

Status Report

2022.12.21

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Another strategy

- Input (1track/node)

1. d_0
2. ϕ
3. ω
4. z_0
5. $\tan \lambda$
6. Uncertainty of d_0
7. Uncertainty of z_0

- Category label

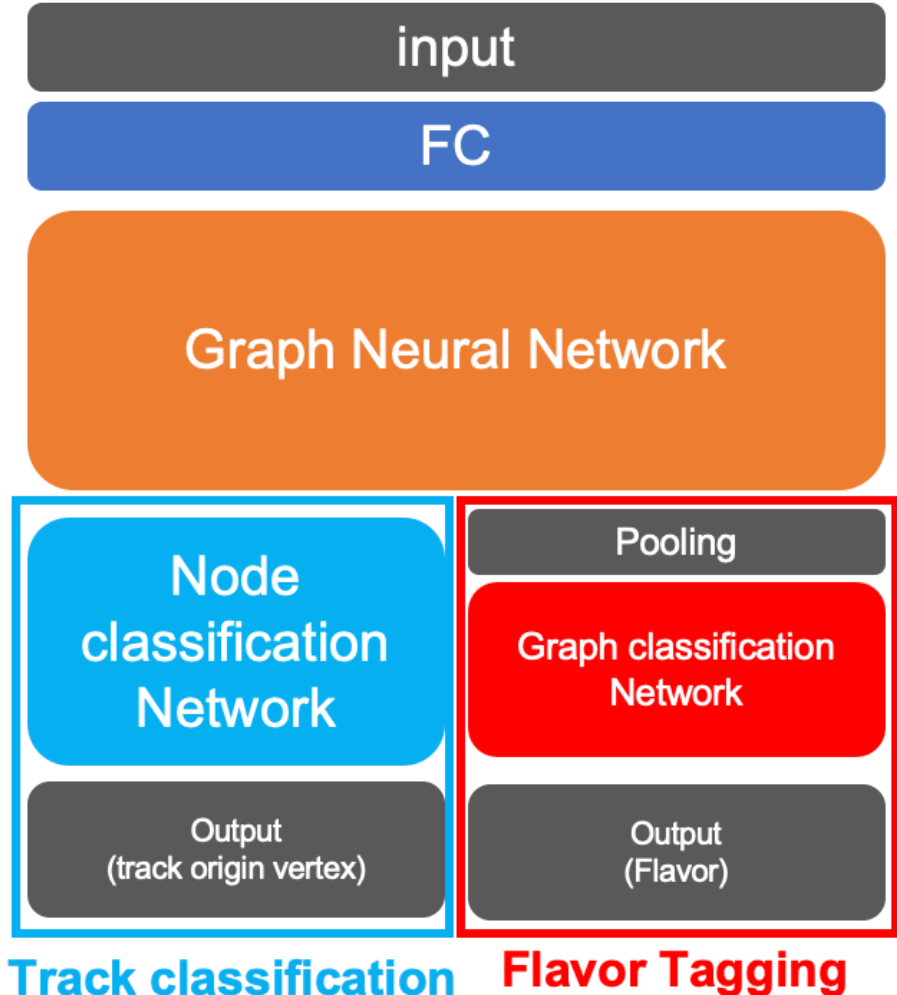
- | (1track/node) | (1jet/graph) |
|---------------|--------------|
| 1. PV | 1. bb |
| 2. SVBB | 2. cc |
| 3. SVCC | 3. uudd |
| 4. TVCC | |
| 5. Others | |

- Loss function

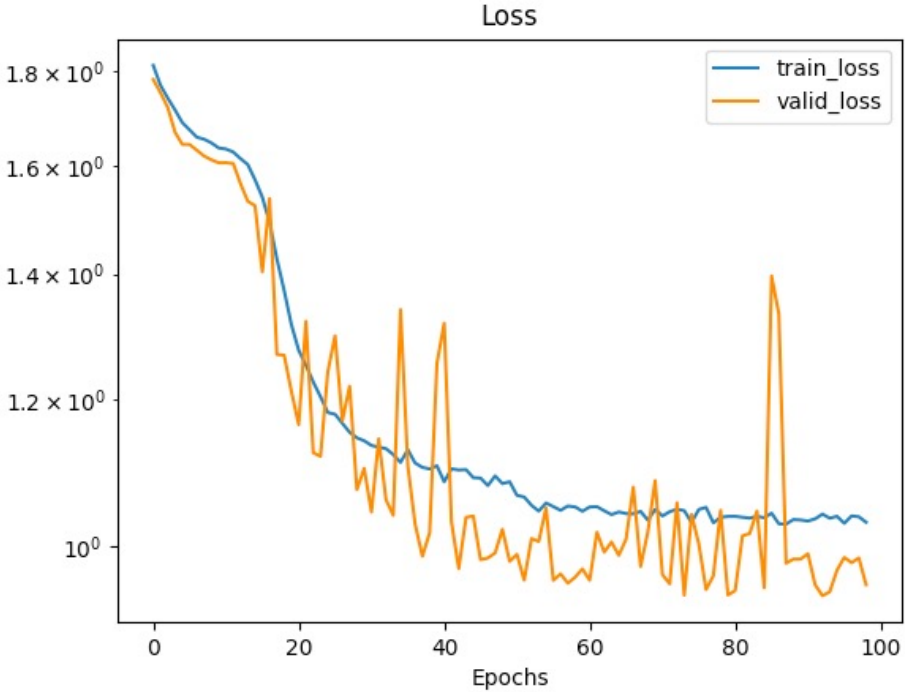
$$L_{total} = L_{Flavor} + \alpha L_{Vertex}$$

- Track-only homo-graphs can be constructed
(Computationally convenient because of the same input)
- Can account for track classification and graph classification losses at the same time (even vertex)

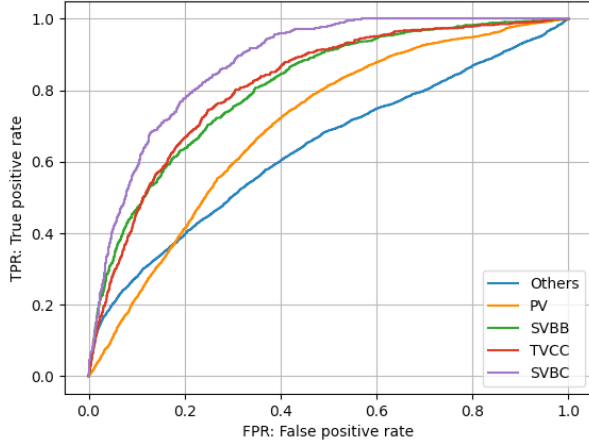
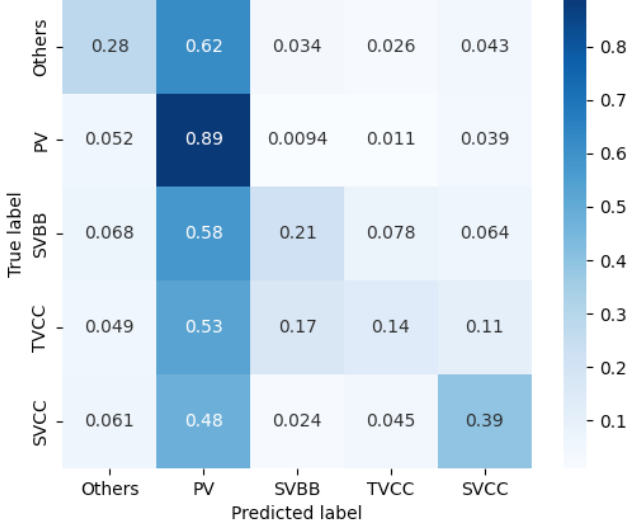
Over view of network



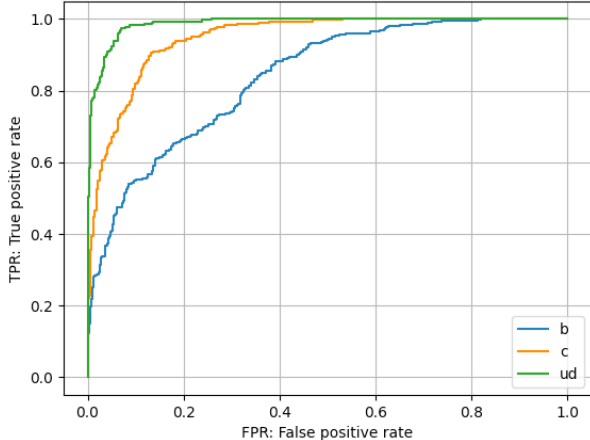
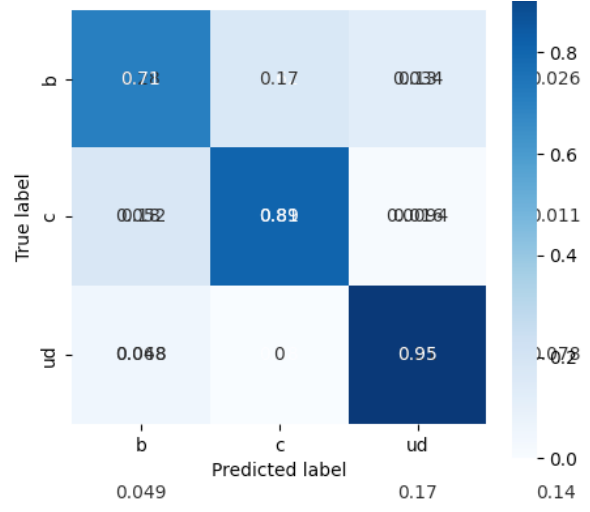
Preliminary result



Tracks

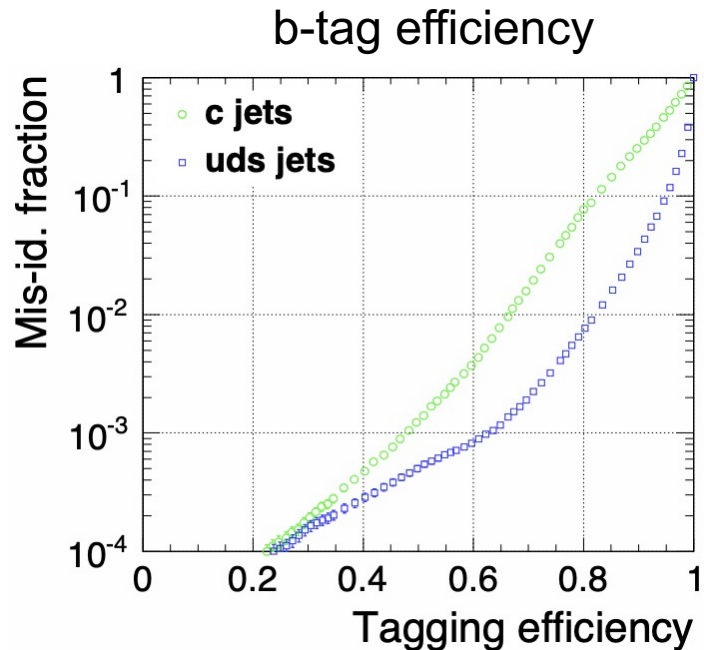


Graphs

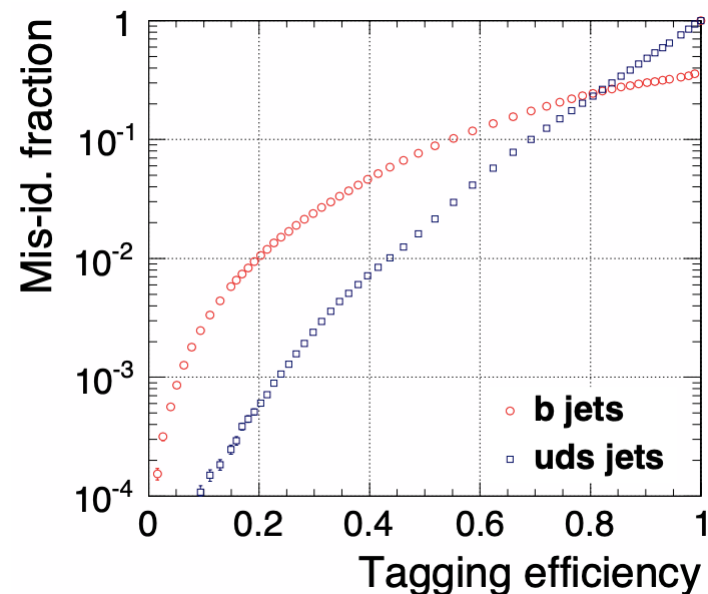


Preliminary result

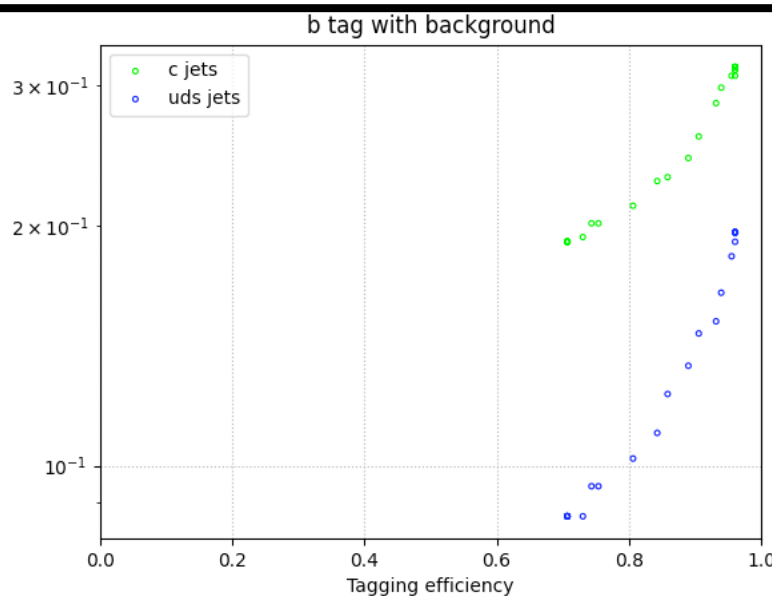
LCFIPlus



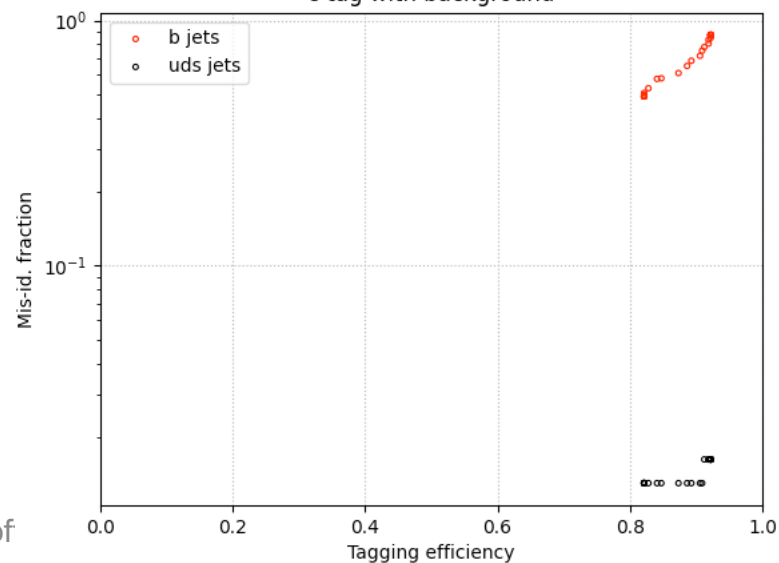
c-tag efficiency



GNN



c tag with background



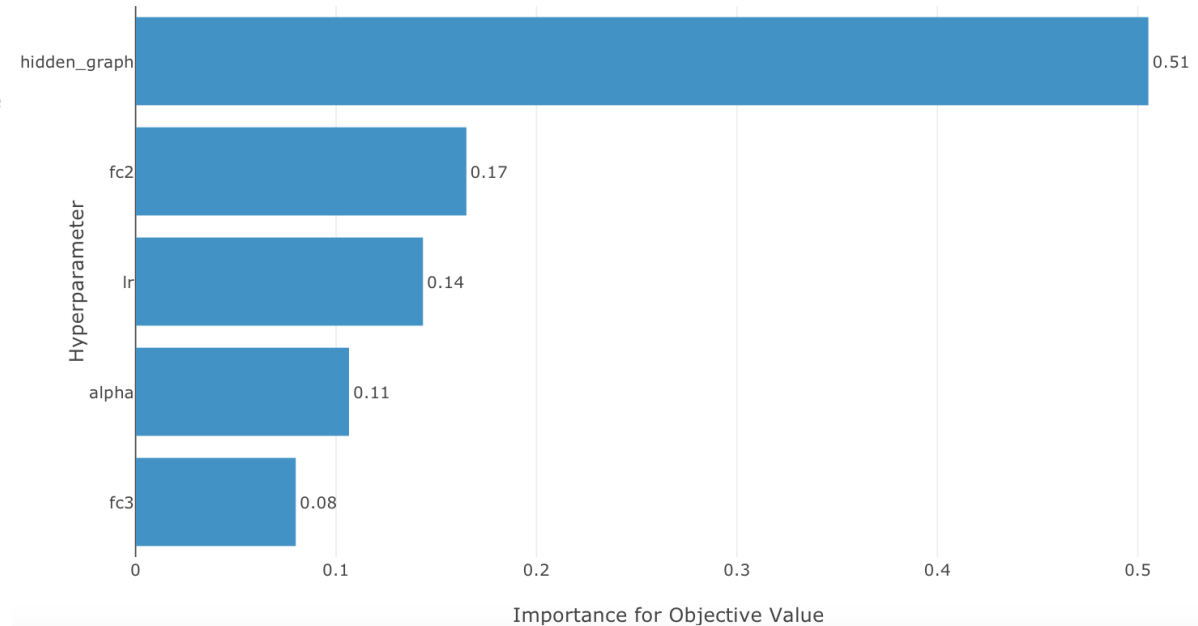
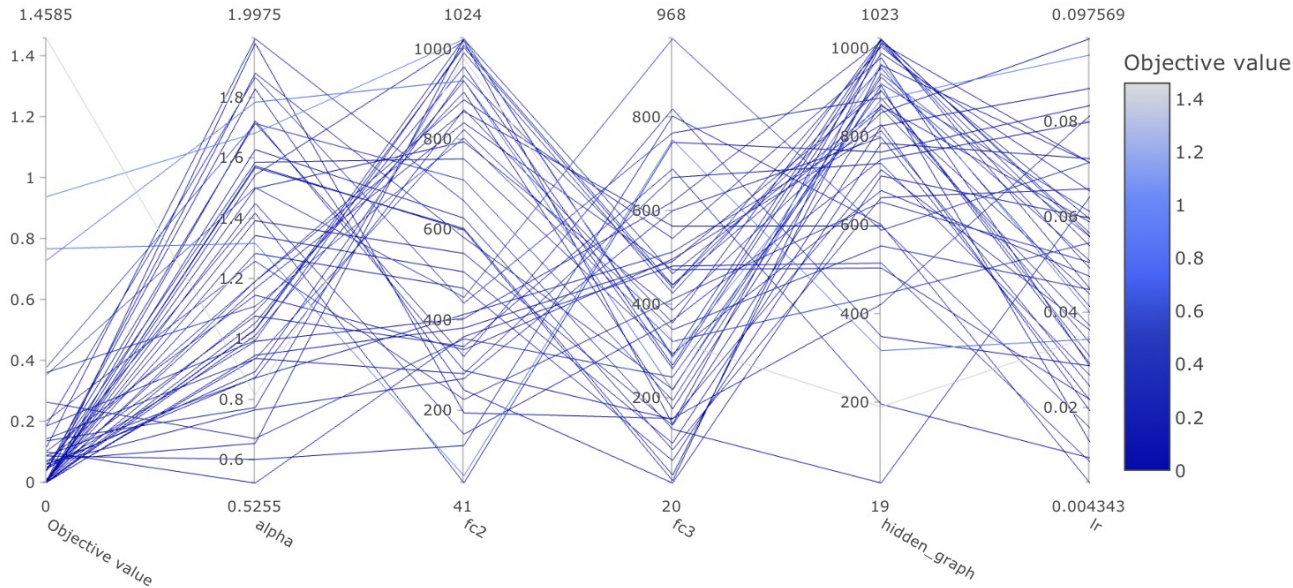
Not well plotted...

Hyperparameter Optimization (Bayesian)

- Optimize parameters
 - Number of nodes (GCN, FC × 2)
 - Learning ratio
 - The ratio between node loss and graph loss ($L_{total} = L_{Flavor} + \alpha L_{Vertex}$)
- Result

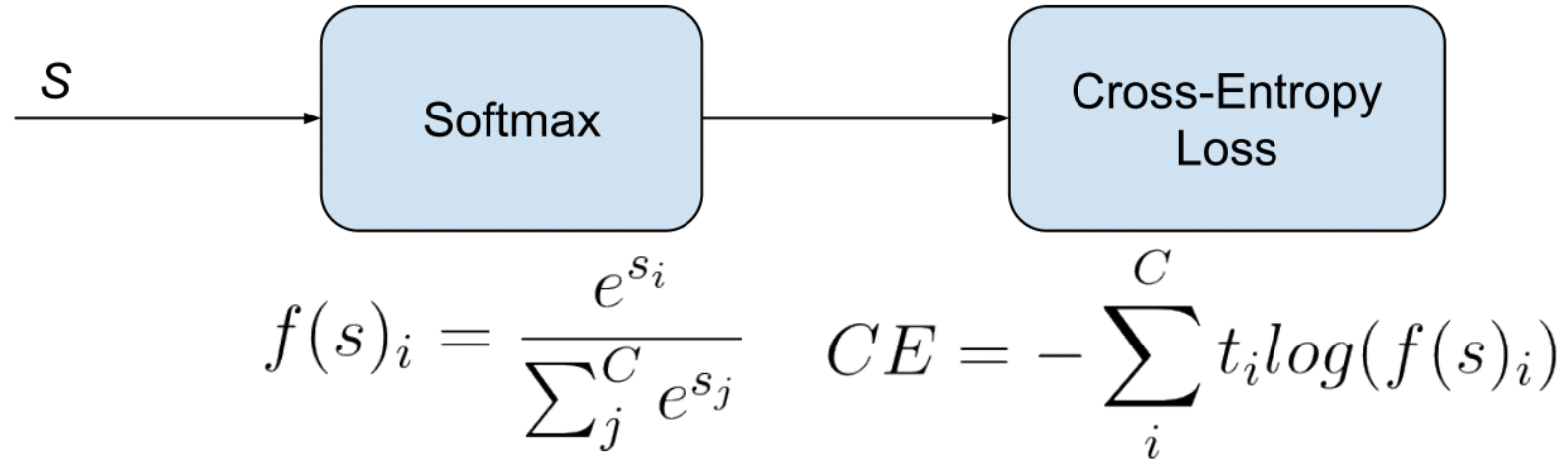
Best value(loss): 0.013276

(params: {'alpha': 1.7258869354102924, 'fc2': 365, 'fc3': 156, 'lr': 0.03644127019749227, 'hidden_graph': 727})

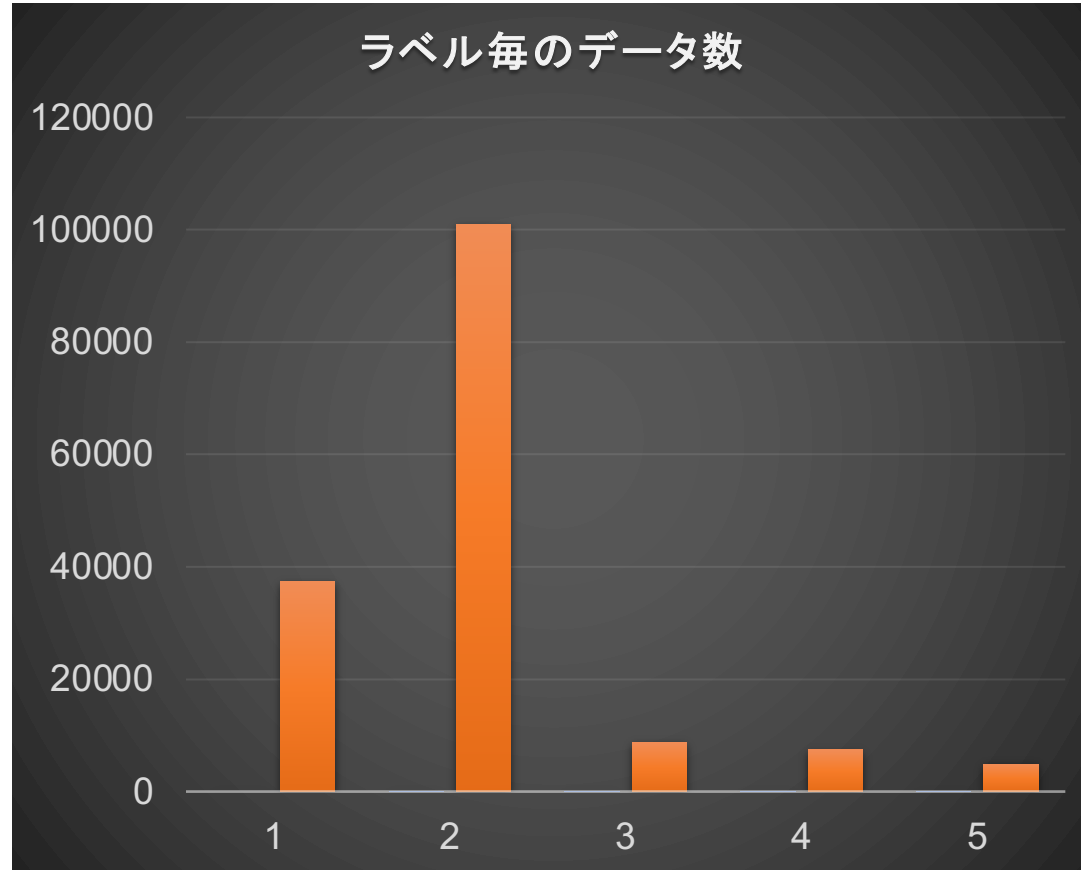


Backup

Categorical cross-entropy Loss



Imbalance of number each labels



- Inverse ratio ?
- Its sqrt ?

Previous strategy

