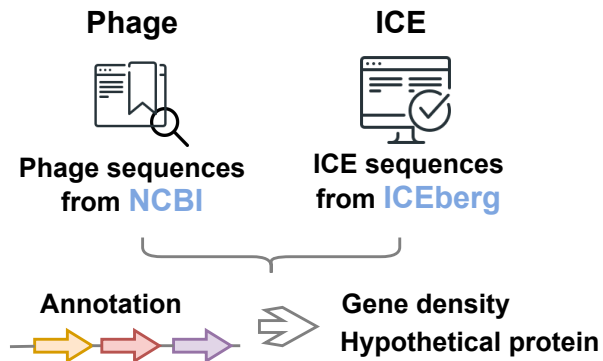


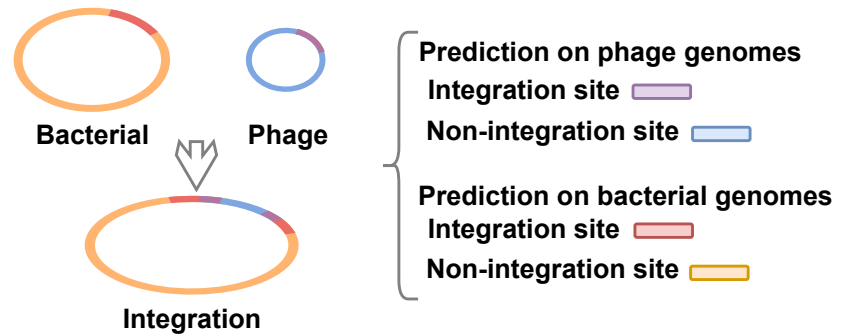
A. Dataset

1. Phage and ICE datasets



2. Phage integration site datasets

Temperate phage dataset

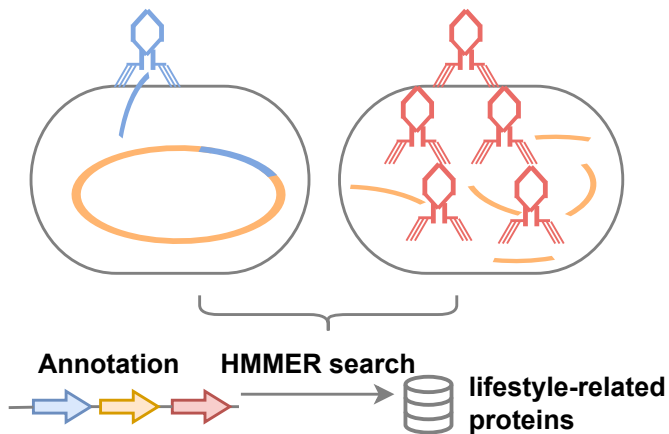


3. Phage lifestyle datasets

Phage evolution dataset

Temperate phage

Virulent phage

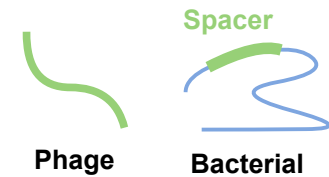
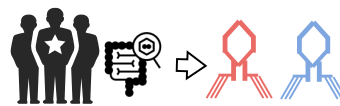


4. Phage host datasets

GPD dataset

Phages from gut metagenomes

Host obtained from CRISPR-spacer



Temperate phage dataset

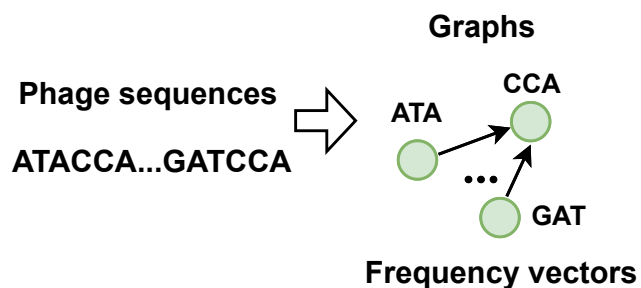
Phages from bacterial NGS data

Host obtained from annotations

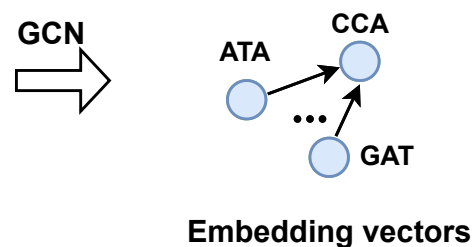


B. GCN framework

1 Construct gapped pattern graphs



2 Gapped pattern graphs embedding



3 Neural network

