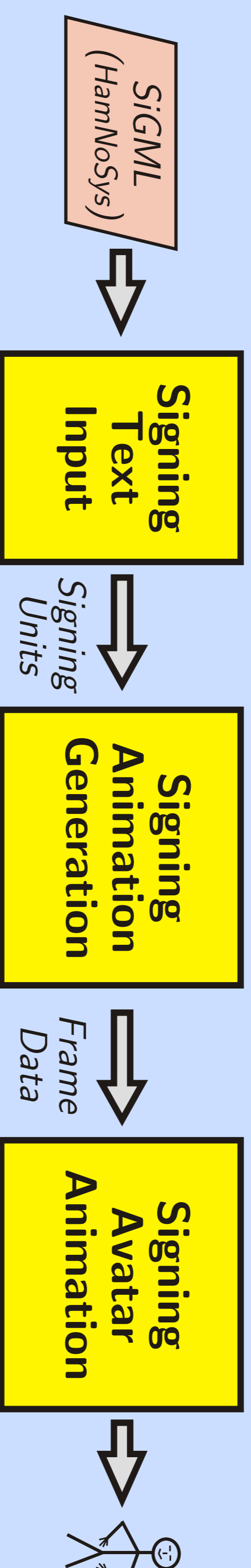
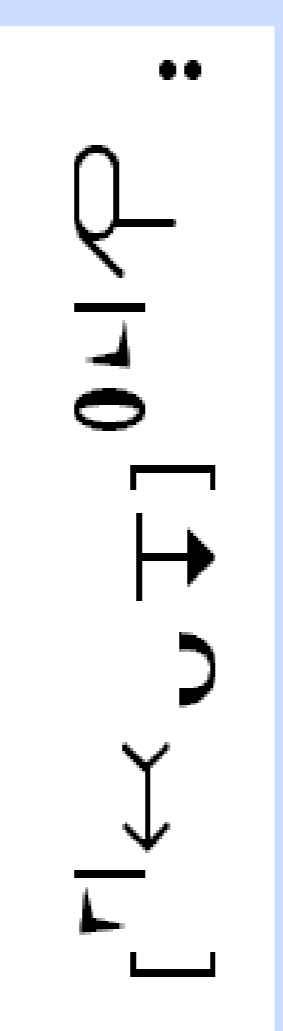


R Elliott, JRW Glauret, VJ Jennings, JR Kennaway, KJ Parsons *School of Computing Sciences, UEA Norwich, UK*



The SiGML Notation

- SiGML stands for *Signing Gesture Markup Language*.
- The SiGML notation has been developed at UEA to support the work of the ViSiCAST and eSIGN projects.
- SiGML allows *sign language sequences* to be defined in a form suitable for performance by a *virtual human*, or *avatar*.
- The signing avatar can be displayed on a computer screen, or on other mobile devices.
- SiGML is a form of *Extensible Markup Language* (XML) – a simple but flexible format for the exchange of structured and semi-structured data.
- XML is represented as plain text – hence it is easily transported over the Internet and World-Wide Web (WWW).
- The most important technical influence on the SiGML definition is *HamNoSys* – a notation for sign language phonetics (example below).



SiGML and HamNoSys

- *HamNoSys* – the *Hamburg Notation System* – is a well-established transcription system for sign languages, developed by our partners at the University of Hamburg.
- Each sign language has its own grammatical structure – it is *not* an alternative form of some spoken language.
- But sign language phonetics are visual, not aural. Sign language is articulated primarily by the *hands*, but also using the head and face.
- Because HamNoSys describes sign language phonetics it can represent signing expressed in *any* sign language.
- Below is the SiGML corresponding to the HamNoSys example on the left:

```
<?xml version="1.0" encoding="iso-8859-1"?>
<!DOCTYPE sigml SYSTEM "http://www.visicast.cmp.uea.ac.uk/sigml/sigml.dtd">
<sigml>
  <hamgestural_sign gloss="going_to_DGS">
    <sign_manual both_hands="true">
      <handconfig handshape="finger2" thumbpos="out"/>
      <handconfig extfidir="no" palmor="1"/>
      <par motion>
        <directedmotion curve="u" direction="o"/>
        <tgt_motion>
          <change posture/>
          <handconfig extfidir="do"/>
        </tgt_motion>
      </par motion>
    </sign_manual>
  </hamgestural_sign>
</sigml>
```

SiGMLSigning Software

- *SiGMLSigning* is a flexible software system, developed at UEA for the eSIGN project, to provide animation of signing sequences defined in SiGML.
- SiGMLSigning implements the processing pipeline shown schematically above.
- At the heart of this process is *Animgen* – the “synthetic animation engine”: this converts SiGML to a sequence of animation “frames” (25fps), each corresponding to a configuration of the avatar’s *virtual skeleton*.
- The SiGMLSigning architecture defines interfaces allowing any suitable avatar to be driven in this way.
- The eSIGN project uses the *VGuido-Mask2* avatar, developed by our partners at Televirtual (below left).



- To support our research into synthetic virtual human animation we have developed our own avatar animation system – the *Avatar Research Platform*, ARP (above right).