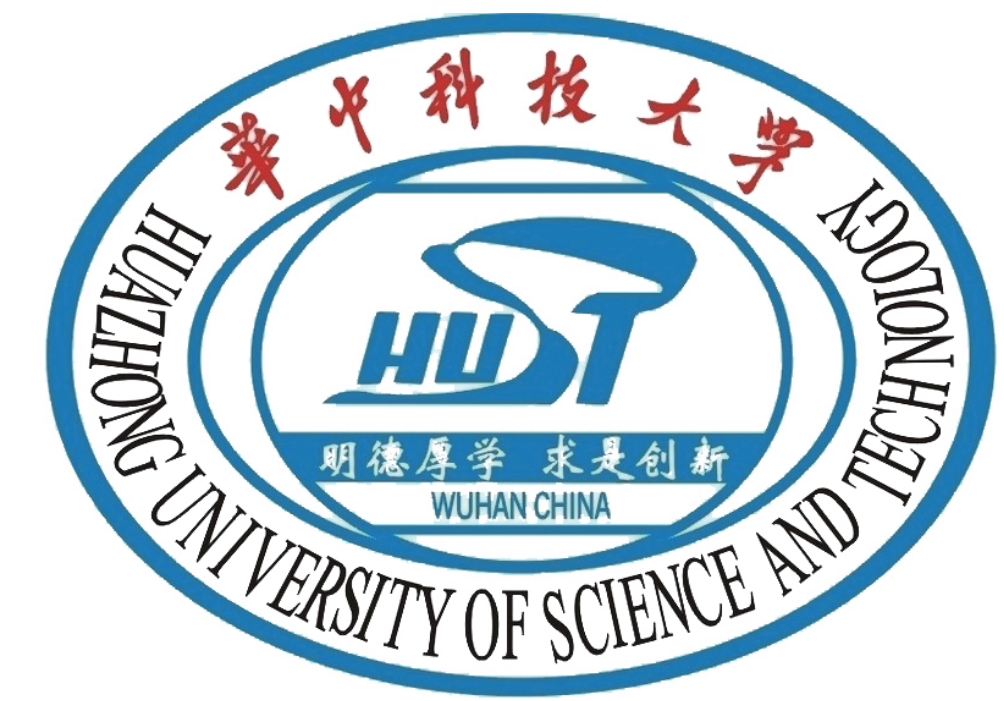


E-STORE: An Energy-constrained Smartphone Storage for Near Real-time Disaster Image Sharing



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Background and Challenges

■ Disaster environments

— Images sharing for disaster relief

■ Challenges

— Image redundancy
— Energy constraint
— Limited bandwidth

■ Existing schemes

— Eliminate the redundant images in the forwarding path of network transmission
— Overlook the energy constraint in smartphones

The Proposed E-STORE System

■ Energy-aware redundancy elimination in the source

— Challenges: 1) High time and energy overheads for calculating image features;
2) The size of image feature is quite large, even larger than the image size
— Solutions: 1) Energy-aware Dynamic Compression Scheme (Step 2);
2) A Conversion Algorithm (Step 3)

■ Fast query index for real-time response (Step 7)

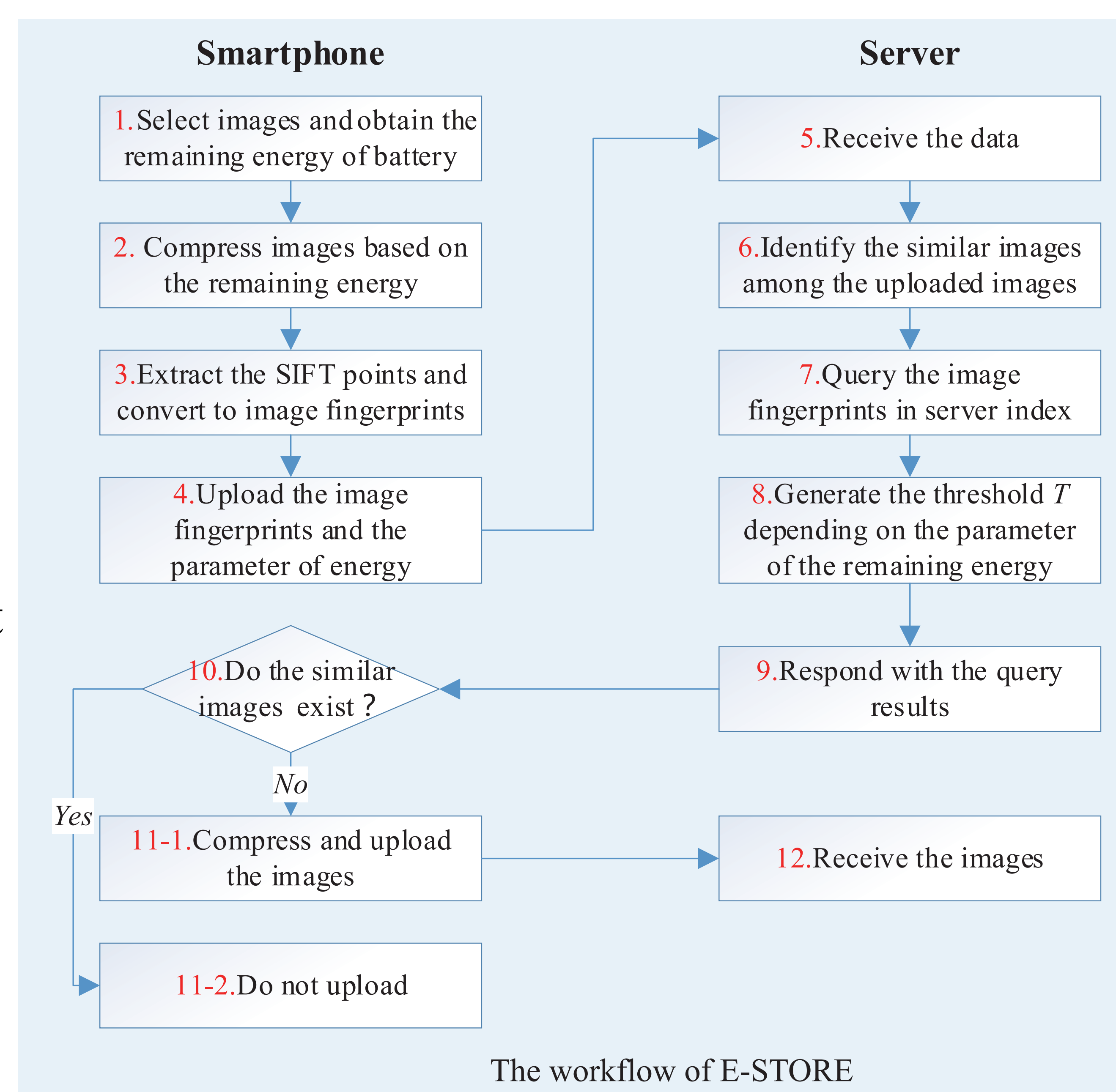
— Locality sensitive hashing: map the similar contents to the same bucket
— Cuckoo hashing: deal with space inefficiency caused by LSH

■ Low battery

— Energy-aware Threshold Setting Scheme (Step 8)

■ Large-size image compression before uploading (Step 11-1)

— The high-quality images are not necessary for such disaster environments
— Further reduce the bandwidth overhead



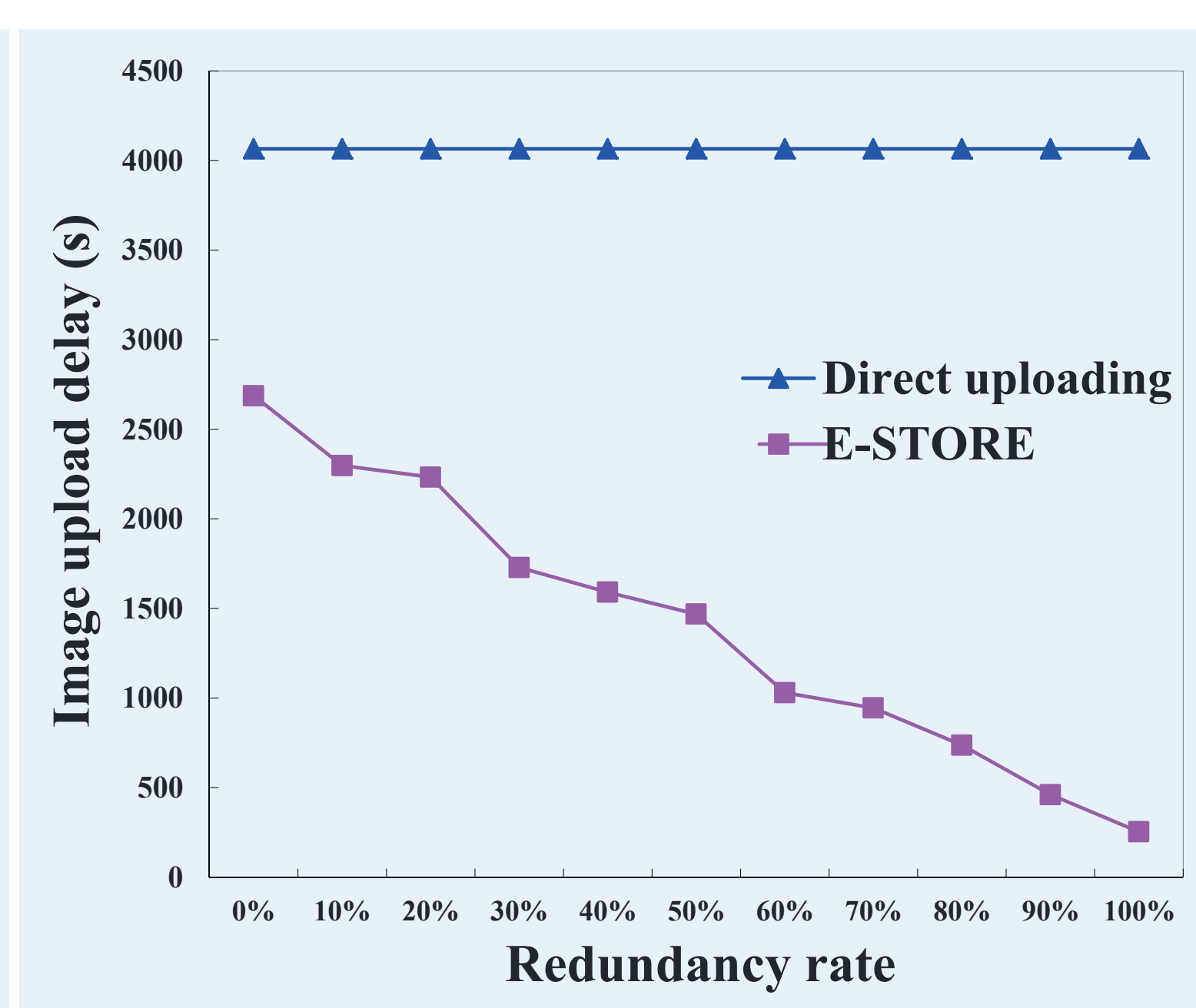
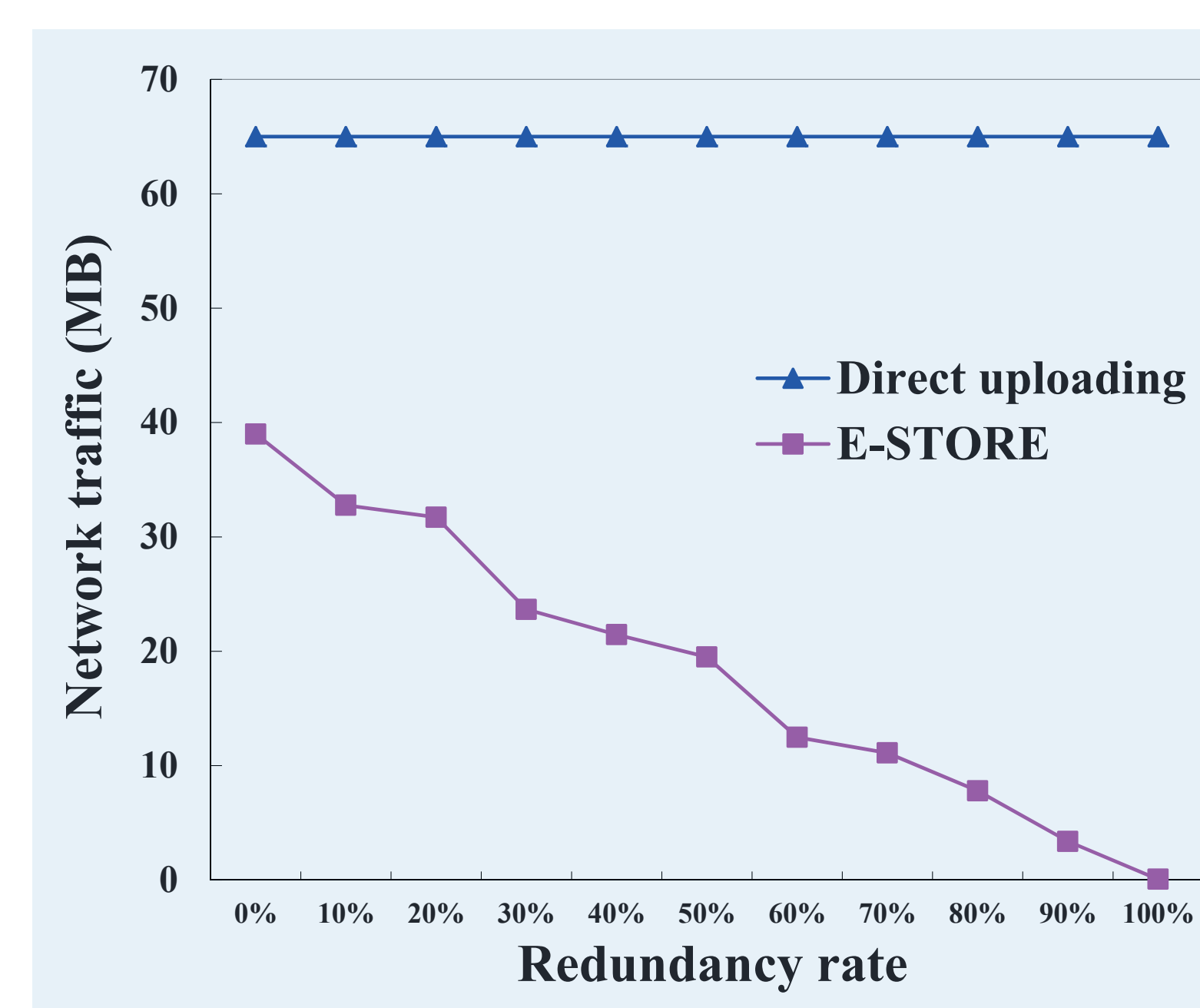
Preliminary Results

■ Evaluation configuration

— Dataset: 50 images(60MB)
— Emulate the network bandwidth in the disaster environments: 128Kbps
— Redundancy ratio: from 0% to 100%

■ Preliminary results

— 40% to 99.9% bandwidth saving
— 33.9% to 93.8% time saving



Future Work

■ Evaluate the performance of E-STORE using real-world datasets

■ Different network bandwidth and loads with a large number of smartphones

■ Measure and analyze the energy overhead of smartphones