



A New Fuzzy Logic Toolkit for SciPy

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SciPy 2013

Fuzzy logic teaches
computers to make
human-like decisions in an
uncertain world.

“The closer one looks at a real-world problem, the
fuzzier becomes the solution”

- Zadeh, 1973

Outline

What is fuzzy logic? (hint: not fuzzy string matching)

Toy example

Live demo

Schematic example of fuzzy control

Anatomy of the skfuzzy package

Todo list for skfuzzy



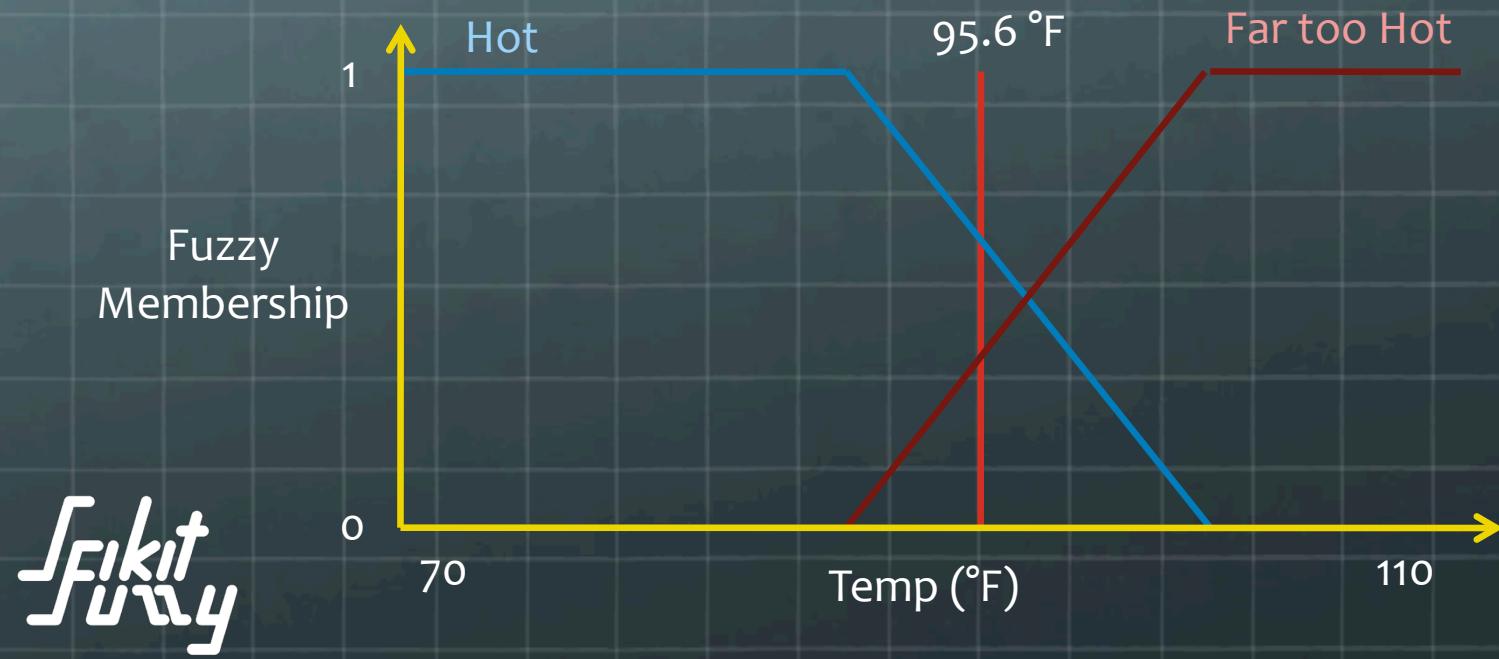
What is this fuzzy stuff?

Uses **intuitive**, **linguistic** terms to build **powerful** models about **complex systems** we encounter in real life.

What is this fuzzy stuff?

How hot is it outside?

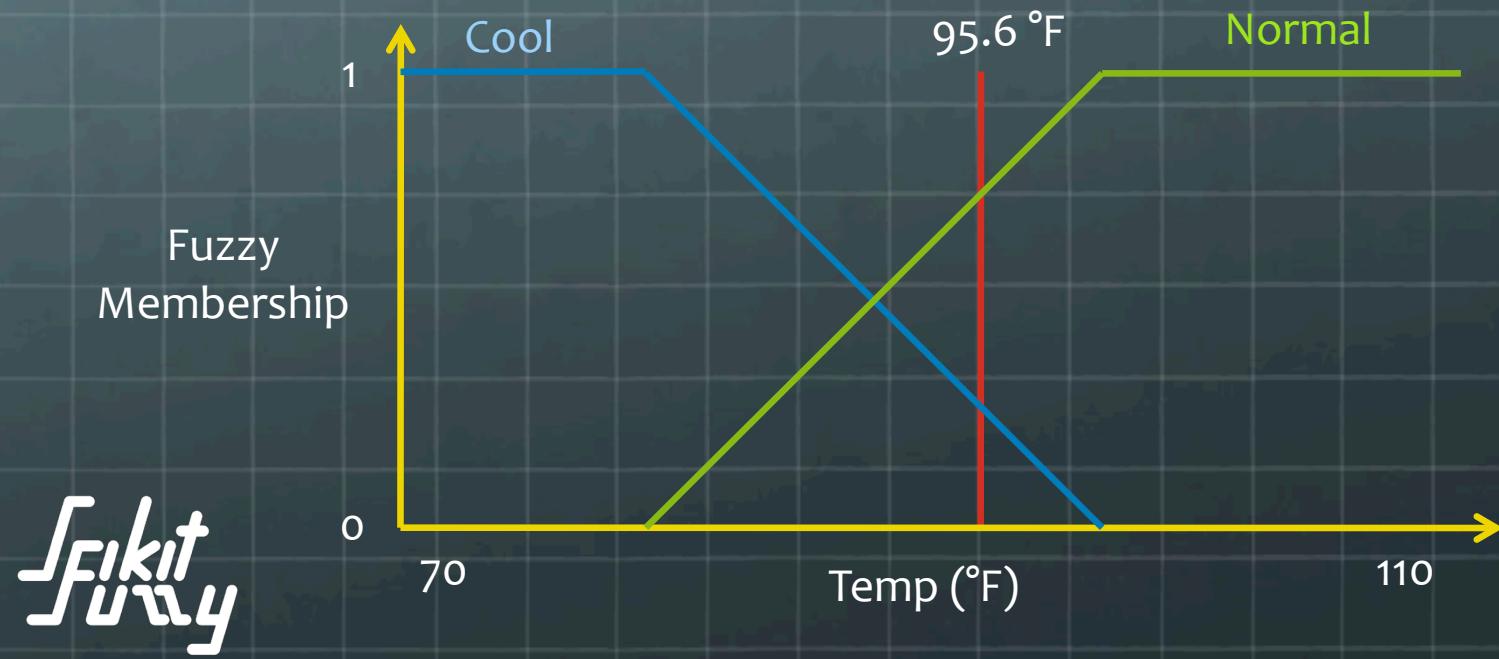
A Minnesotan might answer...



What is this fuzzy stuff?

How hot is it outside?

A Texan might answer...



What is this fuzzy stuff?

Uses **intuitive**, **linguistic** terms to build **powerful** models about **complex systems** we encounter in real life.

Minnesotan perspective:

if temp is *Hot*, **then** look for shade
if temp is *Far too Hot*, **then** run inside

Texan perspective:

if temp is *Cool*, **then** []
if temp is *Normal*, **then** get some lemonade

Fuzzy

Demo

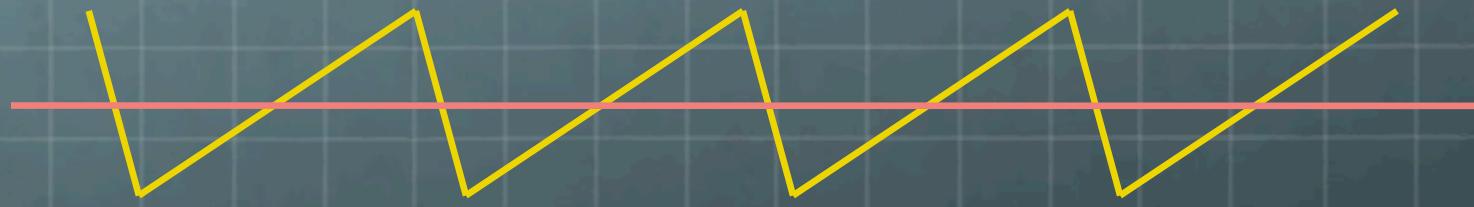
*Fikit
u-ray*

Fuzzy Control

fuzzy

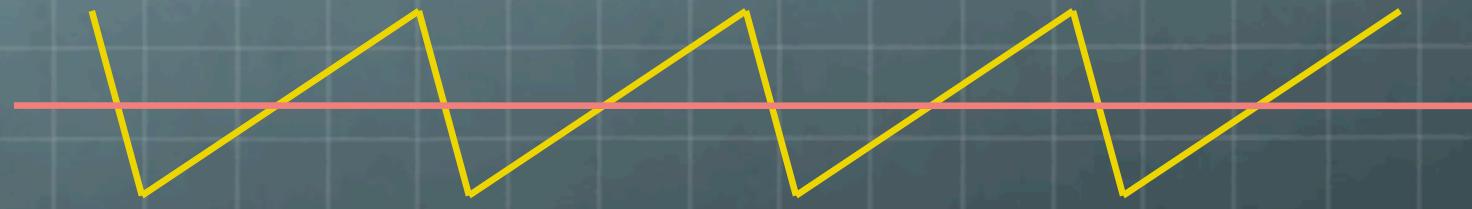
Air-conditioning system

Classical control

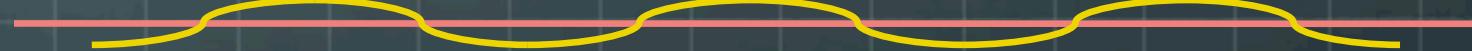


Air-conditioning system

Classical control



Fuzzy control



Features

Most functionality brought into base namespace

```
>>> import skfuzzy as fuzz
```

Fuzzy membership function creation

```
>>> fuzz.membership.
```

Fuzzy mathematics (sets, relations, implication)

```
>>> fuzz.fuzzymath.
```

Defuzzify (crispify)

```
>>> fuzz.defuzz.
```

Fuzzy c-means

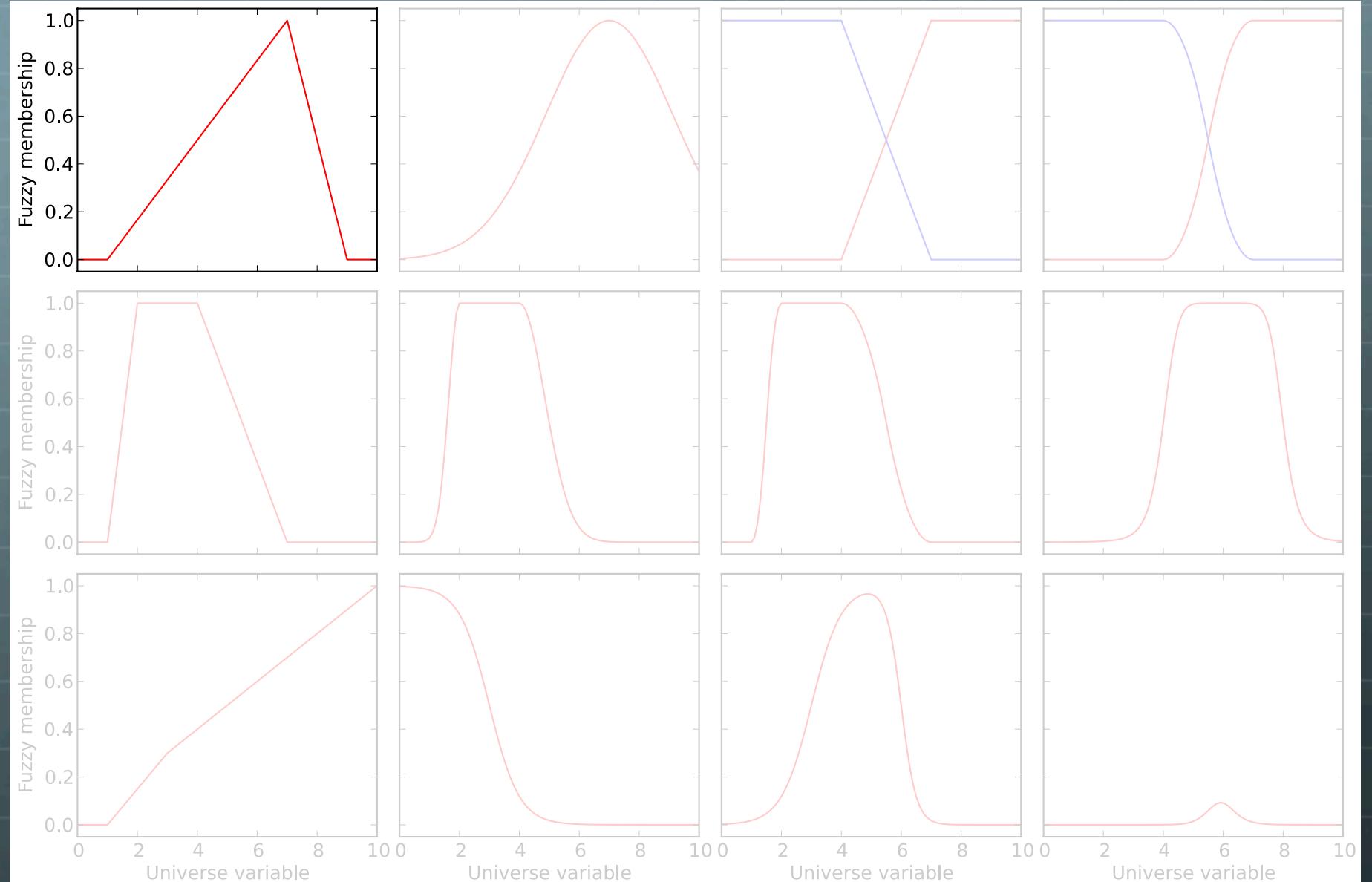
```
>>> fuzz.cluster.
```

1d and 2d denoising with FIRE filters

```
>>> fuzz.filter.
```

Fuzzy Membership Functions

fuzzy



Fuzzy

```
>>> x = np.arange(0, 10.1, 0.1)
>>> tri = fuzz.trimf(x, [1, 7, 9])
```

Work in progress

Documentation

API very well documented in docstrings

Sphinx not yet implemented to generate standalone docs

Examples are in process

Fuzzy c-means needs some Cython love

General testing, bug & docfixes

100% test coverage

Community building

Recap

Provide **foundational** tools for fuzzy logic

Enable fuzzy logic analysis in Python

With Matlab®-like syntax

In the Scikit spirit



Thanks

Especially to Dr. Hal H. Ottesen

The scikit-image team

You





<http://github.com/scikit-fuzzy/scikit-fuzzy>
Pull requests welcome