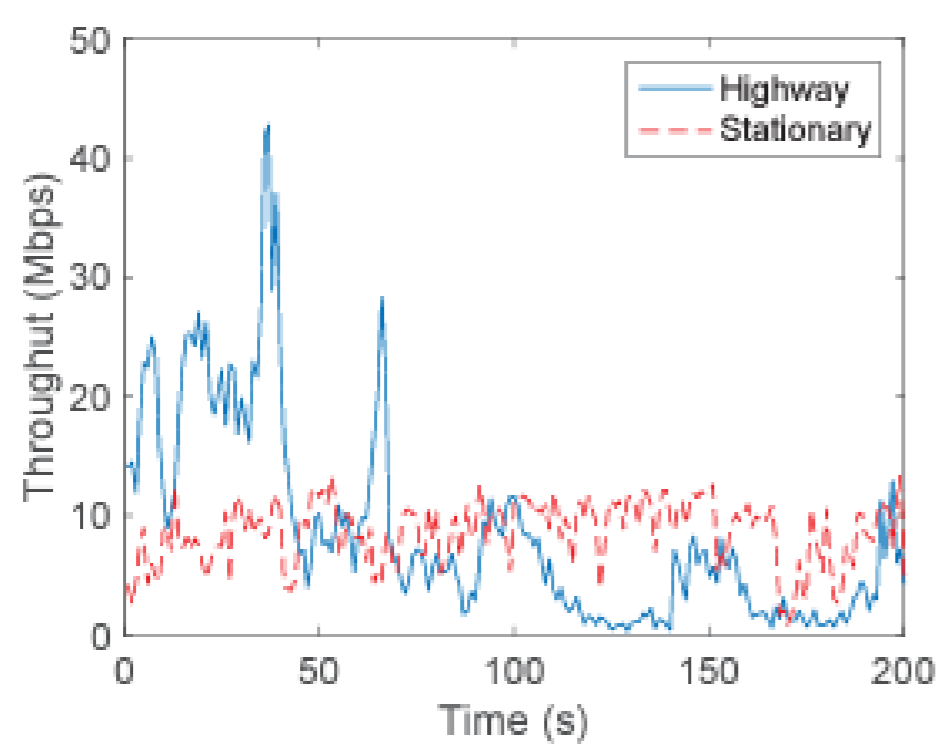


Throughput Prediction using Machine Learning in Cellular Networks

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Motivation

- Many applications such as video streaming relying on throughput in their key decisions.
- Predicting throughput is challenging due to the mobility.
- Continuous fluctuation due to the mobility leads degraded performance and user experience.
- Predicting the fluctuated throughput would improve the user experience.
- We intend to use machine learning algorithm for predicting throughput to improve quality of service.

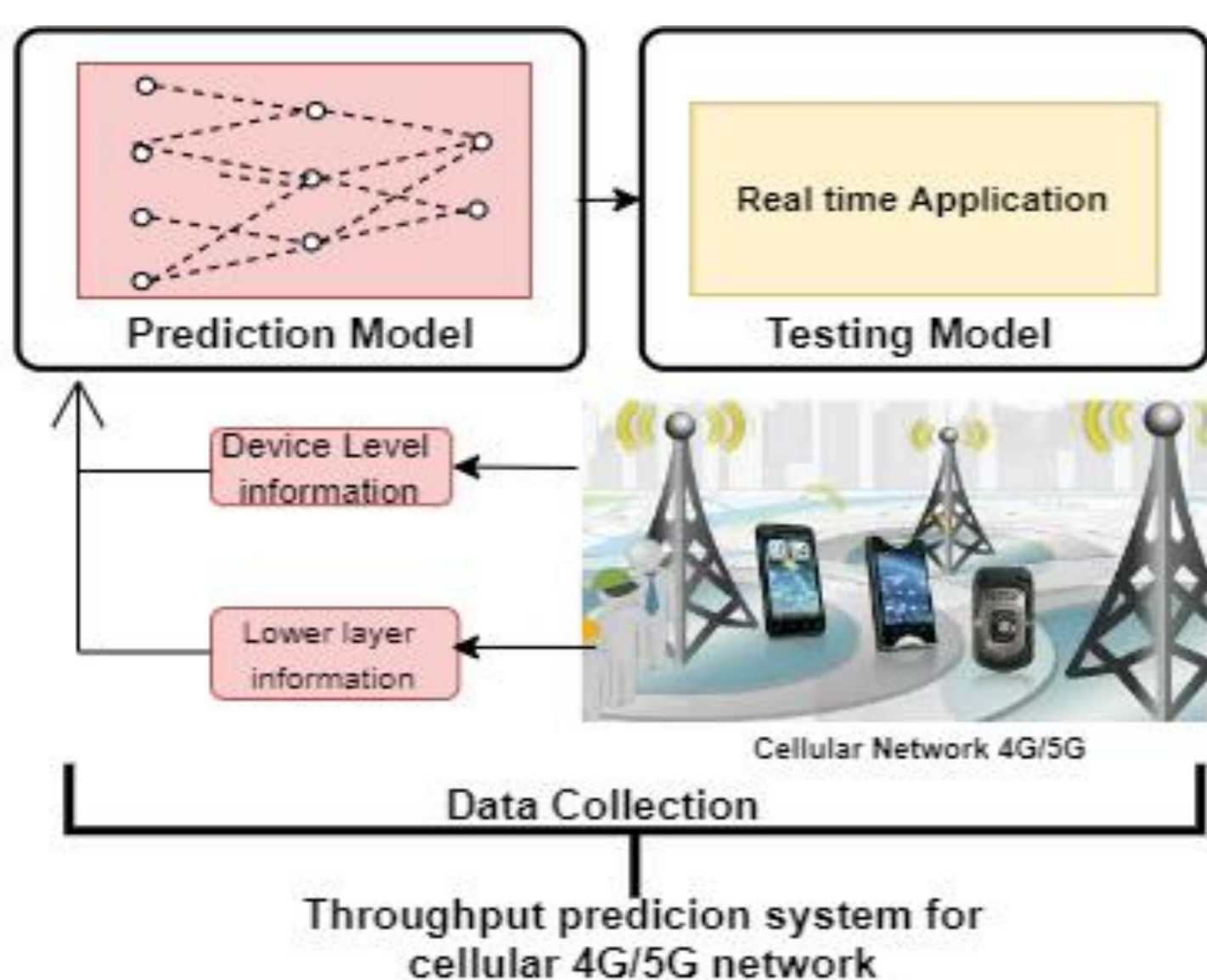


Throughput fluctuation in stationery and mobility scenario

Methodology

- In the first stage dataset from diverse scenarios would be collected.
- The dataset extracted would be cleaned and statistically analyzed.
- Machine learning algorithms are very powerful for detecting complex patterns among multivariable.
- A sophisticated and robust ML model would be designed for throughput prediction.
- An evaluation metrics would be selected to accurately analyze the performance.
- Model will be integrated with real time applications such as video streaming (WebRTC), augmented or virtual reality, cloud gaming etc. and its performance would be tested.

Framework



State of the art

- Recent technologies are relying on additional parameters instead of statistical methods.
- Current model are more inclined towards deep learning instead of machine learning.

Challenges

Data Collection Challenges:

- Collecting from a diverse scenarios.
- Extracting information from lower layers.

Identifying key features

- Finding hidden parameters which are dependent on throughput

Mobility

- Handling frequent handovers

Computational overhead

- Design a lightweight machine learning model.
- Model update

Plans



We plan to do hands on exercise for identifying relevant features.



We plan to find relevant tool for extracting lower level information.



We plan to collect dataset from diverse areas.



We intend to design a lightweight model that balances the computation and accuracy



We intend to leverage continuous learning for updating model in an efficient way



We plan to integrate model with real testbed.

Project contribution to the UN SDG challenges

Industry, innovation and infrastructure design is the primarily objective of SDG goals. This study has a major contribution in achieving this goal of SDG since it provides an internet infrastructure design that would enhance the quality of service and quality of experience. The proposed system also reduced the gap between industry and academia via improving quality of various applications such as video streaming, augmented reality, virtual reality and cloud gaming etc.

References

1. <https://ieeexplore.ieee.org/document/8051088>

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Host Institution