Meet Deadline Requirements Challenge

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01

Implementation

Block Scheduler

- **Todo:**

  Decide block sending sequence

  ⇨ Using block scoring function: **S(block priority, block deadline, block size)**

- **Goal:**

  Gain **best QoE**

- **Decide factor importance:**

  Block priority ⇨ Block deadline ⇨ Block size

Block Scheduler

- **select_block**:
  - **Priority score:**

    {0: 100, 1: 80, 2: 10}

  - **Deadline score:**

    max(0, 100 * [1 - (create_time + deadline - cur_time) / deadline])

  - **Size score:** **Problem Occured!!** Don’t know the range of size

    Directly using **block size**

Block Scoring Function

- **Linear function:**

$$Score = 0.9 \times \text{priority score} + 0.1 * \text{deadline score}$$

We don’t implement size in this function.

Block Scoring Function

- **Non-linear function:**

$$score = \frac{priority\_score^{2.5} * \; ddl\_score^{0.2}}{size^{0.05}},$$

⇨ We choose **non-linear function** to be our block scoring function.

Test Results

	Priority	Deadline	Size	Qoe
Linear	0.5	0.5	X	496
	0.7	0.3	X	506
	0.9	0.1	X	506
Non-linear	2	0.1	2	518
	1	1	1	519
	2.5	0.2	0.05	541

Bandwidth Estimator

- **Todo:**

  Decide packet sending rate & congestion window size :

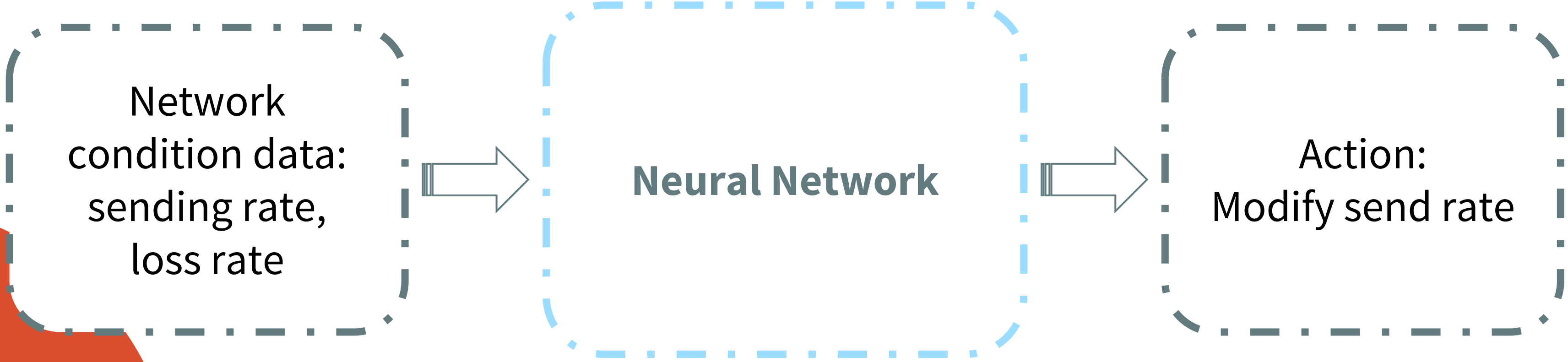
  function cc_triger()

- **Goal:**
  - Gain best QoE
  - Avoid packet loss & timeout
- **Decision factor:**

  Network condition, Packet loss rate

Bandwidth Estimator

- **cc_triger**
  - Send rate control
    - PyTorch



Network condition data: sending rate, loss rate

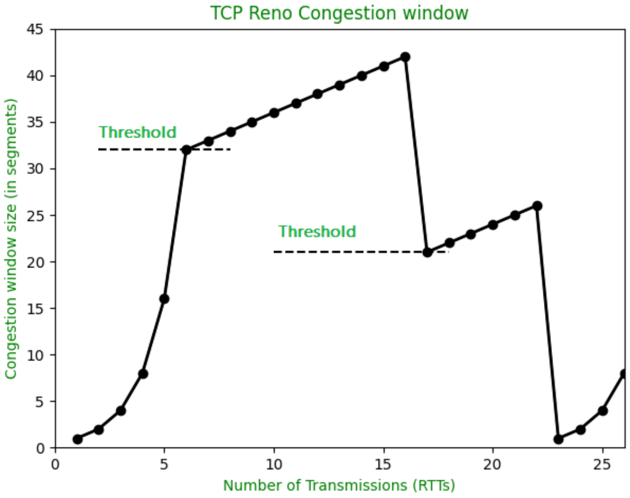
Neural Network

Action: Modify send rate

- **cc_triger**
  - Congestion window control
    - Use TCP Reno
    - Modify fast recovery state:

When larger than 2 packets loss in 5 instant packets

→ Threshold /= 2.4



02

Improvement

Future Plans

- **Current problem:**
  - High loss rate on rapid network condition decline
- **Plans:**
  - Improve cc_trigger function

Thanks for Listening!