Classifier Explanation

Introduction to the Algorithms LIME and SP-LIME

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Me: Hey Siri, order me a Pizza

Siri: *(After a short break that nearly drains your whole battery)* Ok, I'm calling your mother...

Me: Wait! Why would you do this!?

Siri: This is the 5th time you ordered Pizza this week.

What do we want from our model?

1. Why did failed predictions fail?
2. Why did correct predictions succeed?
3. Why is my model uncertain about a prediction?

special importance:
setting a model *live*, where it's not *prelabeled*

Interpretations must be ...

- *human-readable*
- reproducable (same input + same model → same output)
- **model agnostic**, meaning they can work with any (black-box) model

Difficulties:

- Models can be huge (millions of weights)
- Inputvectors can be huge (e.g. images)
- Some models are to complex by it's structure to be readable, (e.g. neural networks)

Example
Desired output of a "Atheism"-Classifier

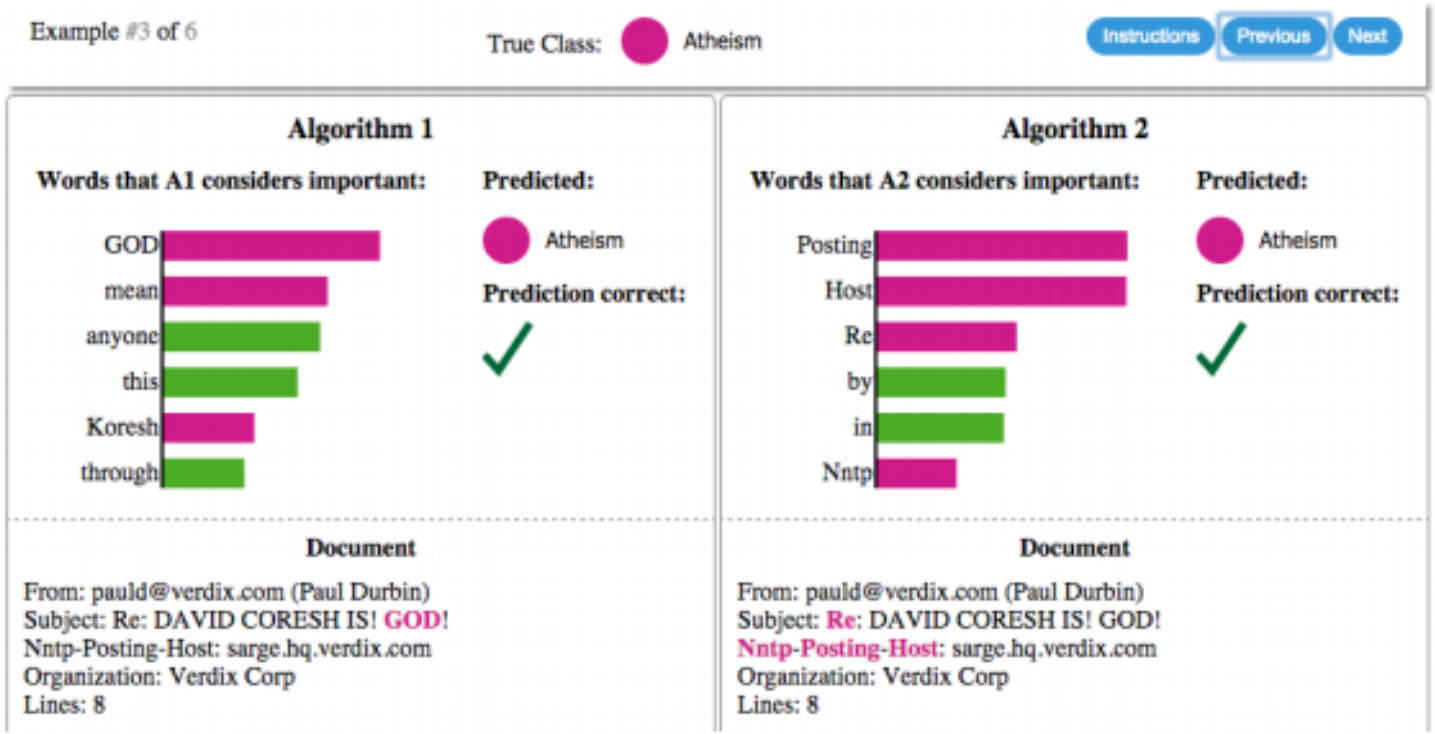

Figure: LIME-Text: predicting "Atheism" for given text

Both algorithms predict correct - yet Algorithm 2 has strange reasons.

Trusting a Model

trusting predictions $\neq$ trusting a model

What do we want?

1. get an *overview* of our Model
2. compare models in reasonable time
3. proove correctness & flaws of a model
4. improve our models

Prooving a Model

Several topics which benefit from machine learning, but need special care:

1. Terrorism-detection
2. Medical diagnosis & prescriptions
3. Fraud-detection

Noone will buy a model, if you can't prove that it's performing reasonable predictions.

Improving a Model

There are several issues, at which explanations can help you improve your models:

1. Filtering of Features
2. Find overfitted weighting of features
3. Find Links in Classification (Similiar Classes and Features)

Gaining insights from explanations can help you improve your model!

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Summary: What do we want

Human Readable Model Explanation For Every Classifier For Every Input

Definitions

All the stuff from the Lime Paper with the fancy ∇ and λ and greeky cheeky mumbo jumbo

Minimizing Fidelity · Interpretability

The part talking about making a minimal complex model which is quite accurate

Here is the Pseudocode.

Visualisation

Put the funky red-blue image with the red-crosses from the paper here

maybe: Example

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Problem with Sampling

Explain that we have to little time to inspect everything Looking for a new way to pick samples

Here is the Pseudocode

SPLIME Example

I guess this needs more than 2 Pages, we should add an example

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Setup Problem, Show Code, Plot Examples, nice This could be left out from the presentation, and just be a live demo
Do both: LIME and ANCHOR and sample with SPLIME