

# SUMMER INTERNSHIP AT IIT HYDERABAD



***One Month Summer Internship Organized by TEQJP-111 held at JIT Hyderabad***

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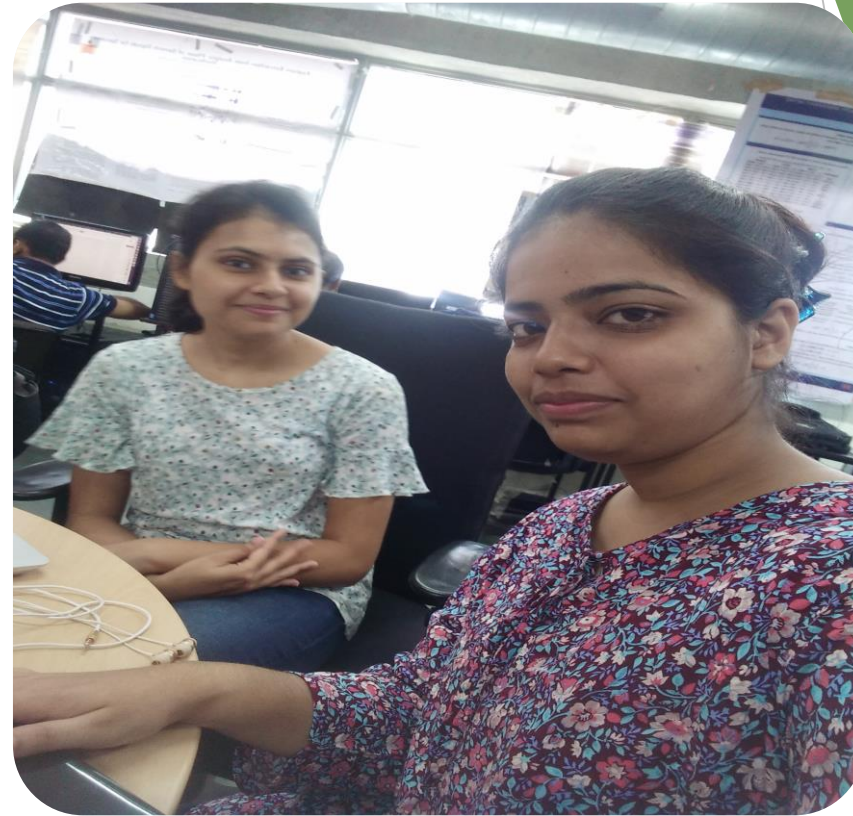
***Topic: Introduction to Quick Sleeping in DRX  
Mechanism to reduce the Power consumption in IoT  
devices.***

# Topic: Introduction to Quick Sleeping in DRX mechanism for reducing Power Consumption in IoT (Internet of Things) devices.

- The world is advancing towards Internet of Things(IoT) where various types of devices communicate and share data with each other. The communication between the devices are enabled and controlled through Machine Type Communications(MTC).
- MTC has a wide range of applications and forms an integral part of IoT. The 3rd Generation Partnership Project(3GPP) standardization body has recognized the potential for MTC and is currently working on standardizing the specifications and deployment of MTC services as part of Long Term Evolution(LTE) networks.
- The system requirements of these MTC devices are different from the regular devices using the LTE network. Many MTC devices are expected to be low cost, low data rate and delay tolerant.
- One of the challenges in MTC using 3GPP LTE is to reduce the power consumption of the User Equipment (UE) in order to prolong their battery life. The power consumption of a UE is directly proportional to its processing time.
- In this paper, we have considered the problem of reducing the UE power consumption, which is also a key aspect being addressed in the ongoing 3GPP LTE MTC standardization.
- We have proposed quick sleeping as a novel, efficient solution which saves processing time of the UEs and helps in reducing the power consumption. We have also proposed four different mechanisms for QSI using PBCH.

- The benefits of these methods are that they require minimal changes to the current 3GPP LTE MTC framework, have minimal impact on the performance of legacy UEs and are easy to implement. The performance of the QSI solutions for an AWGN channel has been analyzed using the QSI BLER performance and the degradation in PBCH BLER performance for the legacy UEs.
- The QSI BLER has been determined for each of these methods using simulations. The degradation in PBCH BLER performance has been estimated analytically and also obtained through simulations.
- The simulation results show that the method of spreading QSI using orthogonal sequences gives the best performance and aligns well with the analytical results. But it requires more memory to store the different orthogonal QSI sequences.
- The other methods like spreading QSI using repetition coding only and repetition coding with FEC also demonstrate good QSI BLER performance and require no extra memory.
- However, the degradation in PBCH BLER performance using these methods is more when compared to the method using orthogonal sequences. The loss in PBCH decoding performance can be eliminated if the eNB can afford addition at transmission power for QSI.
- With the introduction of QSI in DRX has improved a lot, the performance of devices in the day-to-day life, and also it has increased the battery life of UEs.

## SOME GLORIOUS MOMENTS IN IIT HYDERABAD



It was really an awesome learning Experience here.I learned a lot of new things here as well as also explored the College.I would give a big thanks to “Dr.Abhinav Kumar”,my mentor who guided me throughout the internship.I would also thank “TEQIP-111” to give me this opportunity to come here.I would like to visit IIT Hyderabad again.  
Thanks a lot to everyone....