



Multimedia Communications and Signal Processing
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HARP

HEVC Analyzer for Rapid Prototyping

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- ✓ Open Source
- ✓ Encoder Support
- ✓ RDO Analysis
- ✓ Python Export

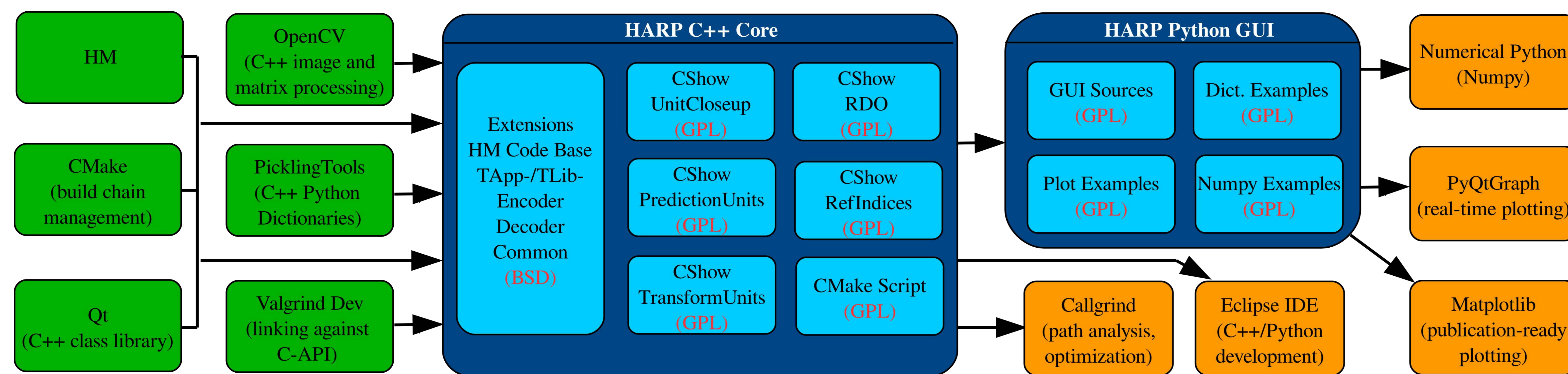
What Do Current Analyzers Lack?

What current analyzers lack:

- No access to decisions taken on encoder side
- Code not available & adaptable, no code examples
- No sufficient data export capabilities
- No support of prototyping in Python/Matlab

What HARP offers:

- ✓ Support of encoder + decoder
- ✓ Open source license (GNU GPL)
- ✓ Exportable POC/CU/PU and RDO trees
- ✓ Matlab-like processing of HM data in Python



HARP for Research

For HEVC beginners:

- Easy entry to the HM code base with examples
- Visualization of internal HM data
- Full OpenCV support, both in C++ and Python

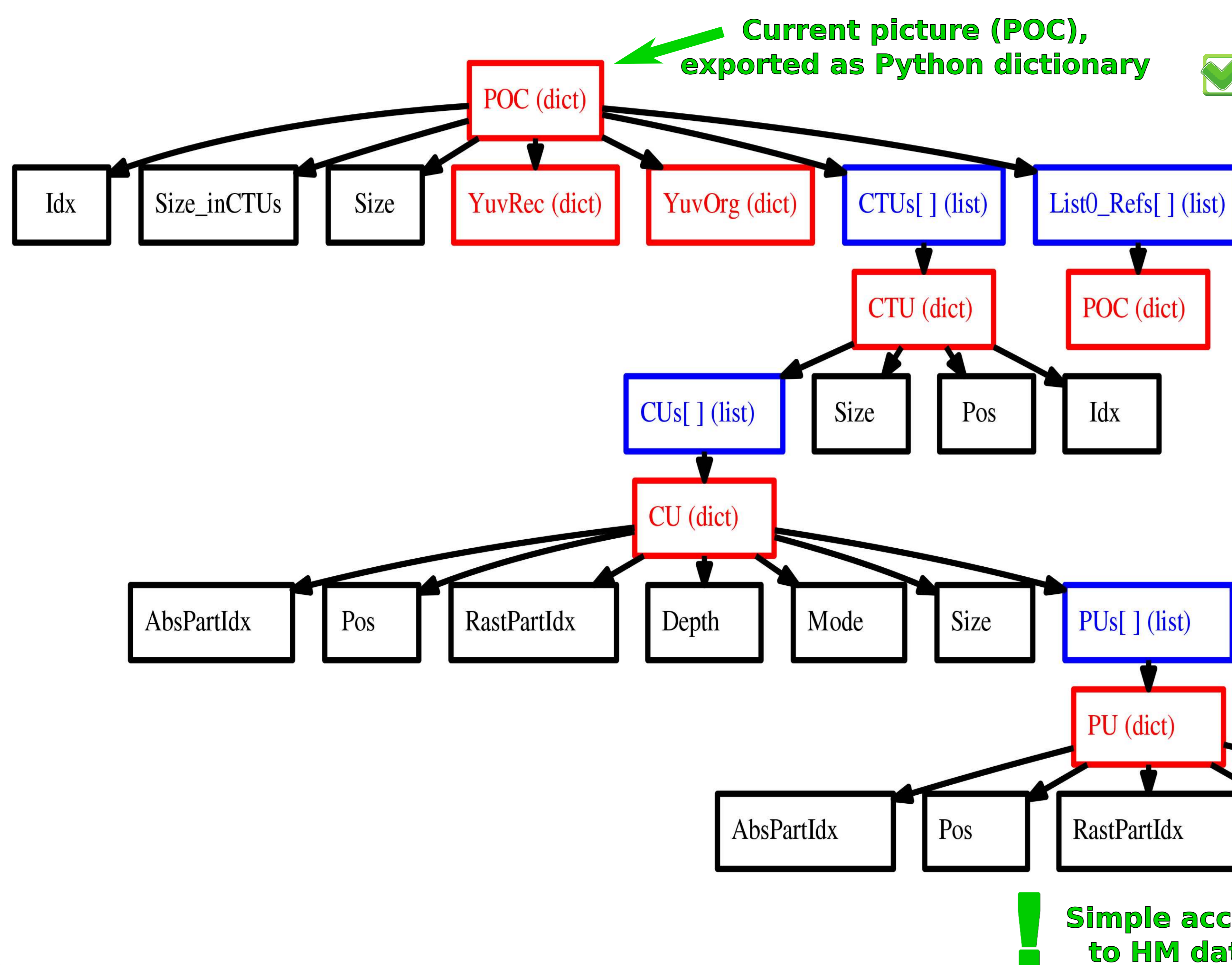
For HEVC professionals:

- Debugging tool for new HEVC extensions
- Detailed insight into the RDO process
- Numerical processing of HM data in Python



Why Emphasis on Python?

- As with JM (H.264), work with HM mostly takes place in C++ language (time-consuming!)
- Advanced C++ skills and knowledge of HM class APIs required (difficult for student projects!)
- **For testing of new ideas, Python is far better suited!**



✓ Solution: Export to Python Dicts

- Preservation of POC/CU/PU trees
- Single file, no tree flattening ("txt")
- RDO tree export (if required)
- Buffers included (Org/Rec/Ref etc.)

In Python:

- One-liner for import of HM data
- Buffers in Numpy format (OpenCV)
- Interweave with HM C++ Code
- Matlab-like data access & looping:

```
for CTU in POC["CTUs"]:
    for CU in CTU["CUs"]:
        for PU in CU["PUs"]:
            print CU["Mode"]
            print PU["Size"]
```

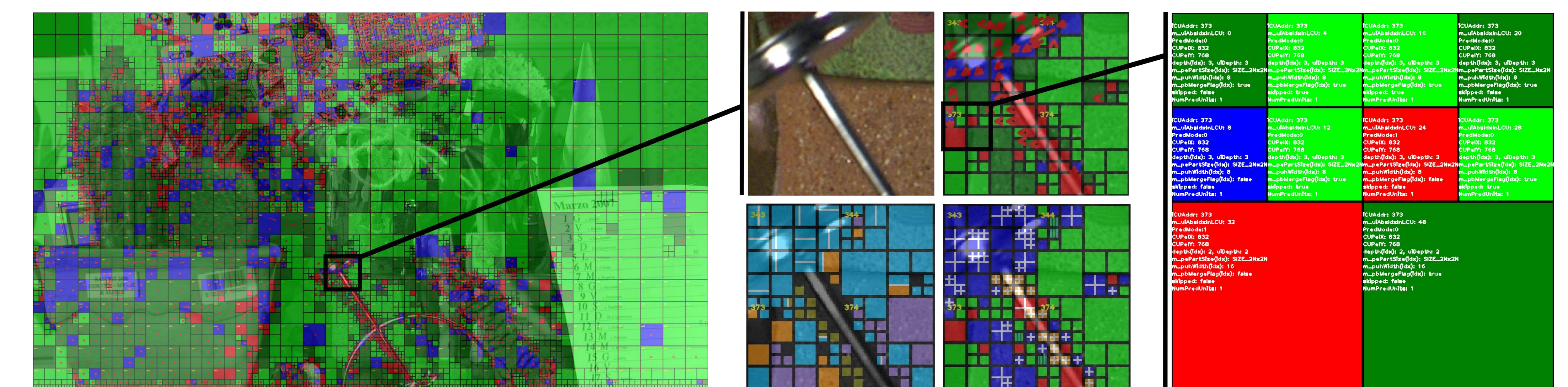
HARP for Teaching

For professors:

- Visual demonstration of next-gen video codecs
- Allow insight into QP-related encoder decisions
- Thesis topics on HEVC without the C++ "barrier"

For students:

- Simple to install, simple to use "HEVC sandbox"
- All required documentation + tutorials online
- Python matrix processing very similar to Matlab



Download HARP & Contribute!

Download: www.LMS.LNT.de/HARP (or search for HEVC HARP)
Getting started: just follow the corresponding tutorials on HARP's homepage
Tested OS so far: 64 Bit Linux Ubuntu/Suse/CentOS

Please contribute back interesting HARP modifications! Thank you!!

