AGENT BASED FRAMEWORK FOR AVATAR INTERACTIONS IN AN ADAPTIVE VIRTUAL WORLD GAME ENVIRONMENT

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RATIONALE AND OBJECTIVES:

Technology has progressed by leaps and bounds by making a big footprint on society at large, but more than often we notice the basic infrastructure of social setup not progressing, in many cases quite stagnant- noticeably healthcare[2][3]. While acknowledging progress in healthcare technology- enabling us to perform surgeries and treatments which would seem nothing less than a miracle a decade ago, to the great advances in pharmacology and medicine, one thing which is still elusive and coping up is the healthcare delivery system.

Our research involves integrating technologies like Avatar based Virtual Worlds (VW)- Second Life, real-time skeletal tracking sensor-Microsoft Kinect and explores the idea of improving interactions between medical practitioners and patients using avatars (digital characters that have controllable expressions, animations and speech) to guide and encourage patients to comply with treatments, provide support, and elicit information about their well-being. Also by employing open source Kinect drivers (for tracking avatar motion and gesture control in the virtual world) vast possibilities open up in domains involving human interactions on cognitive, physical and social scale. The specific areas where we are focusing are:

- We seek to understand the implication different user activities as well as social interactions that impact traffic behavior on popular VW hosting applications such as Second Life.
- The way region servers are managed (having constrained resources) and their processing space utilization have not been looked into in detail.
- Control over network resources and traffic profiling: determining what interactions and activities are best for optimized performance measures for best service delivery in the virtual setup.

AGENT-BASED SIMULATION FRAMEWORK:

To model this complex environment with different role-playing entities- an Agent based Framework, allows application based preferences and priorities to be analyzed in allocating network resources and assigning traffic interactions[5][6][7]. The expectation of this is a more meaningful characterization and understanding of application requirements as well as end user expectation to model a real world setting.

 This research proposes to investigate the strategies to guide virtual world interactions using control strategies. Though works like automated QoS control system to allocate network resources for priority applications have been done to characterize traffic flows in real time, but the virtual worlds pose the problem of asymmetrical network loading w.r.t varying social, physical circumstances. Our control strategy works by profiling the traffic from various users to the server as one of the various levels based on the load subjected to network. These levels differentiate the virtual region space into areas where avatar participation

can be controlled by an overseer agent and their actions be known to have a predictable distribution. Thereby, optimal resources allocation for these specific regions can be done. We have developed an Agent-based simulation framework and to test the framework, we develop a Healthcare facility in VW setting where multitude activities can be developed or customized as per requirement.

RESULTS:

Through our simulation framework, we test our control strategy to characterize traffic patterns in the hosted environment to improve game quality experienced by users. Role playing agents perform the necessary traffic policing and the game progression dynamically adapts with the system. Profiling traffic as per our proposed control strategy helps to identify bottleneck situations, which are further avoided by agent's intelligent functionality.

From control perspective, better management of the traffic can be done such that no overloading is allowed to disrupt the quality of service experienced by end-user in these regions specifically the most popular ones. From economic perspective, privileges and access can be granted to avatars confirming to pay as per the economic policy adopted by the healthcare provider. From consumer/ end-user perspective (here patient), this virtual health facility gives the benefits of continuous care, work around for geographic limitations and liberty for participation as would a real-life healthcare facility gives. For a provider (here healthcare practitioner/doctor), it gives the ability to monitor progress and service provision to a larger set of people, customizable settings for different activities planned for overall health activity envisioned and electronic recording of patient progress in real time for better analysis and health predictions.

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