Update from Descartes Research Group

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SSP 2022, Stuttgart, November 8, 2022
New Course on Systems Benchmarking

- Theoretical and practical foundations
- Both a textbook and a handbook on benchmarking
- Includes modern applications, case studies, and latest research based on input from over 40 benchmarking experts
- Teaching materials available on request
- Credits: Numerous (under-)graduate students (2006-2022):

http://benchmarking-book.com
Software Engineering Group

Software Architecture
- Distributed Systems
- DevOps
- Modeling & Simulation
- Performance Engineering

Benchmarking & Experimental Analysis
- Performance
- Energy Efficiency
- Security
- Dependability

Autonomic Systems
- Self-Adaptation
- Self-Organization
- Self-Protection
- Artificial Intelligence

Predictive Data Analytics
- Statistical Modeling
- Machine Learning
- Time Series Forecasting
- Critical Event Prediction

Vision of Self-Aware Computing
Research Areas

Internet-of-Things / Cyber-Physical Systems
- Mobile networking and communication
- Transport / logistics
- Predictive maintenance
- Robot localization & people detection

Data Centers
- Cloud computing
- Green IT
- Security
- Resilience and robustness

Earth Observation
- Scientific computing
- Scalable data processing
- Satellite image analysis

Medicine and Sports Science
- AI-based decision support systems
- Telemedical and real-time AI systems
- ML-based pattern recognition for vital time series
Earth Observation (EO)

Image Sources: DLR EOC
Continuous monitoring and quantification of global environmental change at all scales
Example: DLR Global SnowPack Proc. Workflow

1) Pre-Processing
- Data input:
  - GMTED2010 DEM
  - MOD10A1
  - MYD10A1
  - ESA DUE GlobSnow

- 1) Pre-Processing
  - Resampling to MODIS Tiles
  - DEM for each MODIS Tile
  - Classification of Layer 'NDSI_Snow_Cover'
  - Global SnowPack Array Stacked for hydrolog. year ± 1 day

2) Processing
- Terra ≠ cloud
- Aqua ≠ cloud
- Daily merged
- Daily Combination
- Day-1
- Day
- Day+1
- 3-Day Interpolation
- 3-day interpolated
- DEM < MIN(snow)
- DEM > MAX(snow free)
- Topographic interpolated
- Snow
- Full data stack
- Cloud-free daily
- SWE to Snow Cover
- Projection to MODIS Tile
- Daily GlobSnow Coverage

3) Post-Processing
- Days to Cloudfree
- Elevation & Duration
- Accuracy
- Accuracy Assessment
- If Days > 30
- Daily GlobSnow Coverage
- Cloud-free daily
- Large GAP Filling
- Snow Cover Duration (SCD)
- Deviations from mean SCD
- Value added products
- Legend
- Original dataset
- Intermediate dataset
- Output dataset
- Intermediate result
- Rule
- Sub process
- Main procedure
Example Result: DLR Global SnowPack
HPDA terrabyte project @ DLR

- Pilot project -
World Settlement Footprint WSF
Fragen?

http://se.informatik.uni-wuerzburg.de

http://descartes.tools