The International Cooperative Education and Career Development (ICECD) Program

Mie University, JAPAN

During September 26th – December 22nd, 2011

By

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Report of International Internship Program in Japan

Graduate school of Computer Engineering,

Suranaree University of Technology

Santi Nopnipa

Abstract

My name is Santi Nopnipa. I am 4th year student under graduate in Computer Engineering, Suranaree University of Technology, THAILAND. Before I joined international internship program, I have studied JODC (Japan Overseas Development Corporation) and studied Japanese language. It was interesting to learn about Japanese culture and Japanese language. And I would have experience working with the software and network.

Contents

1. Schedule

Tentative Schedule of the International Cooperative Education and Career Development (ICECD) program during September 26th, 2011 ～ December 22nd, 2011

Date	Schedule	memo
September 26 (Mon)	Procedure for moving in the student dormitory	
PM	Free	
September 27 (Tue) 9:00～10:30	CIER, Mie University	
13:00	Graduate school of Engineering	**Prof. Ohta Yoshikatsu** Department of Information Engineering Division of Information Engineering Computer Science
September 28 (Wed)	Japanese Language Class ① 10:00-11:00 Japanese Language Class ② 11:00-12:00	Prof. Matsuoka Chizuko
PM	Studying at Graduate school of Engineering	Prof. Ohta Yoshikatsu
September 29 (Thu)	Japanese Language Class ③ 10:00-11:00 Japanese Language Class ④ 11:00-12:00	Prof. Fukuoka Masako
PM	Studying at Graduate school of Engineering	Prof. Ohta Yoshikatsu
September 30 (Fri)	Studying at Graduate school of Engineering	Prof. Ohta Yoshikatsu
October 1, 2 (Sat, Sun)	Free	
October 3 (Mon) ～ December 21(Wed)	Graduate school of Engineering 【Presentation at CIER】	Prof. Ohta Yoshikatsu
December 15	Presentation	CIER
December 22 (Thu)	Leave Mie University.	

2. Overview of Computer Network Laboratory

Member

Staffs: Professor: Yoshikatsu Ohta

Associate Professor: Hidetomo Suzuki

Assistant Professor: Niwat Thepvilojanapong

Secretary: Yoshiko Ochiai

(Computer Network, Computer Software, Pattern Analysis)

Students: Doctor: 1

Master: 11

Undergraduate Student: 9

Research

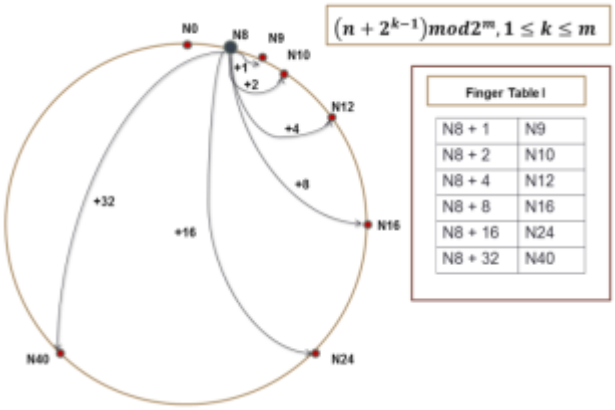
- Network Group: Overlay/ Adhoc/ Sensor Network, Security, Etc.
- Image Processing: Medical Image Processing, Visual information processing and cooperative behavior of mobile, robots, Etc.

3. Learning and Working

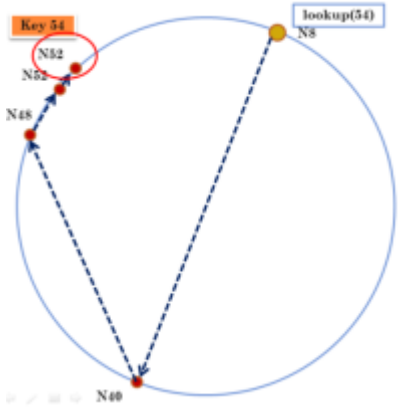
First week I have been learning Japanese language with Prof.Matsuoka Ochizuko and Prof.Fukuoka Masako both very kind. Prof.Matsuoka brew tea from Korea to me, tea from Korea is very delicious. In the afternoon I had worked in Computer Network Laboratory, I have found that Prof. Yoshikatsu Ohta as an advisor and surprised to see Asst.Prof. Niwat Thepvilojanapong which is thai. First day Prof.Ohta advice about computer network laboratory and assigned to Asst.Prof.Niwat is my a consultant. In the laboratory has Hirokazu Nakamori, Kyokei Kawakami and Hiroki Omote to take care and help me. This week I have read research papers and find a project of interest, Finally Prof.Ohta assigned "Chord: A Scalable Peer-to-Peer Lookup Protocol for Internet application" implement with JAVA Simulator, which is discussed in the part "Project". When I implement Chord-theory completely, Prof.Ohta suggested the idea helps deal with the weaknesses of the Chord-theory by idea of Mr. Iwao which proposed at Computer Network Laboratory, last year.

4. Project: "Improvement of Chord."

Peer-to-peer systems and applications are distributed systems without any centralized control or hierarchical organization, in which each node runs software with equivalent functionality. A review of the features of recent peer-to-peer applications yields a long list: redundant storage, permanence, selection of nearby servers, anonymity, search, authentication, and hierarchical naming. Despite this rich set of features, the core operation in most peer-to-peer systems is efficient location of data items. Each Chord node needs "routing" information about only a few other nodes. Because the routing table is distributed, a Chord node and communicates with other nodes in order to perform a lookup.



(a)



(b)

Fig.4.1 (a) The equation used to generate Finger Table I entries for node 8. (b) The path a query for key 54 starting node 8, using algorithm in Figure. 4.2.

```
// ask node n to find the successor of id
n.find_successor(id)
   if(id ∈ (n,successor])
      return successor
   else
      n' = closest_preceding_node(id);
      return n'.find_successor(id);

// search the local table for the highest predecessor of id
n.closest_preceding_node(id)
   for i = m downto 1
      if(finger[i]∈ (n, id))
         return finger[i];
   return n;
```

Fig. 4.2 Scalable key lookup using the Finger Table I

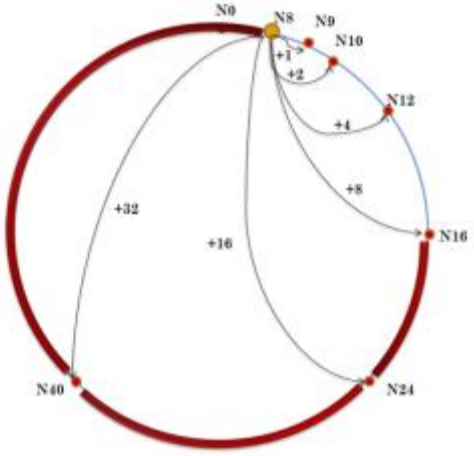
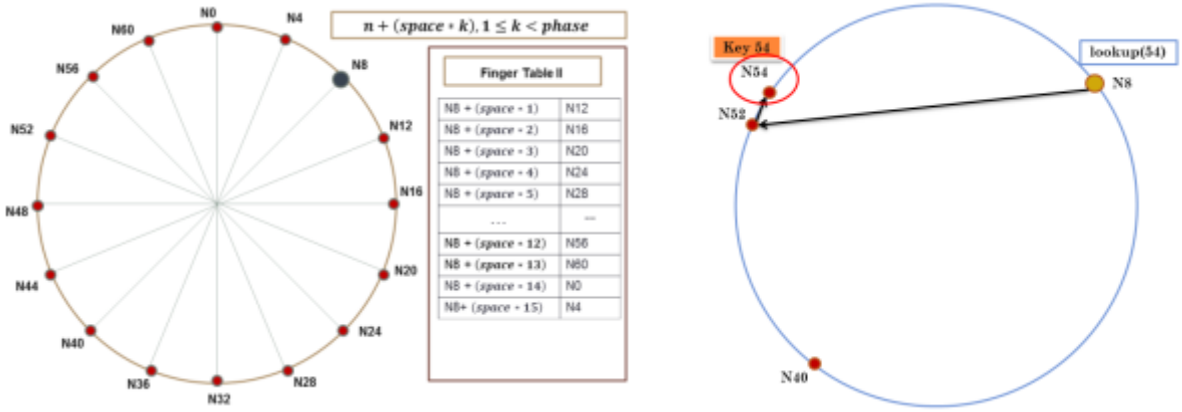


Fig. 4.3 This area is the weakness of Chord node.

Figure 4.2 shows the pseudocode of the *find_successor* operation, extended to use finger tables I. If *id* falls between *n* and its successor, *find_successor* is finished and node n returns its successor. Otherwise, *n* searches its finger table I for the node *n'* whose ID most immediately precedes *id*, and then invokes *find_successor* at *n'*. The reason behind this choice of *n'* is that the closer *n'* is to *id*, the more it will know about the identifier circle in the region of *id*.

As an example, consider the Chord circle in Figure 4.1(b), and suppose node 8 wants to find the successor of key 54. Since the largest finger of node 8 that precedes 54 is node 40, node 8 will ask node 40 to resolve the query. In turn, node 40 will determine the largest finger in its finger table I that precedes 40, i.e., node 52. Finally, node 52 will discover that its own successor, node 54, succeeds key 54, and thus will return node 54 to node 8.

But there are weaknesses in the principles of Chord as show in Figure 4.3. This can eliminate this vulnerability by improvement Chord by idea of Mr. Iwao which proposed at Computer Network Laboratory, last year.



(a) (b)

Fig.4.4 (a) The equation used to generate Finger Table II entries for node 8. (b) The path a query for key 54 starting node 8, using algorithm in Figure. 4.5.

```
// ask node n to find the successor of id
n.find_successor(id)
   if(id ∈ (n,successor])
      return successor
   else
      n' = closest_preceding_node(id);
      return n'.find_successor(id);

// search the local table for the highest predecessor of id
n.closest_preceding_node(id)
   for i = m downto 1
      if(finger[i]∈ (n, id))
         for j = (phase-2) downto 0
            if(finger2[j]∈ (finger[i], id))
               if(finger[i] less than finger2[j])
                  return finger2[j]
               else
                  return finger[i]
         return finger[i];
   return n;
```

Fig.4.5 Scalable key lookup using the Finger Table I and Finger Table II.

Figure 4.5 shows the pseudocode of the *find_successor* operation, extended to use finger tables I and finger tables II. If *id* falls between *n* and its successor, *find_successor* is finished and node n returns its successor. Otherwise, *n* searches its finger table I for the node

n' whose ID most immediately precedes *id*, then n searches its finger table II for the node *n'* for the nearest of precedes *id*, then comparable between *finger[i]* and *finger2[j]* if *finger[i]* less than *finger2[j]* invokes *find_successor* at *finger2[j]* else invokes *find_successor* at *finger[i]*.

As an example, consider the Chord circle in Figure 4.4(b), and suppose node 8 wants to find the successor of key 54. Since the largest finger table I of node 8 that precedes 54 is node 40, then node 8 searches its finger table II for the node 52 for the nearest of precedes 54, then comparable between node 40 from finger table I and node 52 from finger table II node 52 closer key 54 than node 40, so invokes node 52 to resolve the query. In turn, node 52 will determine the largest finger in its finger table I that precedes key 54 and its searches its finger table II for the nearest of precedes key 54, i.e., node52. Finally, node 52 will discover that its own successor, node 54, succeeds key 54, and thus will return node 54 to node 8.

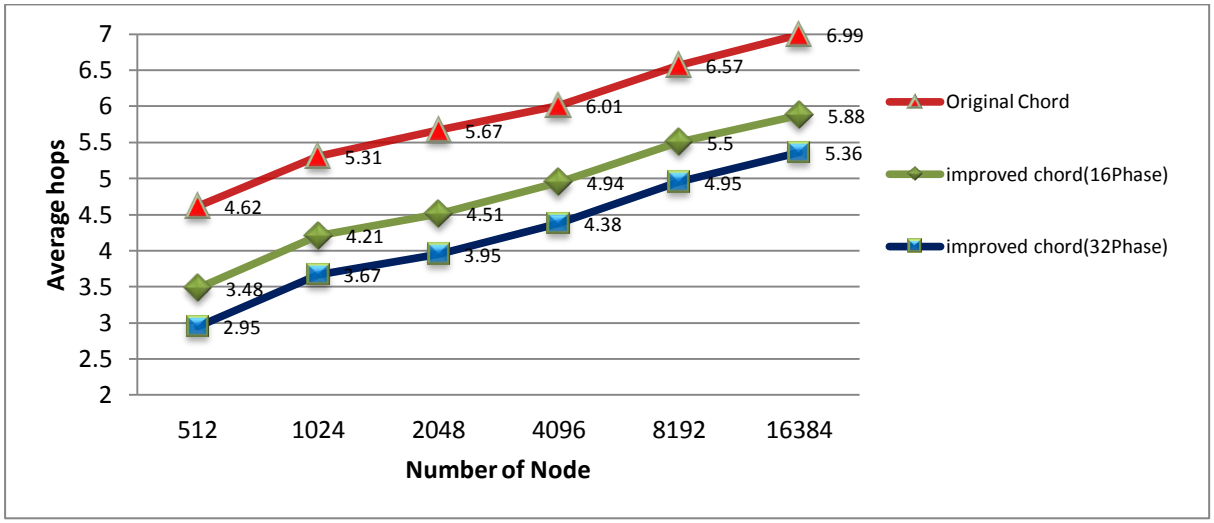


Fig.4.6 The experimental results.

Figure 4.6 is the experimental results. That shows the lookup the successor of key by original chord, improved chord (16 phase) and improved chord (32 phase). The analysis of results revealed that improved chord can help reduce the number of hop. This indicates the reduction in lookup time and reduces storage which is one of the problems of Peer-to-Peer applications.

5. Living in Mie University

Every day I work at Computer network laboratory, Information Engineering. Each week, I have to send brief report. When having problems about the project Prof.Ohta gives consultation to me. On November 21th, 2011 I was very impressed in my birthday Because Prof.Ohta Banquet Birthday party for me. Thank very much for all these things.

The bicycle is a vehicle traveling in Mie University. Every week I am going to purchase food at EON department store or COSMOS supermarket. And every day I have to cooking food myself at dining room this is the first time I made it and this helps me save a lot of expenses but sometimes I have to eat at Japanese restaurant. Japanese foods are very expensive for me but very delicious and healthy. I very like the dorm washing machine because It can be drying.

On October 10th, 2011 I've been to ISE JINGU (伊勢神宮). I very like Japanese traditional market and nature here. In afternoon I've been to Meoto Iwa (夫婦岩) here beautiful sea and nature.

On November 4th, 2011 I've been to NAGASHIMA SPALAND (長島 スパーランド) here amazing machine.

On November 7th, 2011 I've been to Nuclear power plant (原子力発電所).

On November 23rd, 2011 I've been to Mount Gozaisho (御在所岳). This trip is very tiring and dangerous because hiking trails are very slope. All the way natural is very beauty and the first time I saw snow.

Food and Travel













6. Conclusion

Operations in Computer Network Laboratory, Mie University, JAPAN, in addition to the skills of teachers have been trained to do the project. I also have the knowledge and skills of the expert about network. I will take the skills and knowledge gained from this operation to work in the future. During the operation, I have found some problems and difficulties as follows.

1. Problem communicating with Japanese at first. But everything was well. And my communication skill improved.
2. Reading skills in English, I was in the medium. It more time for reading research papers. But I can read English better.
3. Some of the content that I do not know. So take the time to learn these things.

7. Reference

- Ion Stoica, et al, “Chord: A Scalable Peer-to-Peer Lookup Protocol for Internet application”,1EEE/ACM Transactions on Networking, Vol. 11, No.1.pp.17-32, February 2003.
- Takahiro IWAO, “On Churn resilience Improvement Techniques in Chord”, Master Thesis, Graduate School of Engineering, Mie University, 2010.