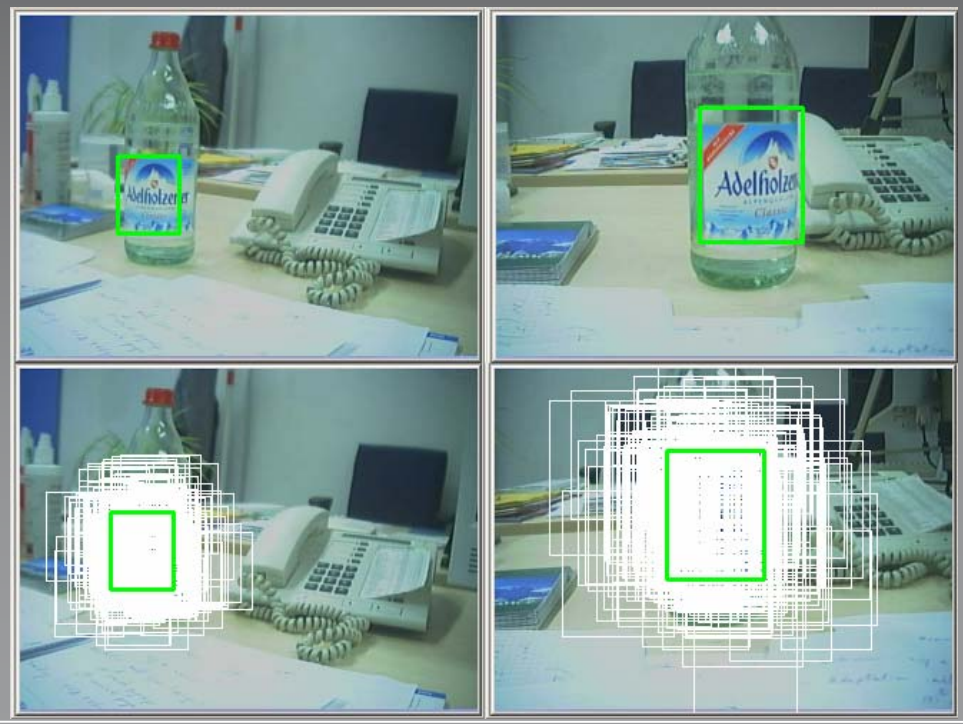
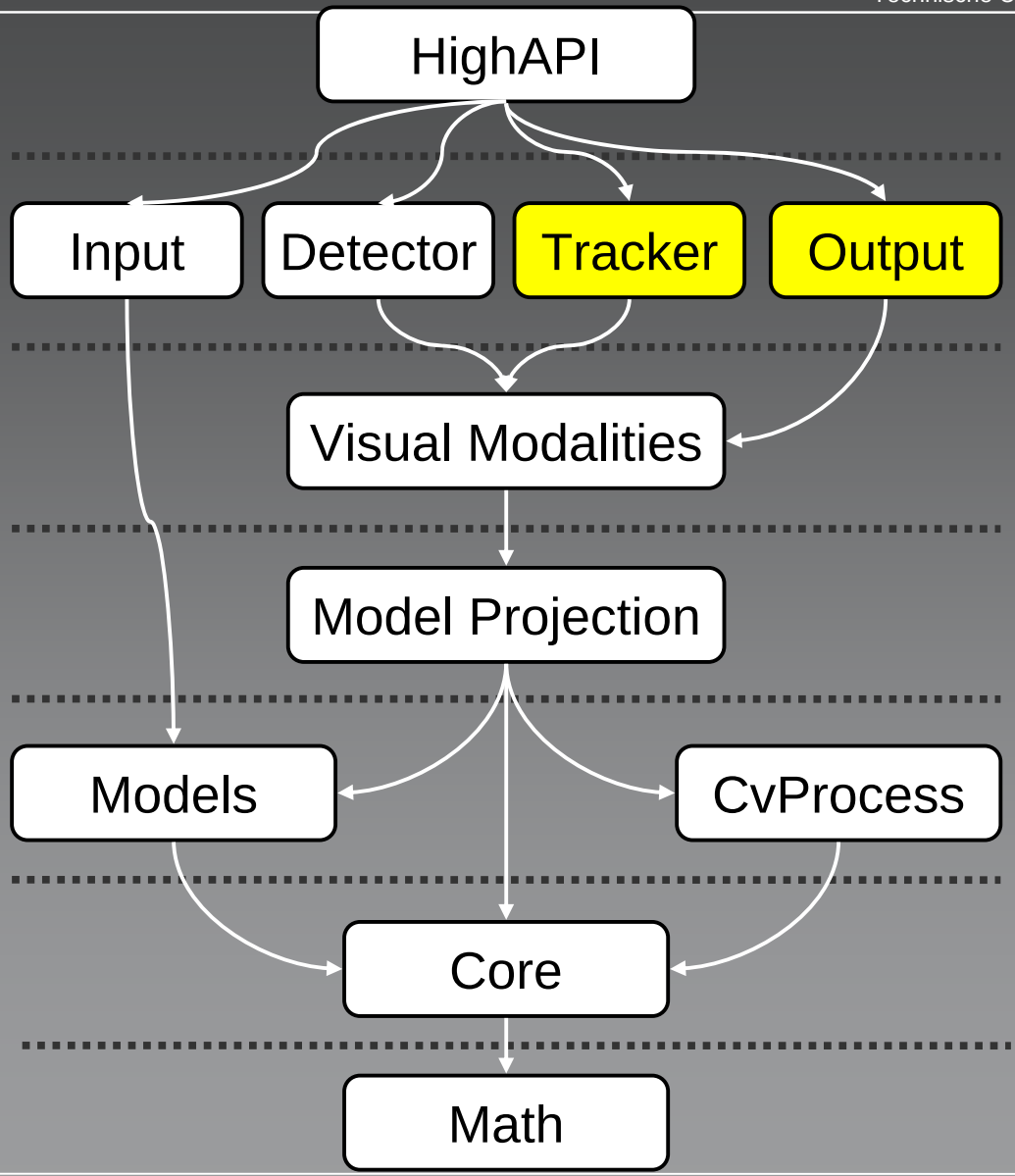
OpenTL – Tutorial 5

- GOAL: Instantiate a SIR particle filter, and track the object




HighAPI
Input
Detector
Tracker
Output
Visual Modalities
Model Projection
Models
CvProcess
Core
Math

Tracker

- opentl::tracker namespace

The Tracker abstraction is common to all Bayesian filters, for single- or multi-target problems

Tracker class abstraction

opentl::tracker::Tracker
{

- Tracker(Likelihood, Warp)
  Construct a tracker, and link to a Likelihood instance

- init(initStates)
  Initialize the state density estimate, $P(s_0)$

- predict()
  From the last posterior $P(s_{t-1})$ and the dynamical model, predict the state prior $P(s^-_t)$

- correct()
  Perform a measurement (using the Likelihood instance) and update the state posterior $P(s^-_t) \rightarrow P(s_t)$

- output()
  Evaluate the output state from $P(s_t)$ (e.g. weighted average)

}

SIR particle filter

opentl::tracker::SIRParticle

- P(s) is internally represented by a set of weighted particles: P(s) ~ $\{s_t^{(i)}, w_t^{(i)}\}$
- The output state is: $\bar{\mathbf{s}}_t = \sum_{i=1}^{N} w_t^{(i)} \mathbf{s}_t^{(i)}$
- In order to get the output:

std::vector<States> * SIRParticle::getTargets(); // Only one State in this vector!

- In order to get a single particle:

State * SIRParticle::getParticles(int i)

- In order to get a particle weight:

double SIRParticle::getParticleWeight(int i)

Output namespace

- opentl::output::Output

This namespace provides output visualization and post-processing

Output class

- output::Output

The Output class contains static functions for visualization, not based on OpenGL

- output::Output::drawPose(

```
&outImage,                  // Destination image
shape,                      // pointer to ShapeAppearance model
warp,                       // pointer to Warp class
pose,                       // pointer to Pose
1,                          // Edge thickness
CV_RGB(255,255,255),        // Color
false,                      // Draw also edge normals
true,                       // Draw edges
camIdx);                    // Camera ID number
```