FACT SHEET

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UNLEASHING CREATIVE TECHNOLOGIES

Nanyang Technological University (NTU) and the Defence Science & Technology Agency (DSTA) have teamed up with University of Southern California (USC) to work towards a common vision of leveraging on creative technologies for applications in the education, defence and/or entertainment domain.

With the signing of the Memorandum of Understanding today, the three parties will be able to tap on one another’s expertise and to synergize efforts made in research areas such as artificial intelligence, computer graphics and animation, gaming as well as modelling and simulation.

Local WarGaming gets a makeover

Full Spectrum Command

Over the last two years, DSTA, recognising the potential of computer games as a supplement to conventional military training methods, has begun to harness innovative PC-game
technologies. Working in tandem with USC’s Institute for Creative Technologies (ICT)\(^1\), an existing PC game which was developed by ICT for the US Army - the Full Spectrum Command (FSC) was then adopted and customized to suit the local training needs.

DSTA and ICT have also since embarked on R&D efforts to enhance the artificial intelligence of the non-player characters (NPC)\(^2\) in the FSC game. Based on hybrid machine learning techniques, the NPC are capable of “learning” and adapting their behaviour after each game, thus achieving an improvement in performance over time. This will give FSC gamers more realism and more challenging games.

**Full Spectrum Leader**

To motivate and engage a new generation of IT-savvy soldiers who are familiar with weapons and systems used in the Singapore Armed Forces (SAF), the new Full Spectrum Leader (FSL) game has been developed under a project agreement between DSTA and ICT. FSL is developed with the SAF’s unique training requirements in mind. It contains realistic 3D models of SAF soldiers, weapons like SAR21, as well as an urban terrain modelled to local training environments. Voice commands were also recorded from real soldiers to provide a distinct Singaporean flavour. SAF platoon tactics and procedures were also taken into account during the game development.

FSL is a training tool for platoon commanders in battlefield co-ordination at the platoon level. The game challenges the player to understand the significance of terrain analysis, his position in influencing the battle, and the potential fratricide situations that can occur during battle. One of the key features in FSC is the focus on firepower and manoeuvre techniques taken by a platoon for peacekeeping and peace enforcement operations in an urban environment.

The objective of the game is to develop the SAF platoon commanders’ cognitive skills, tactical decision-making, resource management and adaptive thinking through realistic, yet fun and entertaining, game-play. FSL is targeted for download from the SAF NSMen’s portal as early as next month.

Now, with the partners working in alliance with NTU and the other schools/research centres in USC, we can expect more creative and realistic computer games to enhance our soldiers training in the near future.

\(^1\) The collaborative work was conducted under a Project Agreement signed between Singapore Army and US Army.

\(^2\) NPC is a game terminology to refer to those computer-controlled characters that the gamers interact with or play against.
Real-Time Human Character Animation

In modelling and simulation, it is important to incorporate appropriate and meaningful, subtle facial expressions and body language. Existing human character animation systems lack the flexibility for adaptation to meet the requirements of the dynamic environment. Furthermore, these systems can only generate a limited set of facial expressions and body movements during runtime. With the advancement in commercialized motion capture and 3D key-framing approach, research possibilities in the reuse of captured and synthesized motions are now possible.

Under the MOU, Temasek Labs@NTU³ and ICT plan to explore and create a highly efficient, robust and generic real-time character animation engines comprising features that can be easily integrated and modified to meet the requirements of a designated simulation. The project includes devising highly effective and robust methods to generate and control body movements and facial expressions of virtual humans.

The proposed 3D character animation system, which will focus on reshaping, cycling, blending, transition and retargeting of motion clips, is expected to allow computer artists and/or developers to interactively create realistic and fascinating complex motion and facial expressions of human characters with little effort. While significantly increasing the realism of simulation, future development cost is also expected to be reduced. The potential application areas include TV and animated feature production, warfare simulations, interactive movies, simulation rides and many others.

³ TL@NTU is a research institute jointly established by NTU and DSTA.