V-Man Generation for 3-D Real Time Animation

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The V-Man project has developed an intuitive authoring and intelligent system to create, animate, control and interact in **real-time** with a new generation of 3D virtual characters: **the V-Men**. It combines several innovative algorithms coming from Virtual Reality, Physical Simulation, Computer Vision, Robotics and Artificial Intelligence.

V-Men synthesise motion at runtime according to their environment, their task and their physical parameters. Given a high-level task like "walk to that spot" or "get that object", a V-Man generates the complete animation required to accomplish the task. In doing so, the character draws upon its unique set of skills, which are manufactured during the character creation. Each skill is a short sequence of motion capture animation defining a single action. Transitions between movements require combination of motion blending algorithms, animation sampling methods and real-time physical simulation of the body. Moreover a path planner based on genetic algorithms allows a virtual character to autonomously compute collision free paths in real time according to its movement constraints as well as its areas of interest.

Interaction is intuitive between the user and the V-Men: a V-Man understands high-level multimodal commands such as “go there” or “put that there”, where the command is expressed through out a voice control system while the deictics “that” and “there” are defined by mouse clicks. Moreover V-Men are capable to communicate through naturally spoken sentences with users using a natural language dialogue system.

The key to the system is the automated creation of realistic V-Men, not requiring the expertise of an animator. It is based of the acquisition of real human data captured by 3D body scanners, which is then processed to generate firstly animatable body meshes, secondly skinned body meshes and finally 3D garments.