WHAT IS SCRIPTING?

- A Written Program
- Automates Tasks
- Usually Interpreted
WHAT ARE SOME EXAMPLES OF SCRIPTING LANGUAGES?

- Python
- JavaScript
- Ruby
- Perl
- SQL

RAYSTATION SCRIPTING LANGUAGES

- PYTHON
  - Iron-Python
  - Leverages .Net
  - Fantastic User Interfaces
  - Above Average Multithreading
  - Cython
  - Built on C (C extensions)
  - Strong Scientific and Numeric Code support
  - Huge amount of 3rd party modules

- C#/.Net
  - Full power of Microsoft Visual Studios
  - Compiled programs
  - LINQ
SCRIPTING INTERFACE

- Should be clean
- Should be intuitive
- Should be accessible
- Should be flexible

SCRIPTING INTERFACE

- Should allow Remote Debugging
- Should support Command Line Interface
- Should support Read/Write Operations
- Should be Fully Documented

USES

- Automation
- Extension
- Data Mining
- Research
AUTOMATION

- Protocols
- Scripted Plans
- Auto Breast
- TBI
- Machine Learning and Deep Learning

EXTENSION – EXAMPLES

- Add compatibility with vendors that don't honor DICOM tags
- Re-purposed tags
- Private tags
- Patient Area
- Leaf constraints
- DCA
- Adapt to varying machine design
- Jaws replaced by MLCs
- 2nd check software or R&V systems may require both X and Y Jaws
- Leaf constraints

DATA MINING

- All Aspects of the patient object exposed
- Machine
- Machine DB
- Patient DB
- All Databases should be queryable
RESEARCH – EXAMPLES

• Custom/user defined optimization algorithms
• LET optimization
• Creation of new deformed or synthetic CTs

MACHINE LEARNING

• Real Machine Learning
• Has the potential to create better plans than the baseline plans
• Can be pushed to be more aggressive or more conservative than baseline plans
• Should be powered by a well studied community driven platform
  • TensorFlow – chosen by RaySearch
  • Google AI
  • Open-Source
  • Large adoption – over 1500 GitHub repositories reference TensorFlow
• Has the potential to automate all aspects of radiation oncology
  • Diagnosis
  • Treatment Course
  • Target Definition
  • Organ Segmentation
  • Treatment Planning
  • Plan Evaluation
  • Delivery Evaluation

THANK YOU!