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e-phenology: The application of new technologies to monitor plant phenology and track climate changes in the tropics

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e-phenology: The application of new technologies to monitor plant phenology and track climate changes in the tropics

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Laboratório de Fenologia

RECOD reasoning for complex data

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PHENOLOGY

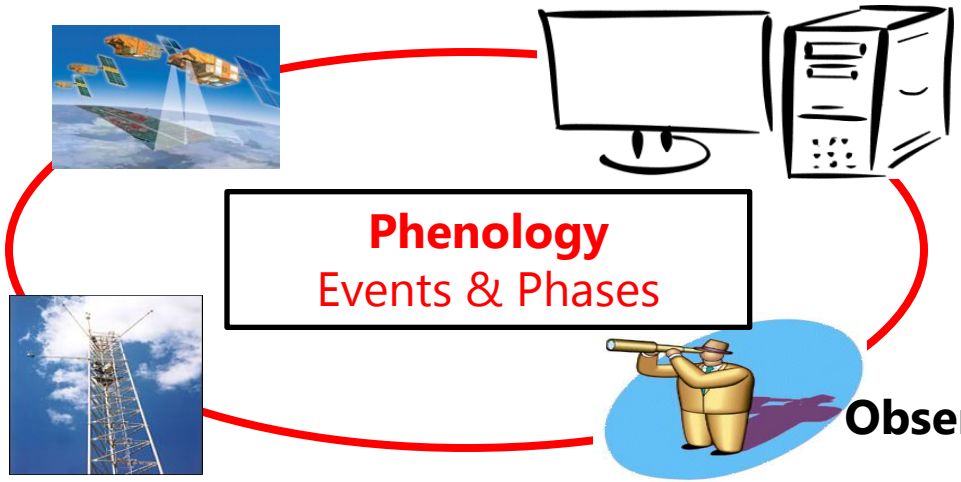
"Phainestai", the ancient Greek word meaning *to show or to appear*.

"The scientific study of periodic biological phenomena, such as flowering, breeding, and migration, in relation to climatic conditions."

The American Heritage Dictionary

Models

- Mechanistic models
- Prognostic phenology
- Statistical models



Measurements

- Remote sensing
- Near-surface remote sensing
- Leaf Area Index
- Flux measurements
- Environmental parameters

Observations

- Phenology Networks
- Legacy data sets
- Experimental sites

Remote phenology

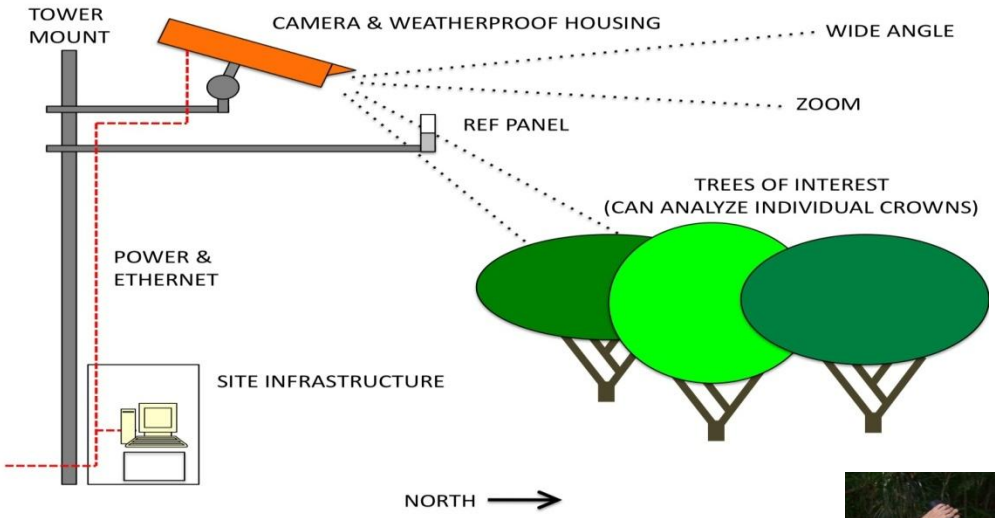
This et al. submitted

Monitoring phenology with a network of webcams

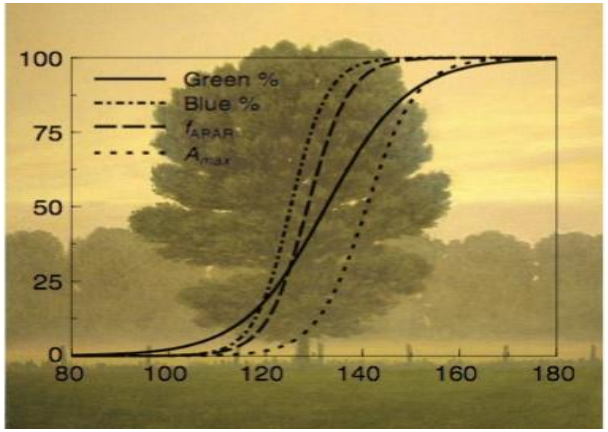
Quantify temporal (seasonal, annual) and spatial patterns of variation in phenology

- Interannual variation
- Across different ecosystems
- Correlation to environmental factors

A. Richardson website



PHENOCAM



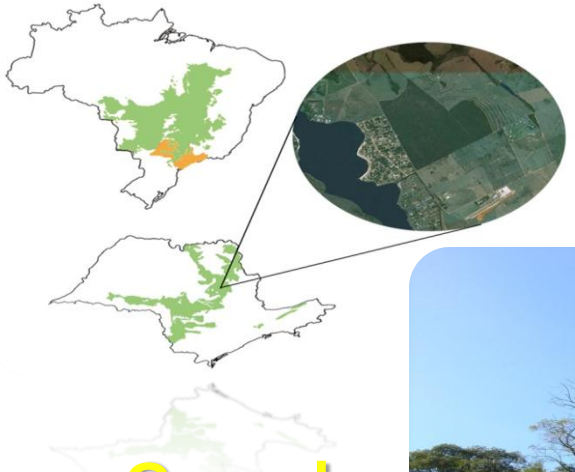
http://phenocam.sr.unh.edu/

Tower mounted webcams offer great potential for quantifying patterns of canopy phenology across sites, **without the need for intensive field monitoring** by an observer.

e-phenology: The application of new technologies to monitor plant phenology and track climate changes in the tropics

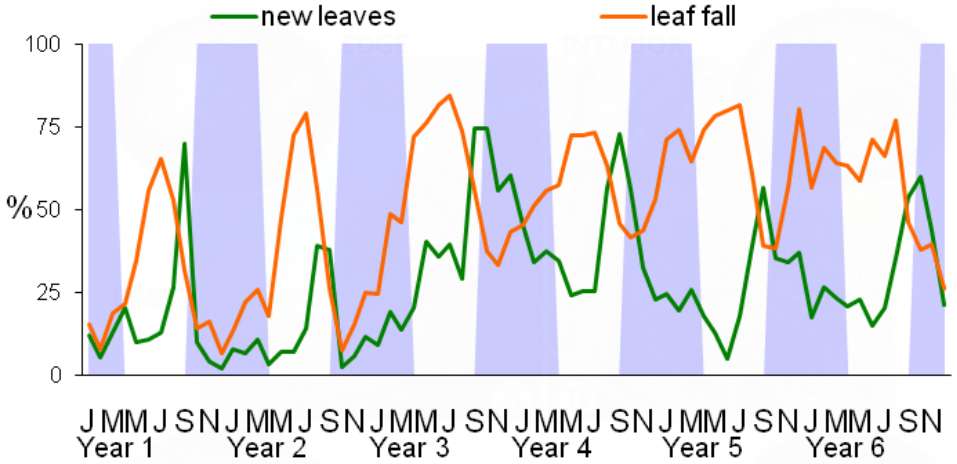
(a) use of new technologies of environmental monitoring - remote phenology monitoring systems;
(b) provide models, methods, and algorithms to support management, integration, and analysis of remote phenology data.
(c) create a protocol for a future Brazilian Network - long term phenology monitoring program;

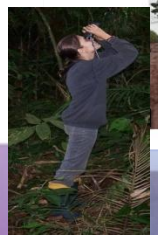
Study Site



Cerrado

Savanna like vegetation





Morellato et al. Im prep
Camargo et al. 2010

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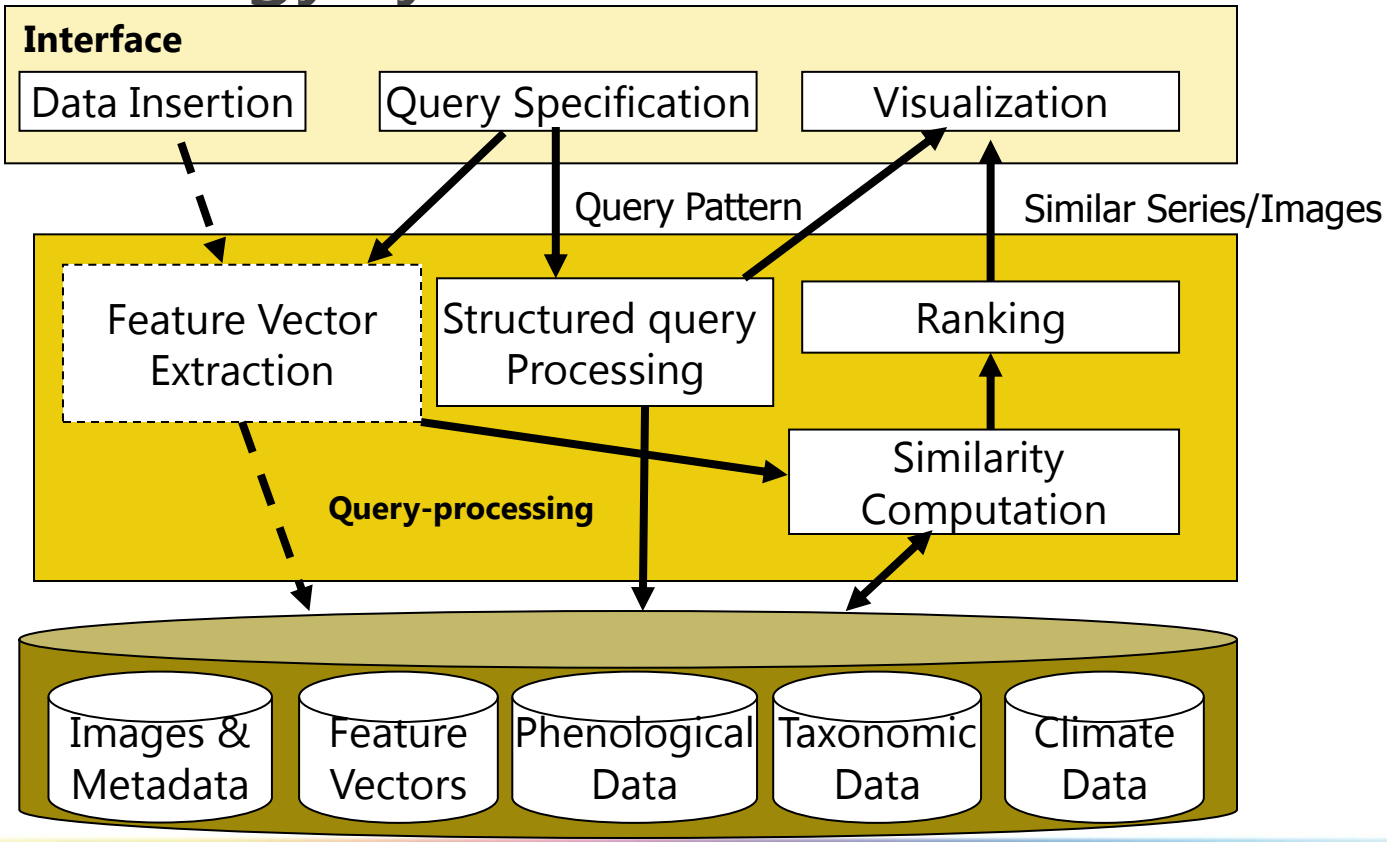
Monitoring local environment

Remote Phenology

e-phenology system



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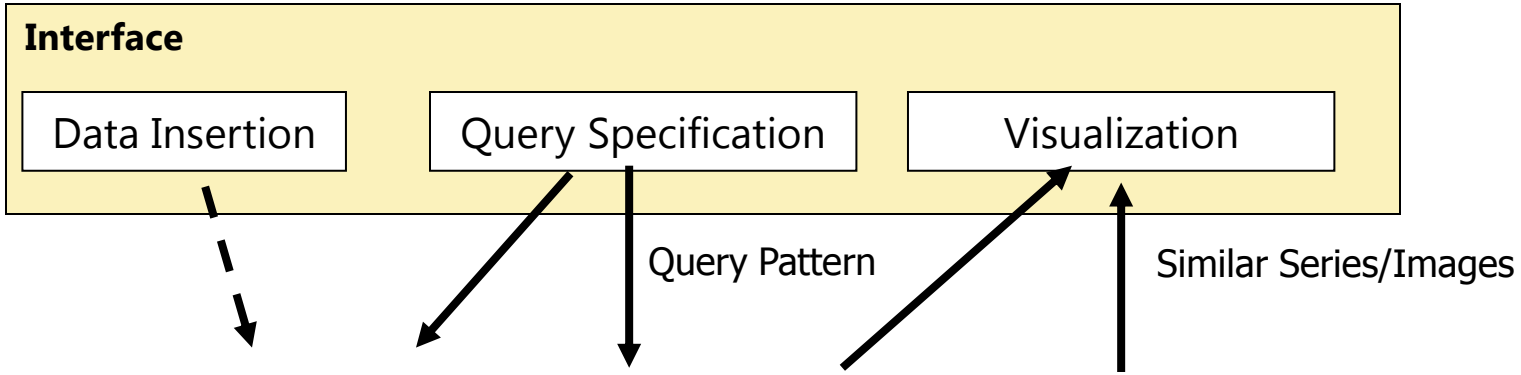
e-phenology system

A. Richardson website

e-phenology system

- Network setting
- Query formulation:
  - Similarity
  - Structured

- Information visualization
  - Query results
  - Temporal series
    - Climate data
    - Phenological data



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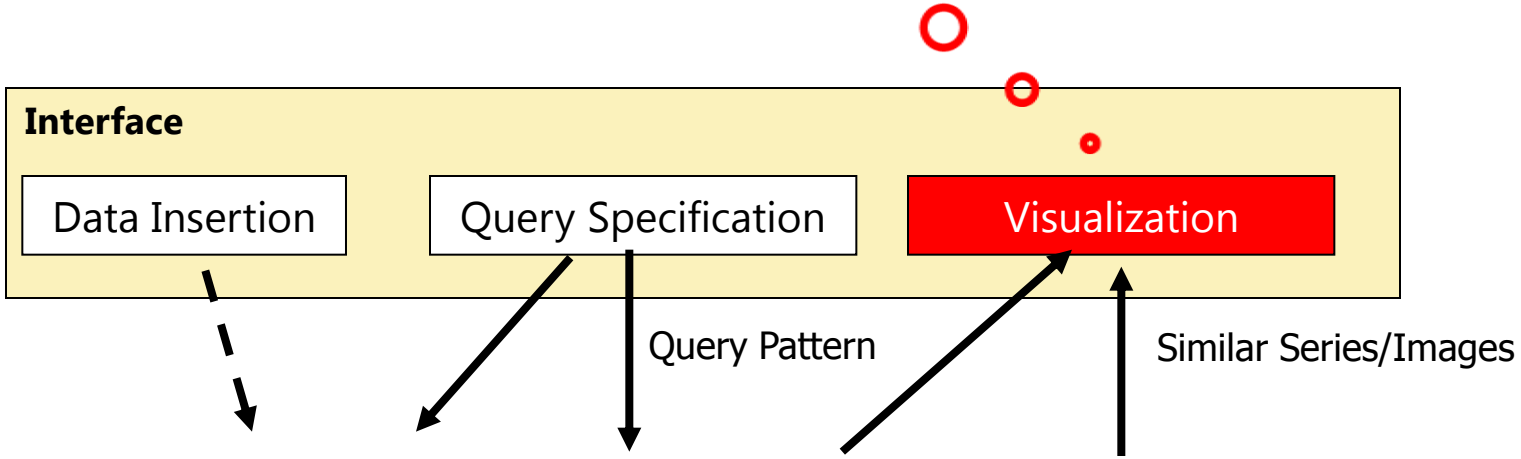

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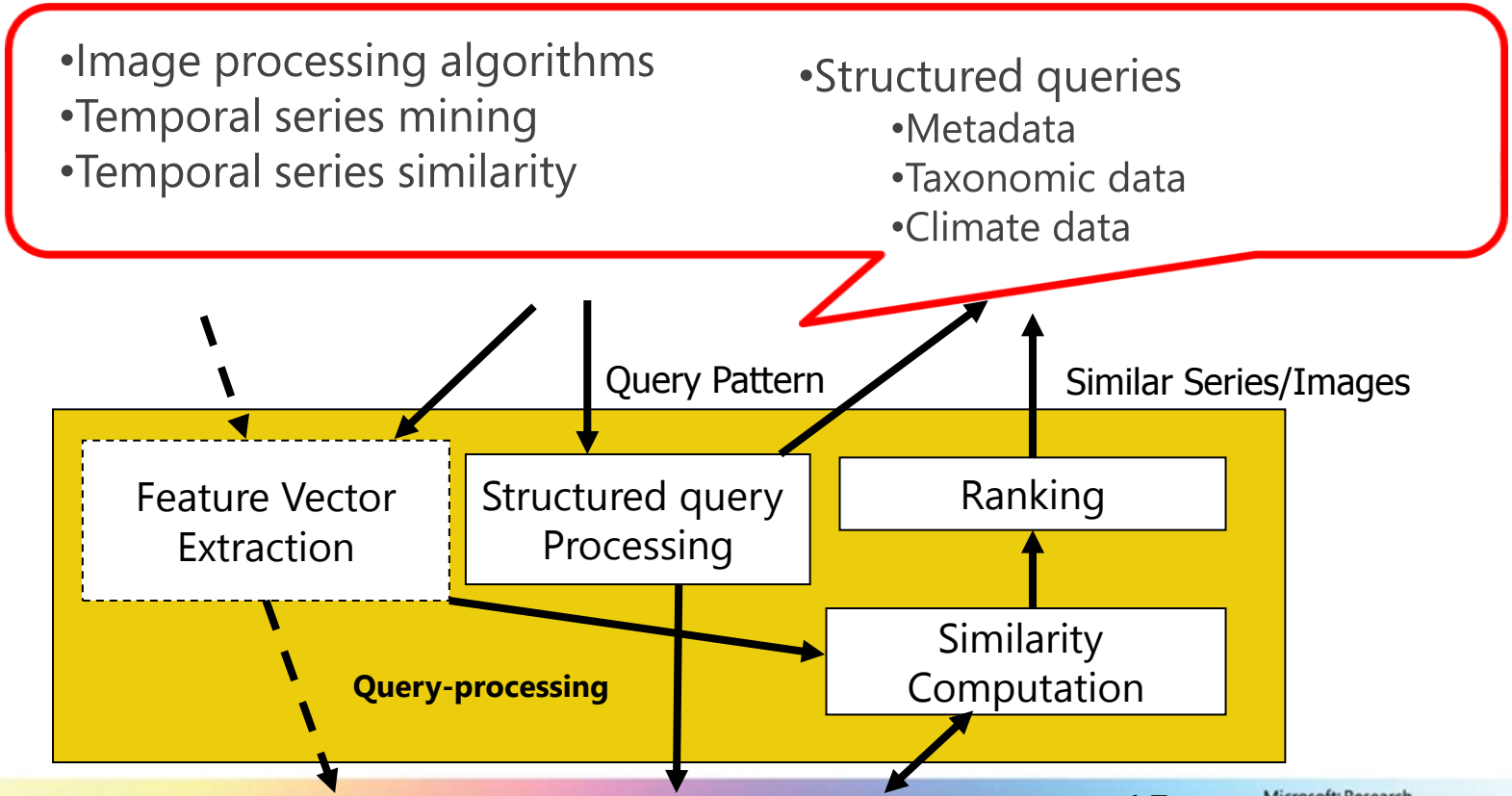

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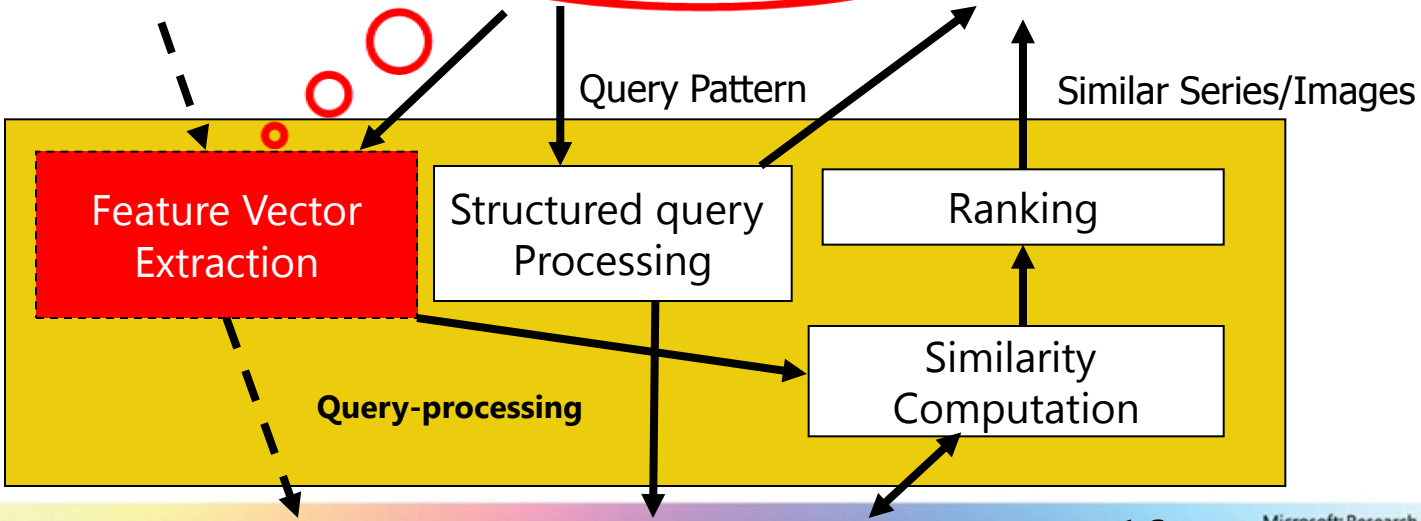

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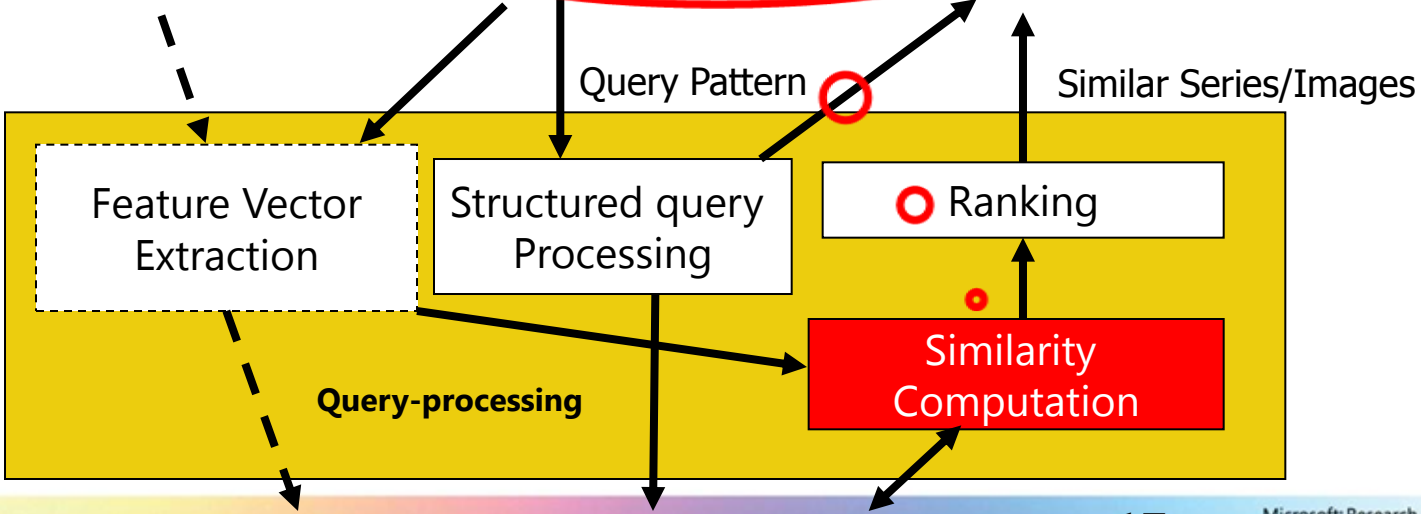

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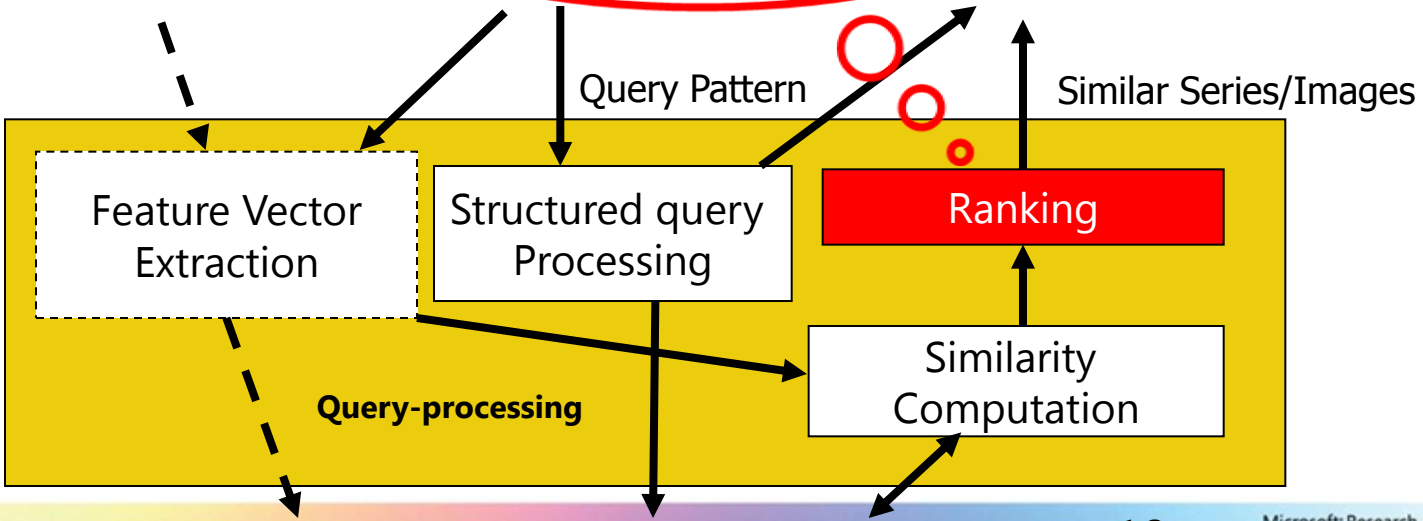

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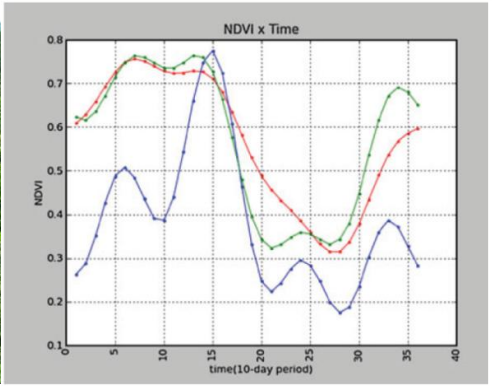
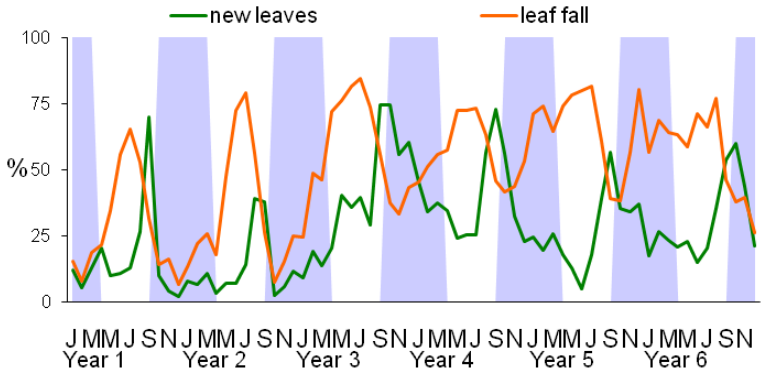
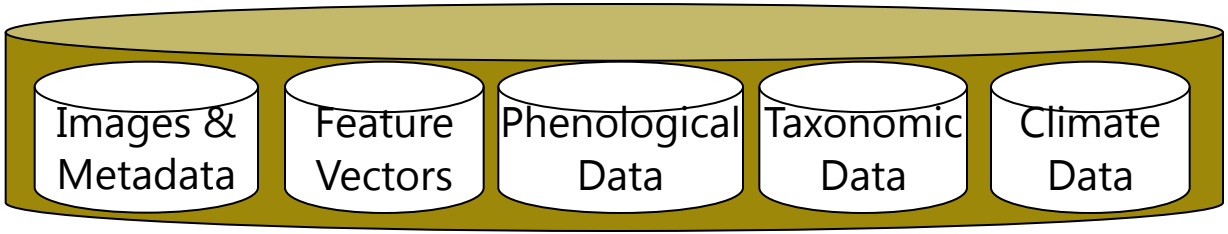
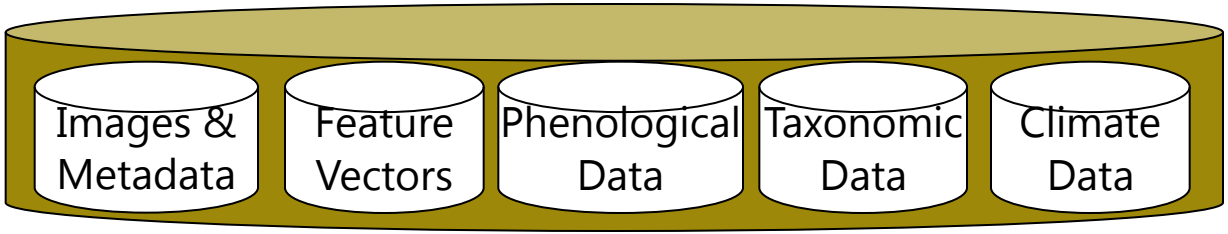






e-phenology system

- Database modeling
- Indexing
- Summaries as views
- Common queries as views



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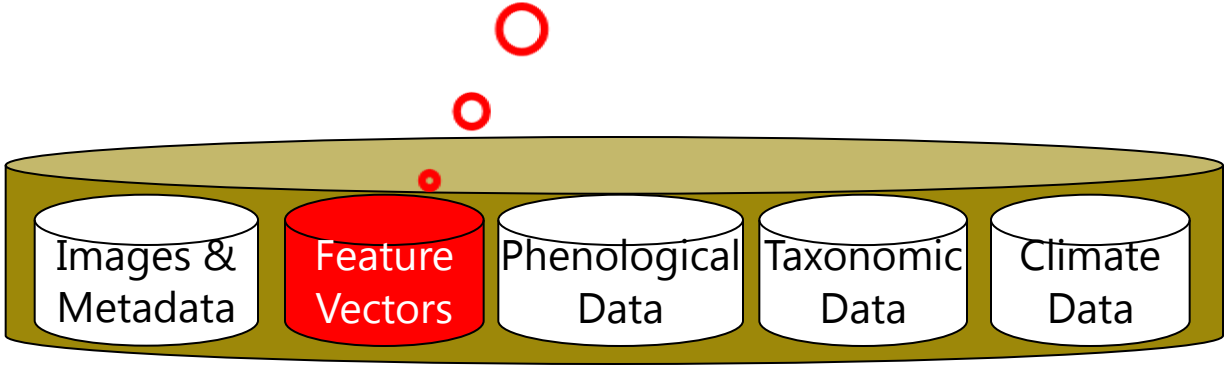

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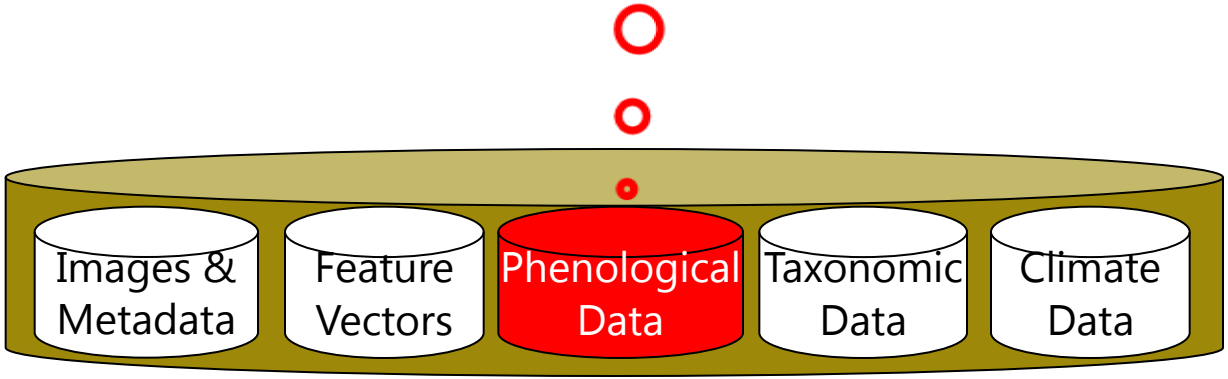

Contributions

- Phenology
  - models and methodologies for climate change analysis based on the exploration of new indices to assess phenology changes
- Computer Science: models, tools and techniques concerning:
  - Image Processing
    - definition and extraction of image content descriptors
  - Databases
    - modeling
    - data mining and fusion
    - time series processing
    - data annotation

unesp

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RECOD
reasoning for complex data

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THANKS!

CNPq
Conselho Nacional de Desenvolvimento Científico e Tecnológico

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TECHNISCHE UNIVERSITÄT MÜNCHEN

TROPI-DRY

"building bridges between research and conservation"

UNIVERSITY OF ALBERTA

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