Input:

- Set $\mathcal{R} = (R_1, R_2, ..., R_m)$ representing available resources, where each resource $R_k \in \mathcal{R}$ has capacity c_k.
- Value $c^{(GPU)}$ representing GPU capacity.
- Set of tasks $\mathcal{T} = (T_1, T_2, ..., T_n)$.
- Values $p_{i,k}$ and $E_{i,k}$ representing processing time and energy consumption of task T_i on resource R_k. If task T_i cannot be executed on resource R_k, then $p_{i,k} = \infty$.
- Values $p_{i,k}^{(GPU)}$ and $E_{i,k}^{(GPU)}$ representing processing time and energy consumption of task T_i on resource R_k if the task is offloaded to GPU. If task T_i cannot be executed on resource R_k, or cannot be offloaded to GPU, then $p_{i,k}^{(GPU)} = \infty$.
- Value h representing major frame length.

ILP model:

$$\min \sum_{T_i \in \mathcal{T}} \sum_{W_j \in \mathcal{W}} \sum_{R_k \in \mathcal{R}} (a_{i,j,k} \cdot E_{i,k} + a_{i,j,k}^{(GPU)} \cdot E_{i,k}^{(GPU)}) \quad \text{subject to:} \tag{1}$$

$$\sum_{W_j \in \mathcal{W}} \sum_{R_k \in \mathcal{R}} (a_{i,j,k} + a_{i,j,k}^{(GPU)}) = 1 \quad \forall T_i \in \mathcal{T} \tag{2}$$

$$\sum_{W_j \in \mathcal{W}} l_j \leq h \tag{3}$$

$$l_j \geq \frac{a_{i,j,k} \cdot p_{i,k} + a_{i,j,k}^{(GPU)} \cdot p_{i,k}^{(GPU)}}{0.6} \quad \forall T_i \in \mathcal{T}, \forall W_j \in \mathcal{W}, \forall R_k \in \mathcal{R} \tag{4}$$

$$\sum_{T_i \in \mathcal{T}} (a_{i,j,k} + a_{i,j,k}^{(GPU)}) \leq c_k \quad \forall W_j \in \mathcal{W}, \forall R_k \in \mathcal{R} \tag{5}$$

$$\sum_{T_i \in \mathcal{T}} \sum_{R_k \in \mathcal{R}} a_{i,j,k}^{(GPU)} \leq c^{(GPU)} \quad \forall W_j \in \mathcal{W} \tag{6}$$

$$a_{i,j,k} = 0 \quad \forall T_i \in \mathcal{T}, \forall W_j \in \mathcal{W}, \forall R_k \in \mathcal{R} : p_{i,k} = \infty \tag{7}$$

$$a_{i,j,k}^{(GPU)} = 0 \quad \forall T_i \in \mathcal{T}, \forall W_j \in \mathcal{W}, \forall R_k \in \mathcal{R} : p_{i,k}^{(GPU)} = \infty \tag{8}$$

$$a_{i,j,k} \in \{0, 1\}, a_{i,j,k}^{(GPU)} \in \{0, 1\} \quad \forall T_i \in \mathcal{T}, \forall W_j \in \mathcal{W}, \forall R_k \in \mathcal{R} \tag{9}$$

$$l_j \in \mathbb{N} \quad \forall W_j \in \mathcal{W} \tag{10}$$