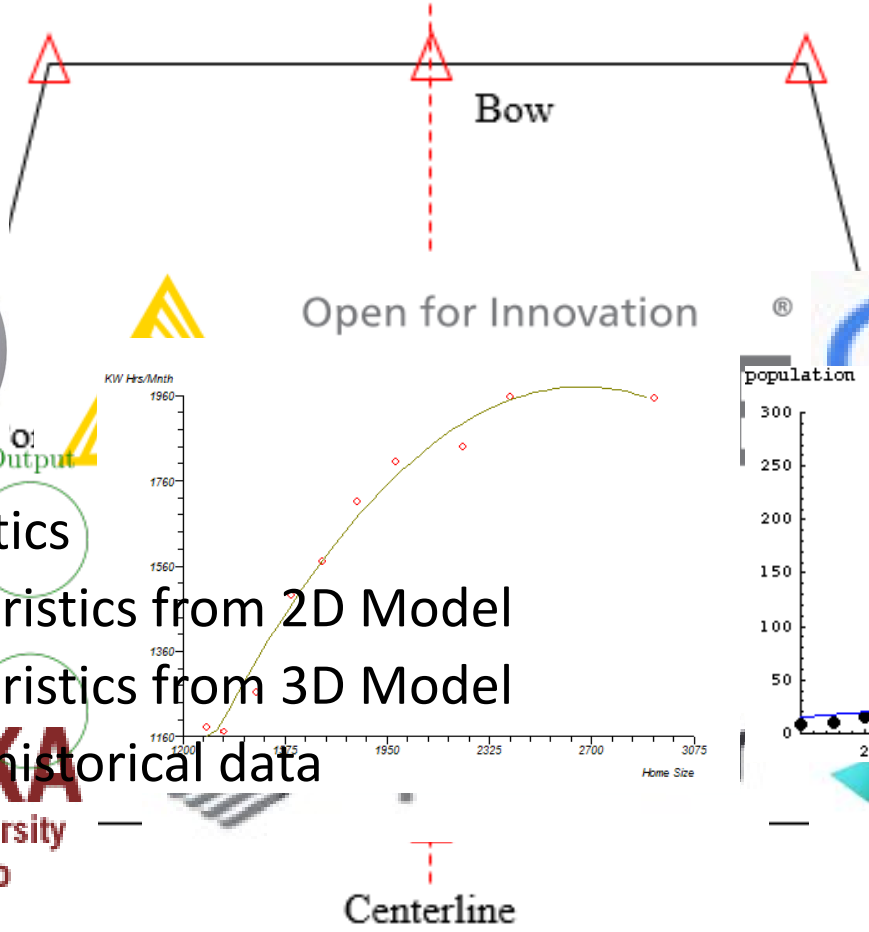


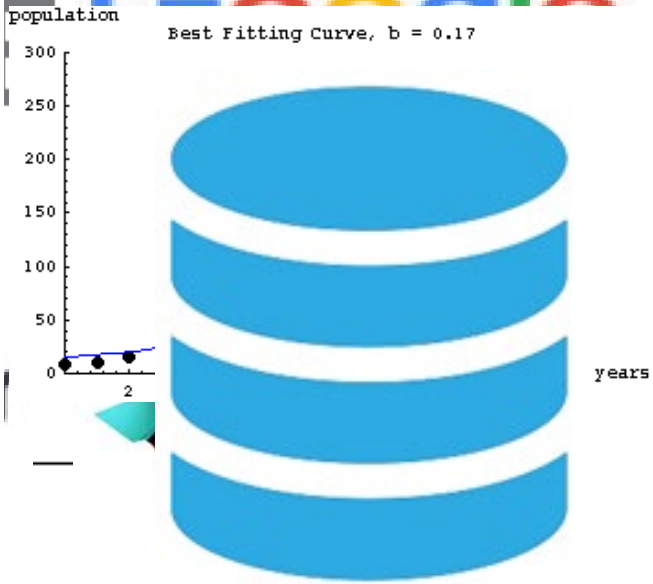


1. Process mapping
2. Verification of monitoring tools
3. Program s
4. S
5. D
6. Block Characteristics

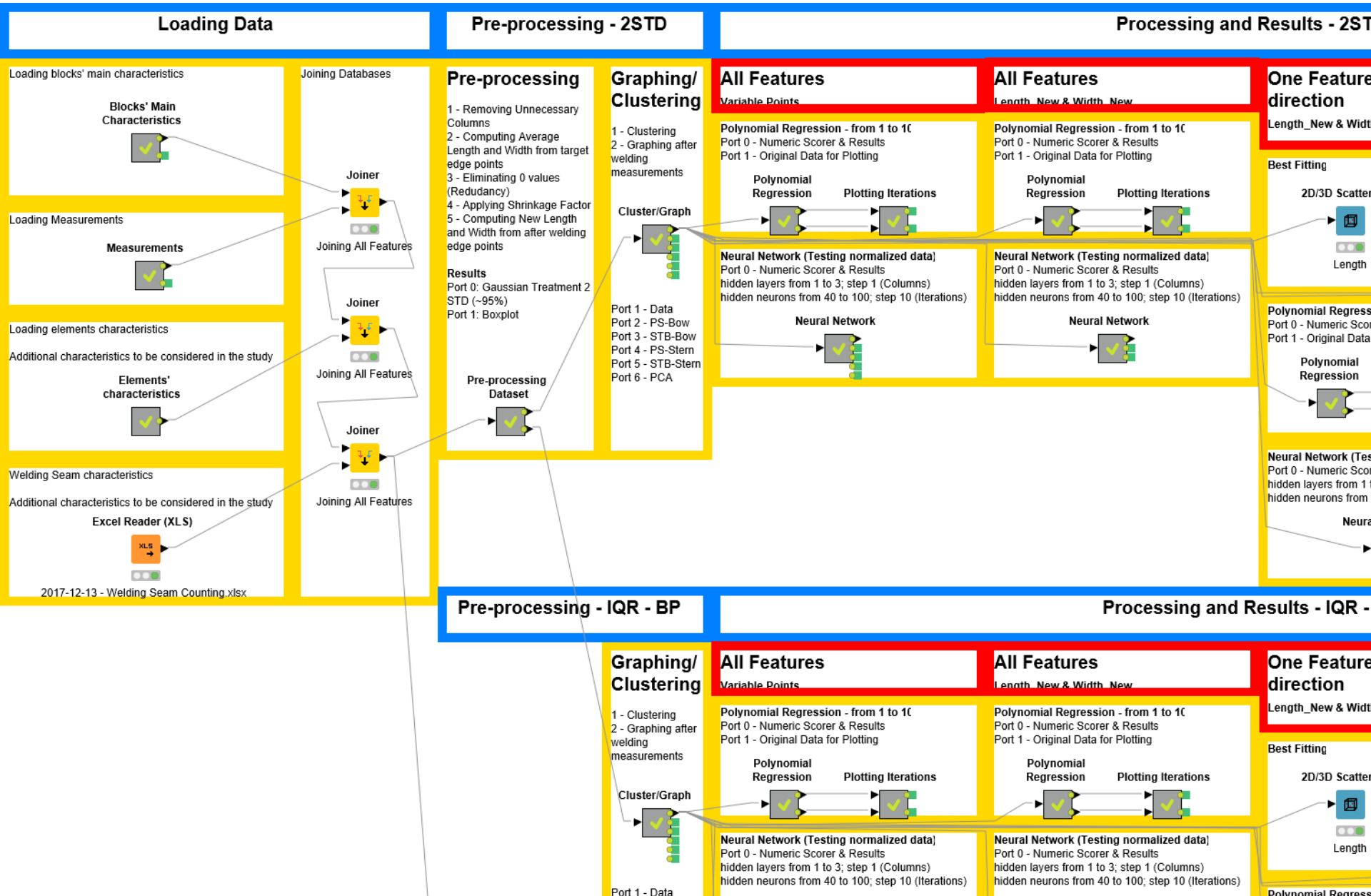
- Welding Characteristics from 2D Model
- Welding Characteristics from 3D Model
- Collection of the historical data



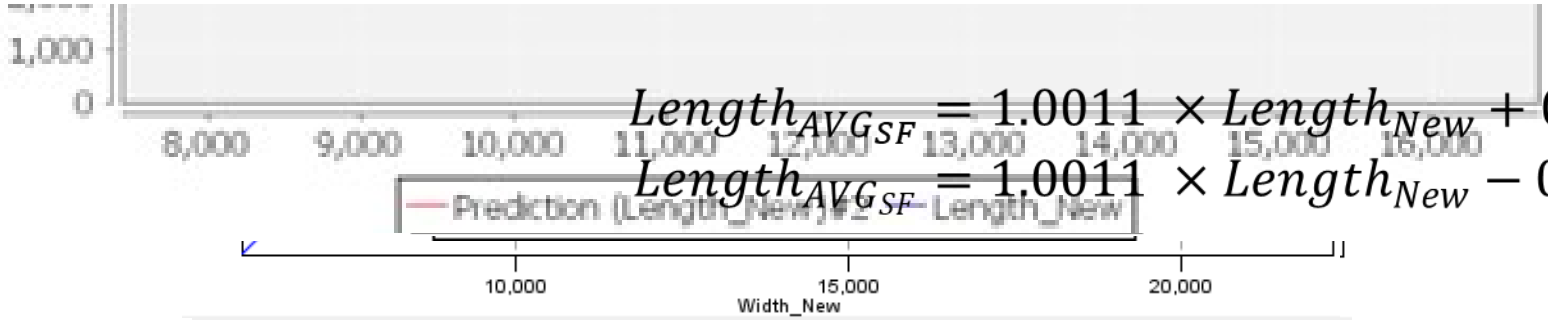




General Overview



Direction	Method	
	2-STD	IQR
Length (x)	Number of Transversal Elements Number of Butt Weld Seams	Length
Width (y)	Stiffener Spacing Block Weightage Thickness of Main Plate	Length Width



$$Length_{AVG_{SF}} = 1.0011 \times Length_{New} + 0.3169$$

$$Length_{AVG_{SF}} = 1.0011 \times Length_{New} - 0.3428$$

Geometric Parameters

Data Treatment – 4 months

KNIME – straight-forward

IQR – Best with Neural Network

2 STD – Best with Polynomial Regression

Best Fitting (R^2) > Polynomial Regression (R^2) > Neural Network (R^2)

Polynomial Regression with many features – No guess

Reduction of Variables was elementary

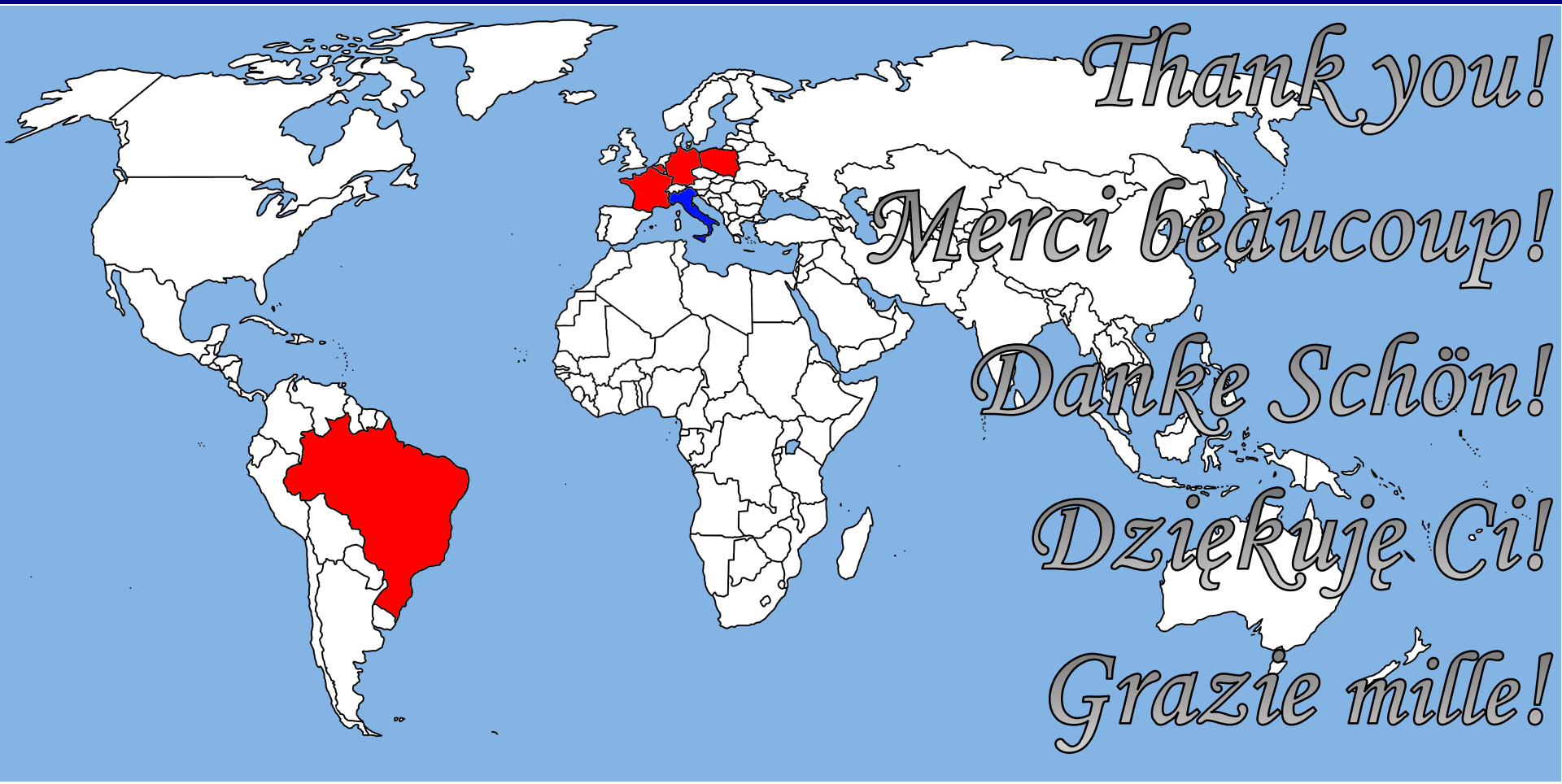
More data necessary in order to improve Learning

More data in order to improve the study

How to integrate the solution with current design software

Assess the excess of material (Production Allowance)

Extend study to other structural elements


Thank you!
Merci beaucoup!
Danke Schön!
Dziękuję Ci!
Grazie mille!