ML based optimal thread spawning wrapper

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Description

In applications like video games which deploys multiple threads to make sure the application can run smoothly we frequently come across the phenomenon which we tend to call a lag. This may take place due to multiple reasons like GPU overheating or insufficient memory but one of the reasons for this problem is improper thread management. The OS system itself is pretty efficient to handle this problem using existing algorithms, however, in this project we propose an alternate solution which harnesses the power of machine learning to self-train and correct thread management.

The number of threads a program can create depend on a lot of things such as the type of system calls being made, the state of the CPU at a given instant, the type of hardware that is running, wait time for each process etc. In order to simplify the process of writing multiple threaded applications while being oblivious to most of the above conditions, we propose to develop a wrapper for an existing thread library which will delegate the thread creation to a learning algorithm to increase the performance in terms of the running time and throughput.

This learning algorithm will take into account the type of OS, CPU loads, CPU core utilization, average time taken for each process, and will try to calculate the average wait time and switching time for each thread. Once these factors have been taken into account the algorithm classifies the processes to be parallelized into **n** pools of **m** functions each which will be grouped according to their execution times (assuming network and disk i/o is more expensive and takes more time). The choosing of **n** and the classification of the functions are taken care of by the Machine learning aspect, the program will have to be run for setting the custom weights tailored for a system if required, or can be run with general settings which will be an approximation of all the previous trials we've conducted.