

IIT MADRAS Technology Transfer Office Indian Institute of Technology Madras TTO - IPM Cell



Industrial Consultancy & Sponsored Research (IC&SR)

METHOD AND APPARATUS FOR SWITCHING BETWEEN VARIOUS TRANSMISSION RATE PREDICTORS

IITM Technology Available for Licensing

Problem Statement

- Rate adaptation through various Transmission Rates (TR) have played an important role in exploiting the instantaneous channel capacity by transmitting bits at a rate that is optimally suited to the current channel conditions.
- A rate adaptation metric, which reflects the channel capacity, is computed at the User Equipment (UE), and is quantized and fed back to the evolved Node B (eNB).
 - The UE also provides an Acknowledgement/Negative Acknowledgement (ACK/NACK) response indicating whether packets are successfully decoded by the UE at a particular transmission rate selected by the eNB. Based on the ACK/NACK response and CQI feedback, the eNB adjusts the transmission rate such that QoS parameters are met.
- However, there are multiple QoS parameters such as BLER, throughput, latency, or the like, which need to be optimized.
- Thus, there is a need of having a method which can meet the overall QoS requirements of each UE through a transmission rate predictor having simple architectural and time complexity respectively.

Technology Category/ Market

Category - Information & Communication Technology (ICT), Wireless Networks Applications - Multi-Armed Bandit (MAB) Algorithm, Data Transmission, Wireless Networks. Industry - Data Networks, IT, Software

Market - Global data transmission services market was valued at USD 133,789.3M in 2021 and is expected to reach USD 204,020.1M by 2029, registering a **CAGR of 4.8%** during 2022-2029.

TRL (Technology Readiness Level)

TRL – 3/4, Technology validated in lab.

Technology

A method and an apparatus for **switching between various transmission rate predictors** as a restless MAB problem (refer Fig. 1, 2& 3).

Method

Associate each of transmission rate predictors, associated with each of QoS parameter, to each of the arms of a restless MAB

Determine a CQI and a cumulative ACK/NACK response from a UE for a TB

Determine that a first QoS parameter, associated with a first arm of the restless MAB, falls to meet the first predefined target value associated with the first arm of the restless MAB

Select the first transmission rate predictor associated with the first QoS parameter to meet the predefined target of the first QoS parameter

Vary the predefined value of the first QoS parameter through the first transmission rate predictor

Determine that the updated value of the first QoS parameter meets the first predefined target value

Fig. 1. Flowchart depicting a proposed method.

Intellectual Property

- IITM IDF Ref. 1360
- IN 428576 Patent Granted
- PCT/IN2017/050043

Research Lab

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Key Features / Value Proposition

- Current invention offers a technique for multiple prediction combining algorithms to achieve certain targets optimally.
- 2. This patent may be used by Base-station vendors or by mobile equipment manufacturers to control parameters based on MCS prediction.
- 3. In case of any hardware implementations various networking devices or external I/O devices may be connected to the computing environment to support the implementation through the networking unit and the I/O device unit.

Fig. 2. illustrates an eNB, transmitting data at various transmission rates.

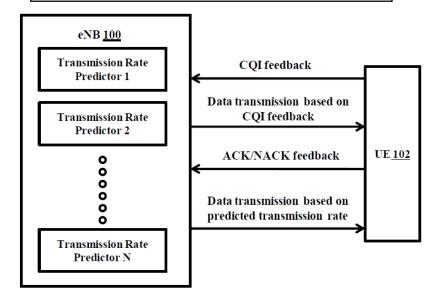
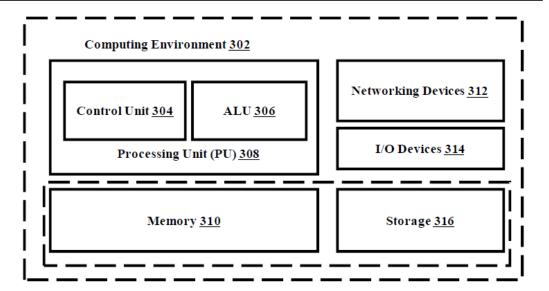


Fig. 3. illustrates a computing environment implementing the proposed method.



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