CollDet — A Library for Collision Detection Based on OpenSG

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The Collision Detection Pipeline

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Some Features of our Pipeline

- Two broad-phase tests:
  - Grid
  - Convex hull check
    - Closest feature tracking, w/o i_collide()
- For the narrow-phase:
  - Boxtree, or
  - Dop-Tree

- Report one intersecting pair of polygons
  (the one first found during hierarchy traversal) or all intersecting pairs
- Supports polygon soups
- Multi-threading support
- Easy-to-use interface
- Runs under Linux (makefiles), Mac (makefiles & xcode project), and Windows (M$ project & makefiles)
- User-defined collision callback classes
// init collision detection
pipeline = new CollisionPipeline( "threadName", threadID );

// register objects
for ( unsigned int i = 0; i < nobjects; i ++ )
{
    pipeline->makeCollidable( object[i].osgnode );
}

// start the collision detection
pipeline->run( threadID );

---

**Callbacks**

- Define callback class:

  ```cpp
  class CollisionCallback : public col::Callback
  {
  public:
      virtual void operator () ( const col::Data *data ) throw();
  };
  ```

- Register objects:

  ```cpp
  for ( unsigned int i = 0; i < nobjects; i ++ )
  for ( unsigned int j = 0; j < i; j ++ )
  {
      pipeline->addCallback( new CollisionCallback(
          object[i].osgnode,
          object[j].osgnode
      ) );
  }
  ```
Future Work — What CollDet can’t do (yet)

- Penetration depth
- Time critical collision detection
- Continuous collision detection
- Deformable objects
  - Animated objects already working, but not yet integrated
Additional Information

- The Library:
  http://cg.in.tu-clausthal.de/research/colldet/

- Additional benchmarking results:
  http://cg.in.tu-clausthal.de/research/colldet_benchmark/