Fujitsu Semiconductor
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Factsheet
CGI Studio

2D and 3D HMI Software Development Platform for Automotive Systems

CGI Studio is Fujitsu's software development platform for development of hybrid 2D and 3D graphical interfaces (HMI/GUI) for Automotive Systems.

Besides the "Candera 2D" engine and the "Candera 3D" engine, Fujitsu provides a continuous tool chain for the development of hybrid 2D and 3D graphical interfaces.

Applications with CGI Studio

- Focusing on automotive clusters and infotainment systems
- Specific software design for automotive needs

One approach covers

- Import design from artist
- Development on host
- Verification on host
- Deployment to target

Beneficial return with CGI Studio

- Cost Savings
  - Reduction of HMI development costs by very early evaluation of HMI development
  - Support of review cycles in a very early stage
  - Support of late changes by tooling in a smooth way
  - Support of variant handling by tooling without the need of recompiling
- Seamless process flow
  - From artist into the electronic system with one tool chain
  - From rapid prototyping of user interfaces to serial development with one tool chain
- Development of 2D and 3D user interface on Microsoft Windows
  - Implement and test user interface in convenient environment
  - Continuous and painless integration on target device
- Strict separation of code and user interface data
  - No source code generation
  - 3D data can be exchanged without source code changes (e.g. skinning)
  - Platform independent abstraction
- Early evaluation of performance and visual impression
  - Immediate output for visual verification
  - Hardware requirements determination during HMI design phase

Candera 2D engine feature set

- Dynamic scene graph
- 2D animations(rotation, scaling, and translation of bitmaps)
- Supports interaction with Candera 3D engine
  - Render to texture
  - Post-process 3D images
  - 2D/3D scene combinations
- Customizable effects on scene graph nodes like shadows and transparency
- Support of hardware layers and multiple displays
- Support of alpha blending
- 2D widget support
- Text rendering capability

Candera 3D engine feature set

- Based on OpenGL 2.0 ES standard
- Full support of OpenGL 2.0 ES feature set
- OS & application independent
- Hardware independent
- Screen and scene management
  - Scene based screen composition
  - Multiple scenes
  - Multiple screens
    - Multiple cameras per scene
    - Scene transition
  - Multiple render targets
  - Multi-pass rendering
  - Anti-aliasing
    - Full screen super-sampling
    - Multi-sampling AA (GPU Based)
    - Object specific AA
  - Dithering
- 3D objects

- 3D surfaces (Mesh)
- Hierarchical object groups
- 2D objects in 3D space
  - Billboards
  - Point sprites
- 2D and 3D text support
- Enhanced 2D True Type Font rendering: LTR, RTL, Bidi, e.g. Arabic
- Object transformations
  - Translation/rotation/scale
- Shared object appearance
  - Materials/shaders/textures
- Bounding volumes
  - spheres
  - aligned boxes
- Ray intersection and object picking

■ 3D processing
- Dynamic lighting
- Static and dynamic shadowing
- Material
- Various render modes (winding, culling, blending, shading, etc.)
- Multi-pass rendering
- Morphing
- Reflection and reflection camera
- Wireframe rendered models
- Environment mapping
- Textures incl. multi-texturing
- Texture maps
- Rendering order, layering
- Level of detail for 3D objects

■ Animation framework
- Modification of 3D object attributes over time
- Key-frame based animations
- Animation playback
- Built-in interpolation strategies
- Adjustable playback speed
- Repeat modes
- Application controlled world-time

■ Asset management
- Resources bundled in assets generated by scene composer (scene trees, 3D models, textures, text and fonts, shaders, animations, widgets)
- Application controlled instantiation
- Different VRAM-upload strategies
- Support of "On-the-Fly"-update

■ Optimization
- Optimized render order
- Optimized state management
- Multiple frequency rendering

■ Platform-, renderer abstraction
- Platform independent engine
- Tiny platform integration I/F
- HW layer configuration support

- Anisotropic filtering
- Non-linear depth buffer
- Render target and EGL extensions
- Custom shader parameter names

CGI Studio Scene Composer

■ 2D and 3D Scene Creation
- Hybrid 2D/3D scene composition
- Mixture of 2D and 3D content in one design
- Distinct layer support for 2D and 3D content

■ Artifact import
- Clearly defined import workflow
  - Update of imported artifacts
- Artifacts import from DCC-tools
  - Models and geometry in FBX format
  - Textures and texture images
  - 2D True Type Fonts (TTF)
  - 3D Fonts
  - Animations
  - Shader programs
  - Widgets

■ Screen and Scene Composition
- Drag & Drop of imported 2D/3D graphical artifacts
- Drag & Drop of widgets
- 2D and 3D Scene composition
- 2D and 3D Object configuration
- Light and camera configuration
- Scene transition configuration
- Widget configuration incl. assignment to 2D/3D objects
- Texture preview
- Animation creation
- Animation configuration and assignment to 2D/3D object widget properties
- Real-time scene visualization
- Multi layer and display support

■ Asset Export
- Export resources for
  - Host system
  - Target system

■ Verification & Testing
- Active scene is always rendered in the WYSISWYG window
- Early visual inspection of imported content
- Object properties can be dynamically changed in the active scene → immediate results

CGI Studio Player

■ Application development & verification

■ Widget design & verification

CGI Studio Courier - Interaction Framework

■ Data binding and message handling

CGI Studio Analyzer

■ Bottleneck detection and optimization

CGI Studio Translator

■ Context based text translations

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