Using Python to Debug IBIS-AMI Models

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Our Current Options for Debugging IBIS-AMI Models

- **Run a full blown, GUI based simulation in our favorite IBIS-AMI capable simulator.**
  - Pros
    - Can use GUI to set parameters. (Don't have to create a *.CSV file.)
    - Can debug model in the same environment that your customer will use to run it.
  - Cons
    - A lot of overhead for debugging something simple in an iterative fashion.
    - You tie up a license, which might be needed elsewhere.
- **Use one of the command line tools provided.**
  - Pros
    - Quick & dirty; can run many iterations.
    - No license required.
  - Cons
    - Need to create a *.CSV file.
    - Single run mode only. (Model loads, runs, and falls out of scope.)
    - No access to source code (that I'm aware of).
    - And, if there is, it's probably in C; yuk!

A 3rd Alternative – *PyIBIS-AMI* (Python AMI testing package)

- **Pros**
  - Forget about *.CSV files.
  - Use Python data structures for holding parameter values, and tweak/reinitialize in an iterative fashion.
  - Keep the model in scope. (Tweak parameters and re-initialize.)
  - Bring the power of Python and its libraries to bear on your debugging effort.
  - Plot results, as part of your iterative debugging loop.
- **Cons**
  - Have to learn Python.
  - Have to install a Python environment.
  - Performance hit, relative to C.

Live Demo

- **Importing the *PyIBIS-AMI* package.**
- **Instantiating the *AMIModel* class.**
- **Instantiating the *AMIModelInitializer* class.**
- **Initializing the model.**
- **Viewing the resultant impulse response.**
- **Debugging the faulty impulse response.**
  - Plotting the frequency response.
  - Querying the model, in response to a hypothesis.
  - Tweaking the initialization data and reinitializing.
  - Viewing the results and validating the hypothesis.

Going Further

- **Applying the power of the *NumPy/SciPy* libraries.**
  - Both the model and its initialization data are first class Python objects, which means you can do anything with them that you could do with any other Python objects.
  - The NumPy/SciPy library pair form a nearly complete replacement of MATLAB, including most of its numerical processing libraries! Imagine the possibilities.
- **Batch mode execution for automated flows.**
  - Test construction grammar makes use of Python embedding, via *EmPy*.
  - Output is XML, for flexible stylizing.
- **GUI tool (coming soon).**
  - Plots will be present by default and updated automatically, when a change is made to the initialization data.

FAQ

- **Does this have any momentum in the community?**
  - Yes!:

File	Type	Py Version	Uploaded on	Size	# downloads
PyIBIS-AMI-0.9.tar.gz (md5)	Source		2012-09-06	382KB	299
PyIBIS_AMI-0.9-py2.7.egg (md5)	Python Egg	2.7	2012-09-06	388KB	319

Author: David Banas
Home Page: https://github.com/capn-freako/PyAMI/wiki
License: BSD
Package Index Owner: dbanas
DOAP record: PyIBIS-AMI-0.9.xml

- **Which Python distribution do you recommend?**
  - http://www.enthought.com/products/epd_free.php

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FAQ (cont'd.)

- **I'm not a bit head; I know just enough C to get my model built. How can I learn just enough Python to use this tool? Check out these resources:**
  - *Learning Python* by Lutz (Published by O'Reilly).
  - *Python in a Nutshell* by Martelli (Published by O'Reilly).
  - The Wiki page for this project: https://github.com/capn-freako/PyAMI/wiki
  - Udacity Python programming course: http://www.udacity.com/overview/Course/cs101/CourseRev/apr2012
  - Send e-mail to ibis-atm@freelists.org. Other users of this package, including myself, might be able to offer some helpful guidance.

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Q&A

- **Questions of clarification on *this* presentation?**
- **Questions on the structure of the *PyIBIS-AMI* package and/or how it fits into the rest of your Python installation?**
- **Questions on getting Python installed?**
- **Stump the Chump!**
  - A completely unprepared, uncanned, very dangerous, potentially embarrassing demonstration of the PyIBIS-AMI package in action…
    …(Wait for it)…
    DIRECTED BY YOU (i.e. – NOT me).
    - The intent here is to offer a true demonstration of the usefulness of this package to someone, whom is just beginning to explore and debug a new model.
    - Hopefully, in doing this we will flush out some of the handier features of Python and its run time command line environment.

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Thank You