

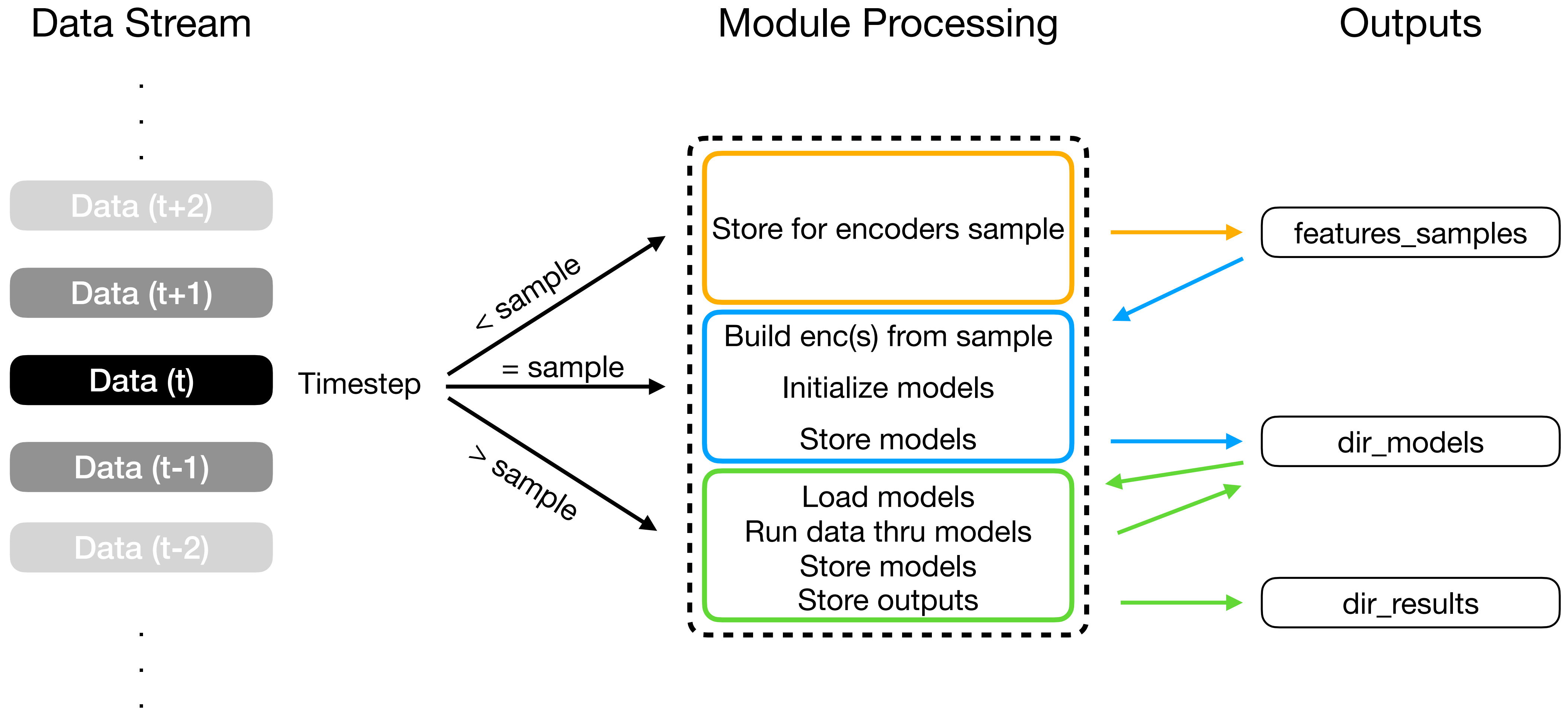
HTM.core Streamer

Python Module

Sam Heiserman — Jan, 2022

Module Overview

1) Sample 2) Initialize 3) Run



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**:
 4. Store Data
- elif mode == **Initialize**:
 4. Store Data
 5. Build Encoder Params
 6. Initialize HTM model(s)
 7. Store HTM model(s)
- else: (mode=**Run**)
 4. Load HTM model(s)
 5. Run Stream Data thru HTM model(s)
 6. Store HTM outputs
 7. Store HTM models()
8. Store Config

Config Structure

Set by user

Where on disk is data & models stored?

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

Which features are modeled?

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

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

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

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

Are timestamp feature be included in models?

What's the name of timestamp feature?

What are the encoder params for timestamp?

```
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
```

Is the htm.core predictor be active?

What is predictor resolution?

How many steps ahead does predictor go?

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

```
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?

```
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