Towards Comprehensible Predictive Modeling

Michael Gleicher

Department of Computer Sciences

University of Wisconsin Madison

What is a <u>Good</u> model?

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Accuracy

What is a <u>Good</u> model?

Descriptive Accuracy

Predictive Accuracy

What is a <u>Good</u> model?

Descriptive Accuracy

Predictive Accuracy

Generalizability

Efficiency in use

Efficiency in construction

Robustness

Data required to build

Conciseness

Compactness

Pre-scriptive power

Self-consistency

Validatability

Verifyability

Simplcity

Parsimony

Tradeoffs

What is a Good model?

Descriptive Accuracy
Predictive Accuracy
Generalizability
Efficiency in use
Efficiency in construction
Robustness
Data required to build
Conciseness
Compactness

Pre-scriptive power
Self-consistency
Validatability
Verifyability
Simplcity
Parsimony

Comprehensibility

What is Comprehensibility?

The ability of **some one**
to understand **some thing**
for **some reason**

This is independent of...
where application, model type,
or **how** we help them do it

Who, What, Why

Who?	What?	Why?
Stakeholders	Phase of the **Process**	Reason for Wanting
Developers	Inputs	Improve Performance
Data Scientists	Methods	Build Theory
Domain Experts	Model	Extend/Characterize
Audience	Outputs	Build Trust
	Experiments	Actionability

Who, What, Why

Who?

Stakeholder

Develope

Data Sci

Domain

Audience

What?

Outputs

Experiments

Why?

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racterize

Build Trust

Actionability

Modeling is a process

There are many people involved

We should try to help all of them

Who, What, Why

Who?

Stakeholders

Developers – general purpose methods

Data Scientists – general purpose process

Domain Experts – specific applications

Audience – uses the results

What?

Phase of the **Process**

Experiments

Why?

Reason for Wanting

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Mix and Match

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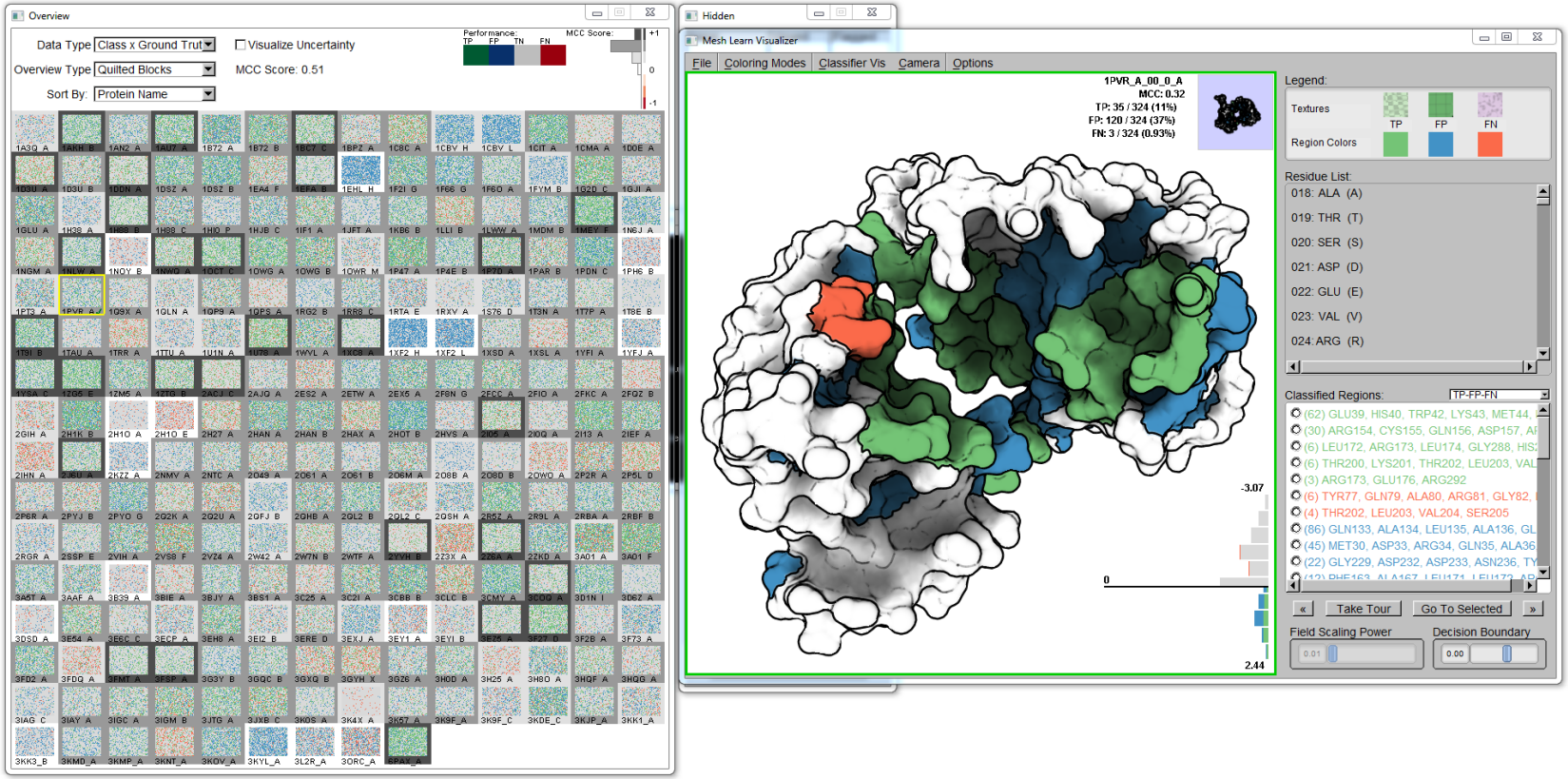
Visual exploration of modeling validation experiments



Sarikaya, Albers, Mitchel and Gleicher. *Visualizing Validation of Protein Surface Classifiers.* Computer Graphics Forum. Proceedings EuroVis 2014

Our Motivation

Who?	What?	Why?
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Pleasant Surprises

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Agenda

Understand Understandability

Metrics for Measuring

Tools for user control over tradeoffs

- tunable methods
- different methods to give options

3 Paths to Understandability

Easier to understand models

Better explanations/visualizations of existing models

Co-design of models and visualizations

3 Paths to Understandability

Easier to understand models

- Explainers (VAST 2013)

Better explanations/visualizations of existing models

- Protein Surface Classifier Validation (EuroVis14)
- Serendip (VAST14)

Co-design of models and visualizations

- Molecular Motion Illustration (TVCG12)
- Splatterplots (TVCG13)

Thanks!

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`gleicher@cs.wisc.edu`