**WHY ML**

Mostly importantly, why should we use ML?

3 advantages

**DRL**

There r all kinds of ML, most researches related to cognitive networks are based on Deep reinforcement learning, which is a method combining Reinforcement L and DL.

RL is good at making decisions by trial and error

DL allows large input

**Advantages of DRL**

Energy saving: A well-trained DRL-based network achieves the aim of green energy-saving.

Large-scale model:

Unsupervised: look at the category of ML, since we don’t need to classify anything in CN but only need to make every effort to find the best config, it’s better to choose unsupervised learning method

Here comes the core of my speech, we replicated/implemented a research. Gonna introduce it from 4 aspects.

**Purpose:**

According to the author, (照着读)

So it’s obvious that the distributed devices are mobile phones, laptops… in the network

Why without online coordination or exchanging messages?

Simple question:

Nobody’d love to. Waste of battery

**Go back to the architecture**

It surprises us that the knowledge plane / FOCALE / self-net cognitive model are neither mentioned here. So this’s another advantage of ML: it conceals the complex cognition process but focus on building the best network configuration

**Network Model**

It’s a wireless network of shared orthogonal channels

**Algorithms**

Uses Deep Q-Learning which is a kind of DRL

**Data**

The red and blue lines are implemented by DRL, comparing to the yellow one using Slotted Aloha.

It’s obvious that after dozens of time slots’ training, channel utilization exceeds Slotted Aloha greatly

Luckily, we’ v found related code from github to improve computational productivity.

The author implemented distributed computation.

4 clusters means 4 computation agents, which improve the rewards. So the training became quicker.

**Deficiency**

More importantly, the high performance couldn’t remain when the network environment changes greatly, so it’s not a thorough cognitive network for now. but I think it’s a good start though.