HTM.core Streamer

Python Module

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Module Overview

1) Sample 2) Initialize 3) Run

Data Stream

.
.
.

Data (t+2)

Data (t+1)

Data (t)

Data (t-1)

Data (t-2)

.
.
.

Timestep

< sample

= sample

> sample

Module Processing

Store for encoders sample

Build enc(s) from sample

Initialize models

Store models

Load models
Run data thru models
Store models
Store outputs

Outputs

features_samples

dir_models

dir_results
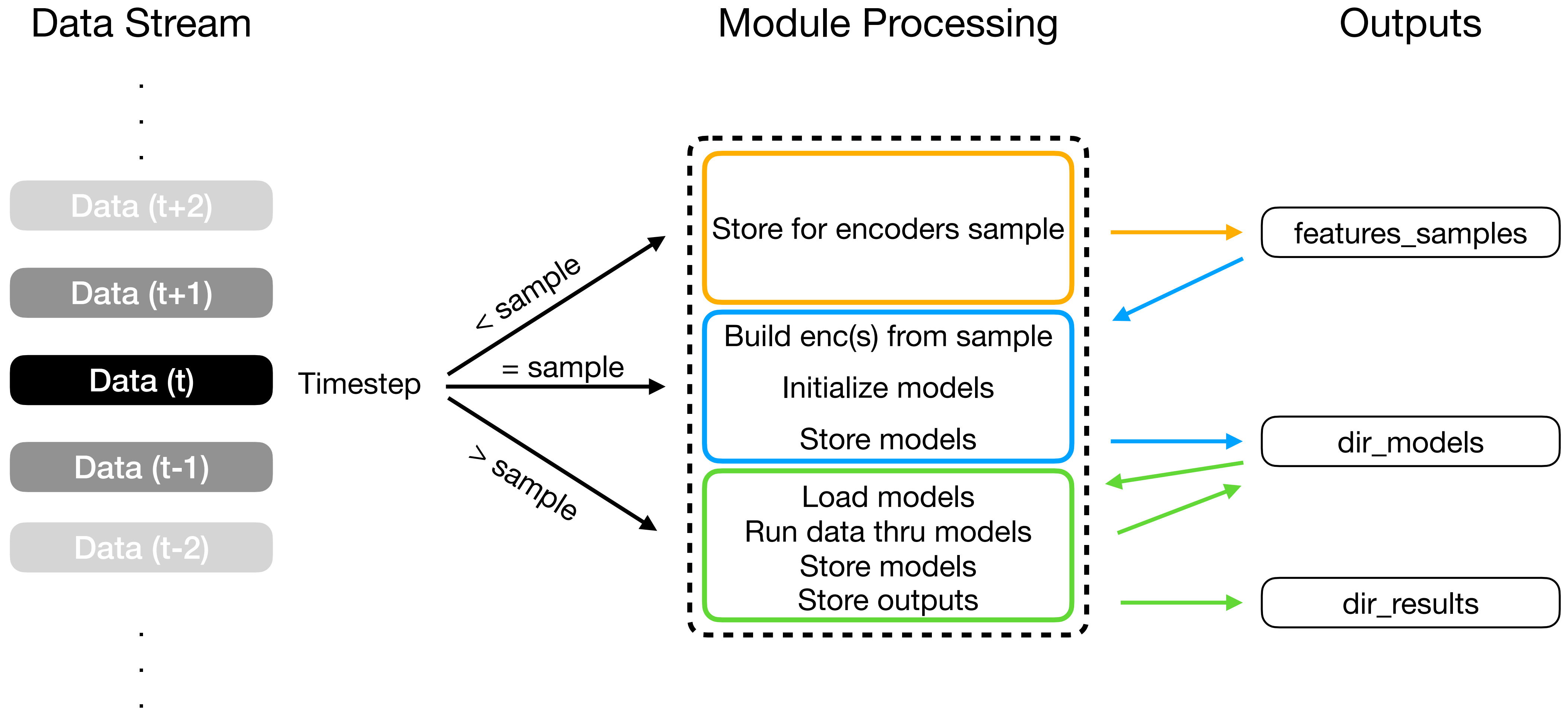
Pseudocode
Main Functions

htm_stream_runner

1. Load --> Config
2. Load —> Batch Data
3. For Row in Batch Data:
   1. Generate —> Stream Data
   2. Store —> Stream Data
   3. Run —> **stream_to_htm**()

stream_to_htm

1. Load —> Config
2. Load --> Stream Data
3. Validate Config
if mode == sample_data:
   4. Store Data
elif mode == init_models:
   4. Store Data
   5. Build Encoder Params
   6. Initialize HTM model(s)
   7. Store HTM model(s)
else: (mode=run_models)
   4. Load HTM model(s)
   5. Run Stream Data thru HTM model(s)
   6. Store HTM models() outputs
   7. Store HTM models()
8. Store Config

Config Structure
Set by user

```yaml
models_encoders:
  minmax_percentiles:
  - 1
  - 99
  n: 700
  n_buckets: 140
  sparsity: 0.02
  timestamp:
    enable: false
    feature: satellite_time
    timeOfDay:
    - 30
    - 1
    weekend: 21
```

Where on disk is data & models stored?

```yaml
dirs:
  data: /where/to/stream/to
  models: /where/to/save-load/models
  results: /where/to/save/results
```

Are timestamp feature be included in models?
What's the name of timestamp feature?
What are the encoder params for timestamp?

Which features are modeled?

```yaml
features:
- Solar_Panel_Voltage_X
- 3.3_Bus_Current
- Receiver_Doppler
- Total_Photo_Current
```

Is the htm.core predictor be active?
What is predictor resolution?
How many steps ahead does predictor go?

```yaml
models_predictor:
  enable: false
  resolution: 1
  steps_ahead:
  - 1
  - 2
```

At what time steps are sampling/learning/running stopped?

```yaml
timesteps_stop:
  learning: 100
  running: 110
  sampling: 50
```

Is there a model for each feature, or one model combing all?

```yaml
models_state:
  learn: true
  mode: sample_data
  model_for_each_feature: true
  timestep: 0
```

Config Structure
Set by user

What are the params for htm.core.AnomalyLikelihood?

What are the params for htm.core.Predictor?

What are the params for htm.core.SpatialPooler?

What are the params for htm.core.TemporalMemory?

```yaml
models_params:
  anomaly:
    period: 1000
  predictor:
    sdrc_alpha: 0.1
  sp:
    boostStrength: 3.0
    columnCount: 1638
    localAreaDensity: 0.04395604395604396
    potentialPct: 0.85
    synPermActiveInc: 0.04
    synPermConnected: 0.13999999999999999
    synPermInactiveDec: 0.006
  tm:
    activationThreshold: 17
    cellsPerColumn: 13
    initialPerm: 0.21
    maxSegmentsPerCell: 128
    maxSynapsesPerSegment: 64
    minThreshold: 10
    newSynapseCount: 32
    permanenceDec: 0.1
    permanenceInc: 0.1
```

Function Call Tree

source.pipeline.htm_stream.**stream_to_htm**()

load_config
load_json
validate_config

if mode == sample:
    extend_features_samples

elif mode == initialize:
    extend_features_samples
    build_enc_params
        get_rdse_resolution
    init_models
        HTMModel.init_model()
            HTMModel.init_encs()
                htm.core.RDSE_Parameters()
                htm.core.RDSE()
                htm.core.DateEncoder()
            HTMModel.init_sp()
                htm.core.SpatialPooler()
            HTMModel.init_tm()
                htm.core.TemporalMemory()
            HTMModel.init_anomalyhistory()
                htm.core.AnomalyLikelihood()
            HTMModel.init_predictor()
                htm.core.Predictor()
    save_models
        save_data_as_pickle

elif mode == run:
    load_models
        load_pickle_object_as_data
    run_models
        HTMModel.run()
            HTMMode.get_encoding()
                htm.core.encoder.encode()
                htm.core.SDR.concatenate()
            htm.core.sp.compute()
            HTMModel.get_predcount()
                htm.core.tm.activateDendrites()
                htm.core.tm.getPredictiveCells()
            htm.core.tm.compute()
            HTMModel.get_preds()
                htm.core.predictor.infer()
                htm.core.predictor.learn()
    save_outputs
    save_models