

Multimedia Data Processing on CIEL

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14 Feb 2012

R202 – Data Centric Networking

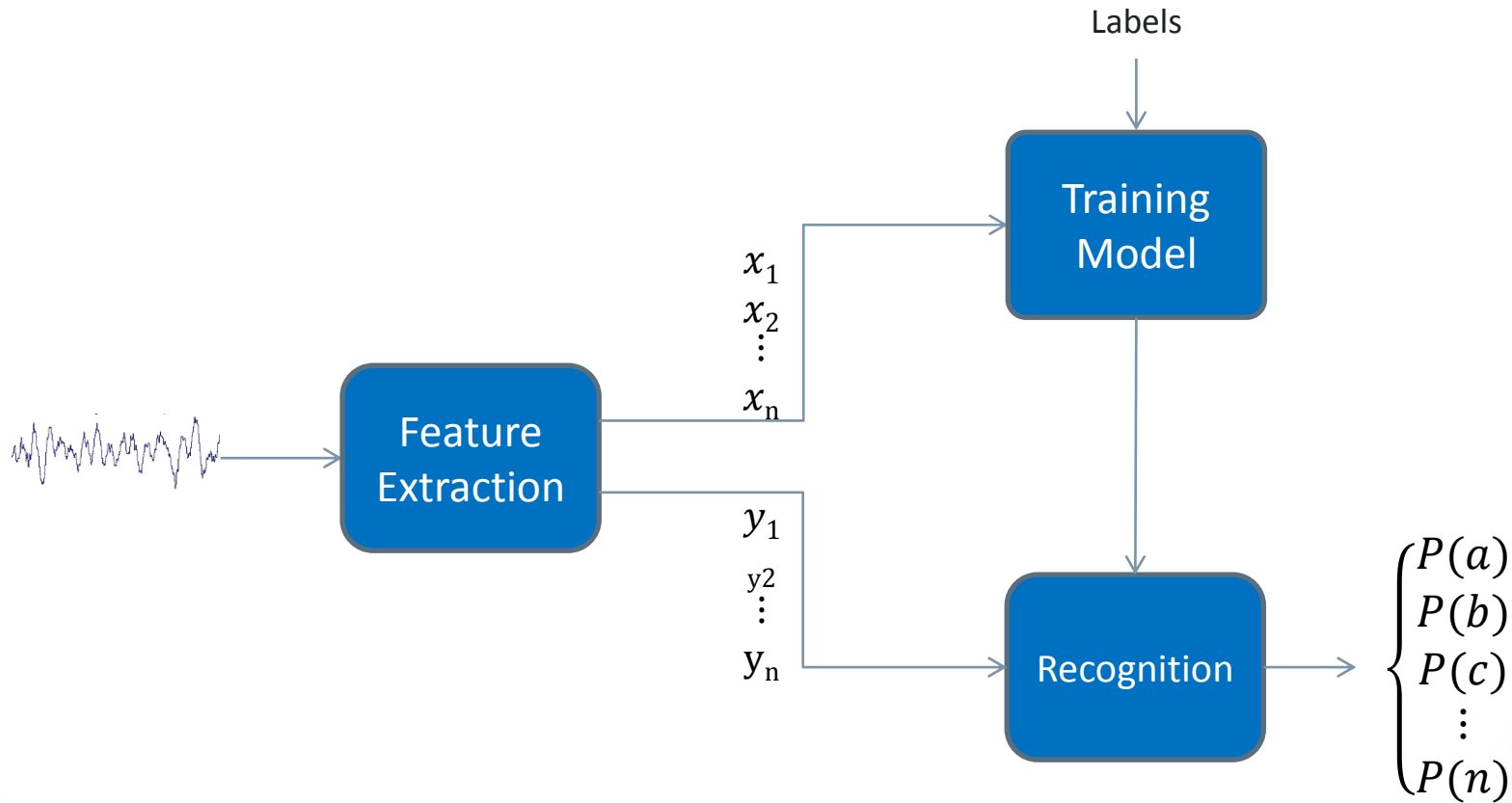
Machine Learning on DC

- Apache Mahout (library for Hadoop)
- Tons of independent codes
- Only on textual/graph content
- No multimedia input
 - Speech, music, image, video

Goal

- Developing an extension for CIEL
 - Prepare multimedia data for processing
 - Tasks should be heavily parallelized
 - Each task should be able to spawn new tasks (iteration)

Model-based Multimedia ML



Dataset

- Multimedia input + time-stamped labels

```
352150000 416514000 Db
416514000 449336000 Ab
449336000 511888000 Ab
511888000 543612000 Gb
543612000 575153000 Db
575153000 639137000 Ab
639137000 670810000 Gb
670810000 701669000 Db
701669000 717149000 Db
717149000 732513000 Bb:min
732513000 764054000 F:min
764054000 796062000 Eb:min7
```

Challenge?

- Terabytes of data
- Very difficult training
- Solution?
 - Group each label together

Solution

352150000 416514000 Db

416514000 449336000 Ab

449336000 511888000 Ab

511888000 543612000 Gb

543612000 575153000 Db

575153000 639137000 Ab

639137000 670810000 Gb

670810000 701669000 Db

701669000 717149000 Db

717149000 732513000 Bb:min

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449336000 511888000 Ab

575153000 639137000 Ab

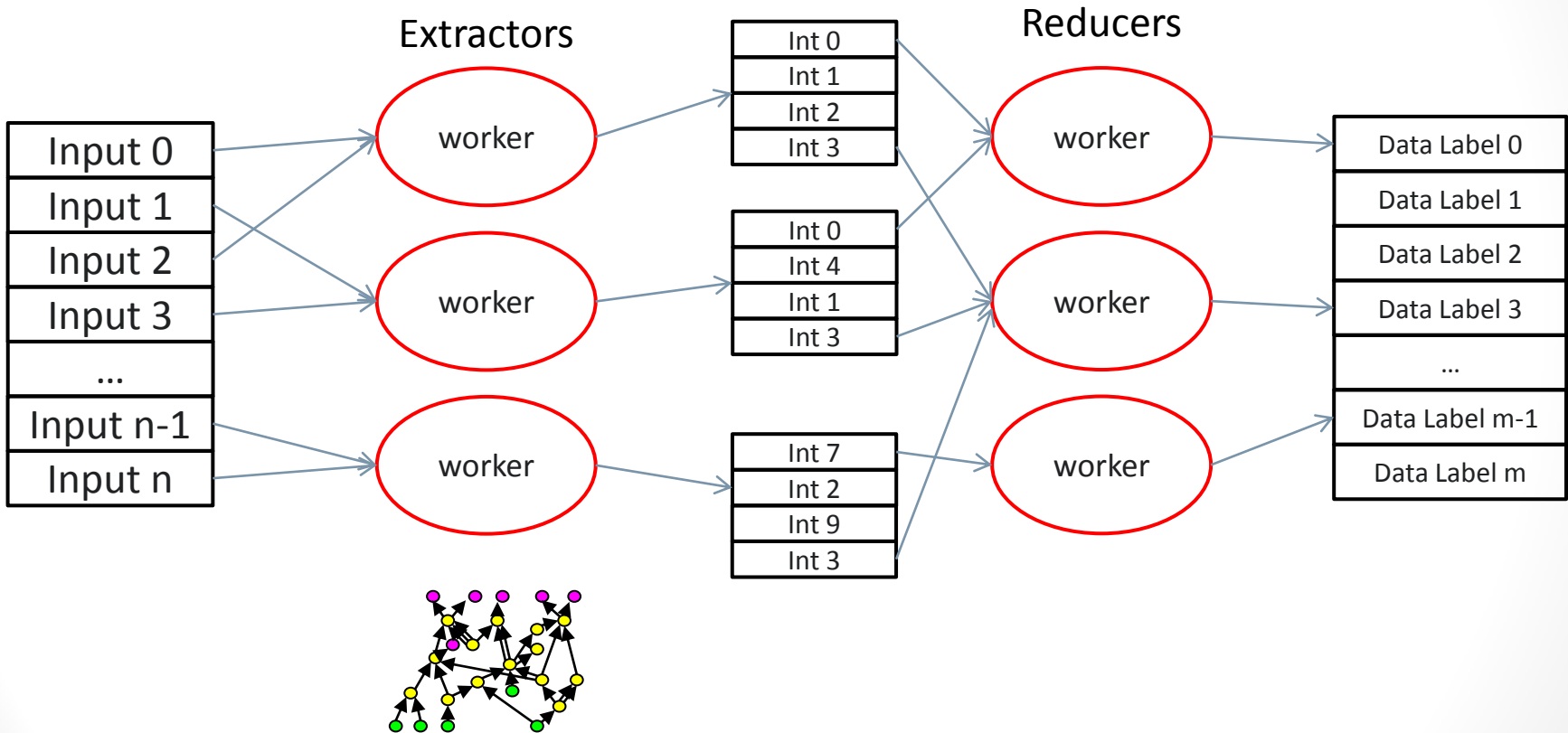
Not that Simple!

- Terabytes of data
 - or gigabytes of labels!
- Image and Video sources
 - No longer can cut audio
 - Need to extract objects from visual sources
 - Huge in interactive ads

Extractor

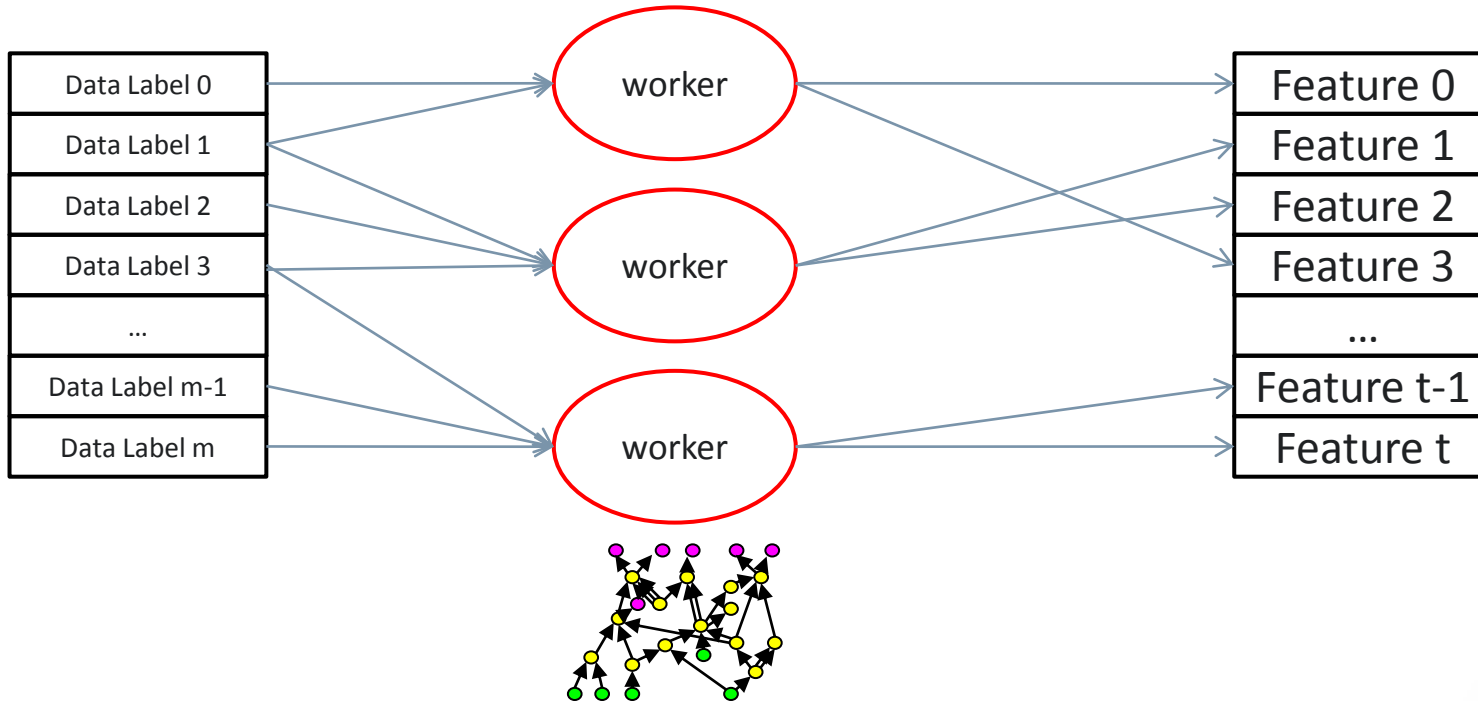
- ```
def extractor(
 string <source_path>,
 string <transcription_path>,
 boolean <spawn> *,
 string <intermediate_path>
)
```

# System Overview



# System Overview (cont.)

Data Analyser



# Data Analyser

- def analyser (  
    string <source\_path>,  
    boolean <spawn> \*,  
    string <destination\_path>  
)

# Overview

- Developer only provides “extractor”, “analyser” and a config
- CIEL (and the extension) takes care of the rest
- Built-in support for audio and video “reducers”
- Sample project for audio processing (MFCC) will be developed for evaluation

