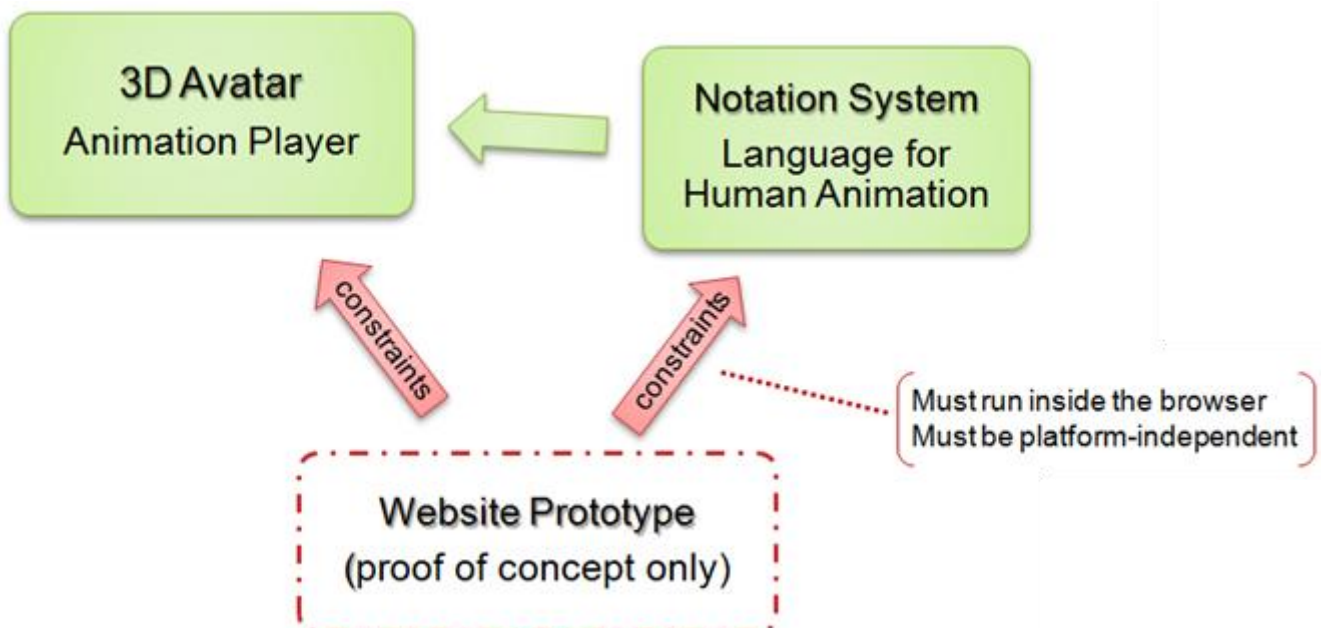# Scripting 3D Human Animation

by Reinhard Pointner

Goals:

- ## Scripting Language
  - similar to natural language

- ## 3D Visualisation
  - state-of-the-art 3D graphics

- ## Web Deployment

Approach and Technologies

Scala Prog. Language

- Host language for the DSL
- Runs on the Java Platform

jMonkeyEngine

- Java Game Engine
- Scene-Graph API

Java Applets

- Embed into web page
- Escape the sandbox

Animation Description Language

- ■ Define joint rotations

- ■ Internal Scala DSL

- ■ Use Language Features
  - • Varargs
  - • Implicit conversions
  - • Non-word method names

- ■ Build instruction tree

Example

```
sequence(
    parallel(
        rotate the (left arm) by (45°) in (2 seconds),
        tilt the (left arm) by (45°) in (2 seconds)
    ),
    rotate the head by (0.5 π) in (500 ms)
)
```

Scriptable Animations

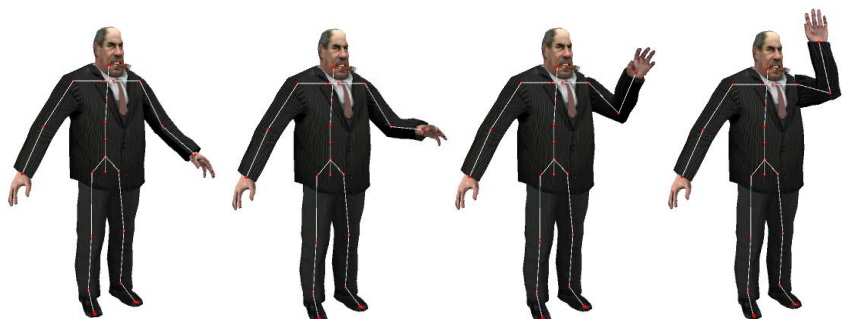Compile and execute
Scala code at runtime
🔒 with restricted access

Process instruction tree
into internal representation

Adjust bone
transformations
over time

Deployment as Java Applet

- Proof-of-concept
- Embedded into a website
- Controlled via JavaScript
- Deployed on the web

Evaluation of Language and Visualisation

Language Implementation

+ Powerful constructs
+ Extremely extensible
+ DSL easily readable

Language Design

– Difficult to comprehend
– Fundamentally flawed
– Error Reporting

3D Visualisation

+ Rigged and skinned model
+ Smooth bone animation
~~Replaceable model~~
~~Finger movements~~

Evaluation of Web Deployment

JNLP Applet

+ Signed applet
+ Pack200 compression
+ Web Start Cache
o Requires Java 6u10

Embedded Scala Compiler

– Bypasses default class loading mechanism
– Severe workarounds required

Collaborative Online
Sign Language Dictionary

Summary & Conclusion

Implementation:

Scripting Language ❌

3D Visualisation ✅⚡

Web Deployment ✅⚡

Technologies:

jMonkeyEngine ✅

Internal Scala DSL ✅

Embed Scala Compiler ❌

Java Applets ✅