

## M.Eng Design Project 2018-19 - Abstract

### **A prototyping effort for in-storage computing on solid-state drives.**

HDD and SSD are the current storage technologies existing in computing technology. SSDs use a more recent technology which is based on semiconductor NAND flash unlike the legacy HDD which has a magnetic based storage technology . SSDs have lot of advantages over HDDs some like **faster speeds** , lower power consumption and more data storage density but since its still an emerging technology they have a cost disadvantage over HDD.

SSDs have faster speeds because they have an in-built controller which helps in various data-storage activities like compaction , wear-leveling and garbage collection . Due to the level of complexity of all these operations that need to be performed the controllers used by the SSDs are powerful.

The aim of this project is to tap at the processing power of this controller to increase the processing power of the Host Device .

The idea to implement is to divide the tasks on the host whether it is a data storage task or processing intensive , based on that the host can decide to assign the task to the SSD controller or process by itself .

The challenge is come up with the task and scheduling algorithm based on the free processing power available on the SSD and also the current tasks which are scheduled on the host processor .

OpenSSD is the platform chosen for this project . The first task is to achieve a protocol to communicate with the controller on the SSD and try sending data and get the controller to acknowledge for the tasks given by the host processor.

The next semester will mainly focus on smart scheduling these tasks based on the type of tasks in the pipeline .

The outcome of this will be a smart computing system whose host can use the SSD controller as a co-processor for enhanced processing capabilities.

The main advantage of such a system is , as the SSD technology keeps improving the in-built controller keeps getting more smart and hence can be used for host processor for more data related tasks thus decreasing a lot of overhead on the host processor .