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Appendix A

Finite state machine with temporal states

The pseudo code of the finite state machine (FSM) that implements the multitemporal framework's control strategy, incorporating the proposed multitemporal extension, is presented below. The two new states of the FSM, TEMP_TD_EVALUATE and TEMP_BU_EVALUATE, are related respectively to the temporal top-down and to the temporal bottom-up steps introduced in Section 5.2.2. The lines printed in bold represent the new code with respect to the previous implementation of the control process in GeoAIDA.

```
procedure INode.fsm()
begin
  case state in
    START_CHILDREN:
      if isRoot then globalTemporalCount:=1;
      count:=0;
      if snode.temporalNode and temporalSequence
        and (snode.temporalOrder <>0) then
        begin
          if (snode.temporalOrder==globalTemporalCount) then
            begin
              generateNodeList(parent.children());
              command:=snode.generateTemporalTopDownCommand
                (globalTemporalCount);
              state:=TEMP_TD_EVALUATE;
              task.register(this,command);
            end;
          end;
        else
          begin
            for each child in snode.children() do
              begin
                count:=count+1;
                hnode=new INode(child);
                childLink(hnode);
                hnode.geoBBox:=geoBBox;
                hnode.state:=TD_START;
                hnode.fsm();
              end;
            state:=BU_START;
          end;
        end;
      ...
end;
```

```

procedure INode.fsm()
begin
  case state in
    ...
    TEMP_TD_EVALUATE:
      todelist:=snode.readTemporalTopDownResult();
      for each tnode in todelist do
        begin
          count:=count+1;
          hnode=new INode(tnode);
          childLink(hnode);
          hnode.state:=TD_START;
          hnode.fsm();
        end;
        state:=BU_START;
      ...
    end;

procedure INode.fsm()
begin
  case state in
    ...
    TD_START:
      command:=snode.generateTopDownCommand();
      snode.generateImages(geoBBox);
      state:=TD_EVALUATE;
      task.register(this,command);
    ...
  end;

procedure INode.fsm()
begin
  case state in
    ...
    TD_EVALUATE:
      hodelist:=snode.readTopDownResult();
      for each hnode in hodelist do
        begin
          parent.childLink(hnode);
          parent.count+1;
          hnode.originalP:=this.p;
          hnode.state:=START_CHILDREN;
          if (hnode.snode.numberOfChildren==0) then
            parent.fsm();
          else
            hnode.fsm();
          end;
          parent.childUnlink(this);
          parent.fsm();
          delete this;
        ...
      end;

```

```

procedure INode.fsm()
begin
  case state in
    ...
  BU_START:
    count:=count-1;
    if count==0 then
      begin
        if (snode.temporalNode) then
          begin
            allCousinsProcessed:=1;
            for each sibling in parent.children() do
              if sibling.snode.temporalNode and sibling.count > 0 then
                allCousinsProcessed:=0;
              if allCousinsProcessed==1 then
                begin
                  generateNodeList(this.children());
                  for each sibling in parent.children() do
                    if sibling.snode.temporalNode and sibling.<>this
                      then
                        concatNodeList(sibling.children());
                        command:=snode.generateTemporalBottomUpCommand();
                        state:=TEMP_BU_EVALUATE;
                        task.register(this,command);
                    end;
                  else
                    begin
                      if temporalSequence then
                        begin
                          globalTemporalCount:=globalTemporalCount+1;
                          for each sibling in parent.children() do
                            if sibling.temporalOrder==globalTemporalCount
                              then
                                sibling.fsm();
                            end;
                          end;
                        end;
                      else
                        begin
                          generateNodeList(this.children());
                          command:=snode.generateBottomUpCommand();
                          state:=BU_EVALUATE;
                          task.register(this,command);
                        end;
                      end;
                    end;
                  ...
                end;
              end;
            end;
          end;
        end;
      end;
    end;
  end;
end;

```

```
procedure INode.fsm()
begin
  case state in
    ...
    TEMP_BU_EVALUATE:
      todelist:=snode.readTemporalBottomUpResult();
      for each sibling in parent.children() do
        begin
          for each child in sibling.children() do
            begin
              sibling.childUlink(child);
              delete child;
            end;
          for each tnode in todelist do
            if tnode.class==sibling.class then
              sibling.childLink(tnode);
            end;
          parent.fsm();
        end;
      end;
    ...
  end;
```

```
procedure INode.fsm()
begin
  case state in
    ...
    BU_EVALUATE:
      godelist:=snode.readBottomUpResult();
      if isRoot then
        analysisFinished(godelist.first);
      else
        begin
          for each gnode in godelist do
            begin
              parent.childLink(gnode);
              gnode.originalP:=this.originalP;
            end;
          parent.childUnlink(this);
          parent.fsm();
        end;
        delete this;
      end;
  end;
```