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 – the Hamburg Notation System – an 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
<?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="uo" palmor="l"/>
      <par_motion>
        <directedmotion curve="u" direction="o"/>
        <tgt_motion>
          <changeposture/>
          <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).

Current SiGML working definition: http://www.visicast.cmp.uea.ac.uk/sigml/
UEA eSIGN: http://www.visicast.cmp.uea.ac.uk/eSIGN/

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ViSiCAST

VGuido

VGuido avatar and Mask2 rendering software supplied by Televirtual Ltd.