Throughput Maximization in Mobile Cloudlets

COMP 8790 Software Engineering Project
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Outline

- Objectives
- Background
- Cloudlet System Model
- Algorithms
- Evaluations
- Conclusion and future work
Objectives

- Master the basic concepts of mobile computing
- Learn basic algorithms for resource management
- Evaluate system performance
Background

- What is Mobile cloud computing (MCC)?
- What is a cloudlet?
What is MCC?

- Mobile Cloud Computing (MCC) is the combination of cloud computing and mobile networks to bring benefits for mobile users, network operators, as well as cloud providers [1].

What is a cloudlet?

- A **cloudlet** is a new architectural element that arises from the convergence of mobile computing and cloud computing [2].

- A cloudlet can be viewed as a "data center in a box" whose goal is to "bring the cloud closer".

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Cloudlet System Model

- **Resources:** CPU, Memory, Storage, Bandwidth
- **Time slot**
  - Generate request
  - \[ T_1 \quad T_2 \quad \ldots \quad T_n \]
- **Requests:** resource + occupation period
- **Admission Control Policy**
- **Markov Chain Model**
  - (predict the system occupation information)
Admission Control Policy

- **Admission cost**
  - Unit admission cost for each resource
  - Occupation period
  - Threshold

![Graph showing the relationship between unit admission cost and system occupied resource.](image)
Markov Chain Model

A markov chain is a mathematical system that undergoes transitions from one state to another, between a finite or countable number of possible states\(^3\).

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Markov Chain Model

- Get training data
- Fill in the transition matrix
- Apply to the prediction

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Online Request Throughput Maximization Problem

- One request per time slot
- Requests arrive one by one
- Check if there are requests finished at the end of each time slot
Algorithms

Online Batch Request Throughput Maximization Problem

- Multiple request per time slot
- Greedy Strategy
Evaluations
Evaluation

System throughput vs Monitoring period T (number of time slots)

- T = 24
- T = 48
- T = 96
Conclusion and future work

- System achieves an acceptable throughput with the predicted resources occupation information
- The size of training sample affect the detect accuracy
- The proposed markov model state–state can be improved to state–multi states
Thank you!

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