Youth Activity-Travel Behavior with Mobile Communications in Japan

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Implications of Information and Communications Technologies for Travel Behavior of Teens:

What Does the Future Hold?

The 84th TRB Annual Meeting

Outline

- Mobile communications in Japan
- My research interests
- Case studies of two persons' communications
  - Meeting appointment and waiting behavior using mobile phone
  - Communications behavior of young couples

Mobile Communications in Japan

- Mobile phone has rapidly become widespread.
  - Number of subscription of mobile phone is 94 million (penetration rate: 73%) in Nov. 2004.
  - Number of subscription of mobile phone with Internet access is 73 million (78%) in Nov. 2004.
- Mobile phone has so many functions: e-mail, Internet access, camera, listening to music, watching movie, playing game, TV phone, GPS, route navigation, credit card, etc.
- Young people use mobile phone anytime and anywhere, also while traveling.

video


三越前
歩60秒!
ホビー館
パソコン館
メディア・周辺館
デジタルカメラ
2F


2F
代理店
4F
3F
2F
1F
三井住友銀行
ABC-MART
AOYAMA


Fleurage un
高層ビル街方面


TAKASHIMAYA
TIMES SQUARE
Takashimaya


12


I like mobile phone! I know how to use this.
Oh my god! Don’t call anyone!

What I have been doing

- Activity-based analysis of travel behavior based on "space-time prism" constraints
- Data collection of activity-travel scheduling/patterns using positioning technologies (GPS, GSM, etc.) and GIS

- Telecommunications could be also a demand derived from the desire to participate in activities in "cyberspace".

My Research Interests in Telecommunications and Travel

- To investigate the way telecommunication use affects individual activity scheduling and travel behavior
- To investigate the reason why activities are scheduled and rescheduled (i.e. by one's discretion or by communications)
- To update the theory of "space-time accessibility" to "virtual accessibility" incorporating activities engaged in cyberspace, including activities while traveling
- To investigate the relationships between real/virtual accessibility and activity-travel behavior

Extending the Concept of Accessibility

- Space accessibility
  - The ease to access to destination in space dimension
- Space-time accessibility
  - The ease to participate in activities in space and time
- Virtual accessibility
  - The ease to participate in activities in space and time and cyberspace

Virtual Accessibility

- Virtual accessibility: $A = f(c_k, a_k, t_k)$

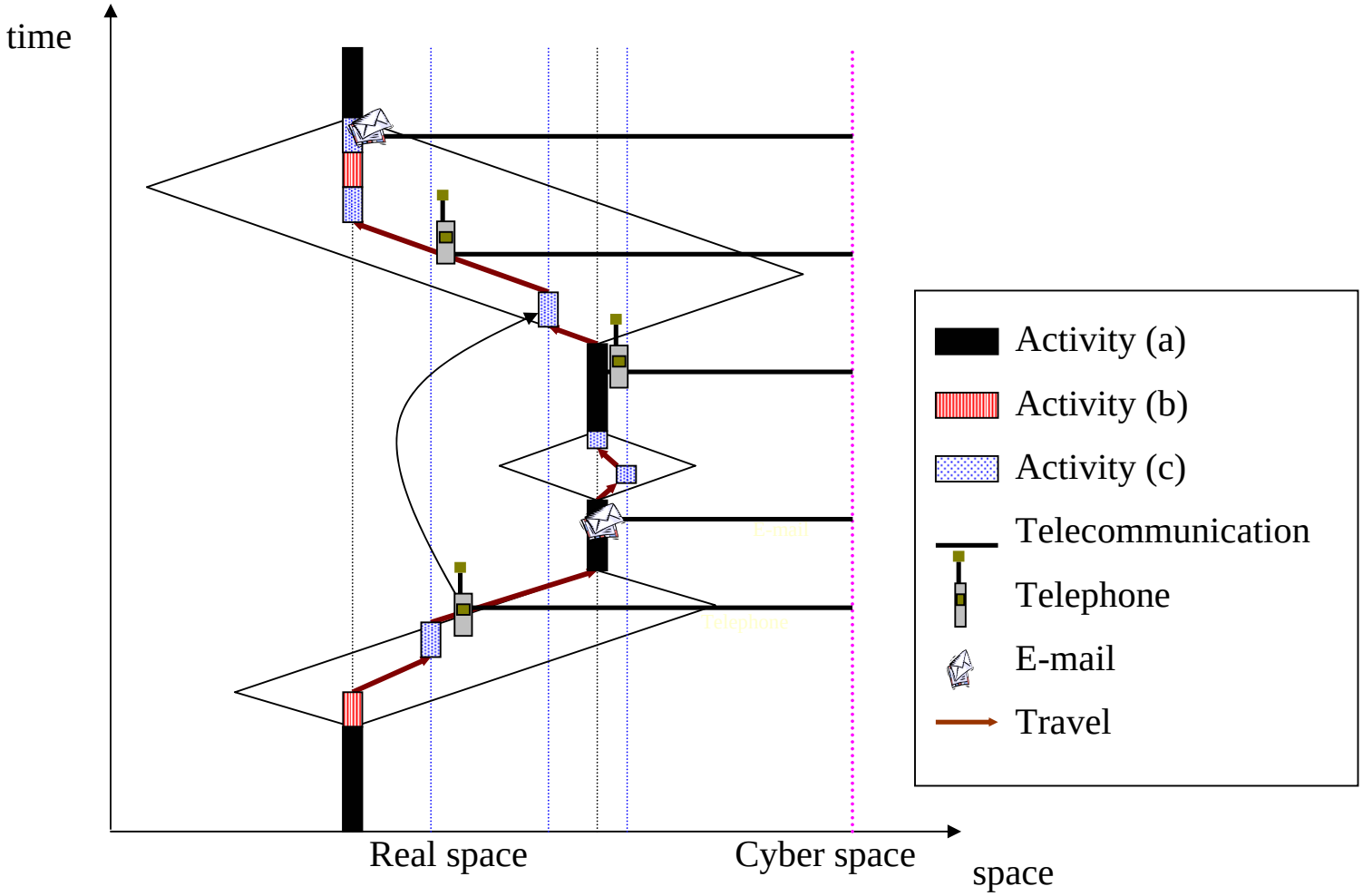
  c_k :cost for participating in activities at opportunity k (including travel cost)
  - Telecommunication cost, device literacy, etc.

  a_k :attractiveness of opportunity k
  - The partner, contents of information obtained, etc.

  t_k :available time at opportunity k
  - Available time for telecommunications

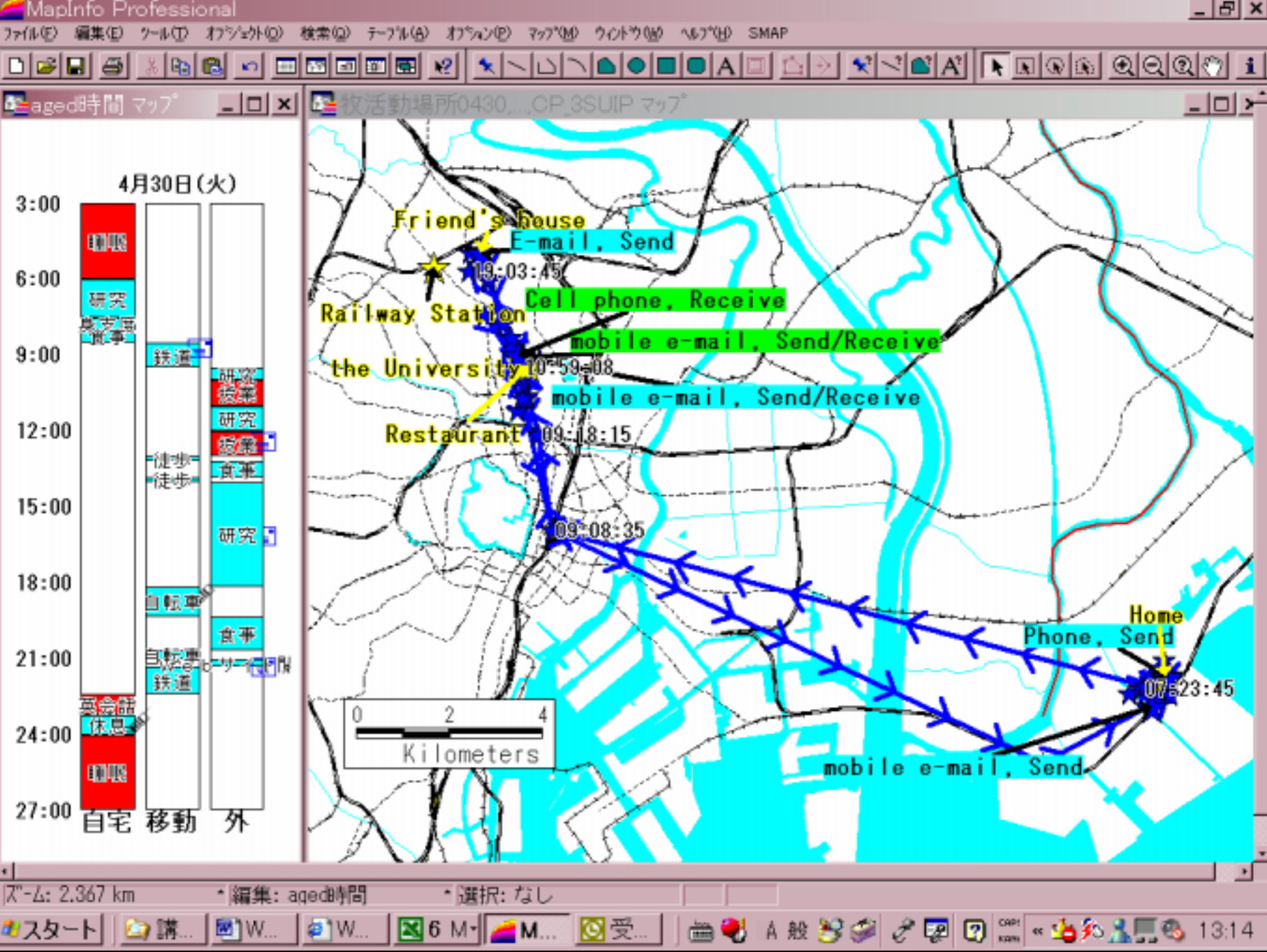
  – Introducing space-time constraints in real space where telecommunications device is available

Activity Schedule and Space-Time Path Including Telecommunications



Data to be Collected to Analyze Activity Scheduling Behavior with Telecommunications

- Activity diary with pre-planned activities and space-time constraints
  - activity type, start/end time, location, accompanied persons, travel mode
- Telecommunications diary
  - time, send/receipt, the contents, the partner, medium, the way it affects an activity scheduling (addition, deletion or modification of activities)
- Travel trajectory
  - by GPS, GSM, etc.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Railway Station
Cell phone, Receive
mobile e-mail, Send/Receive
the University 10:59:08
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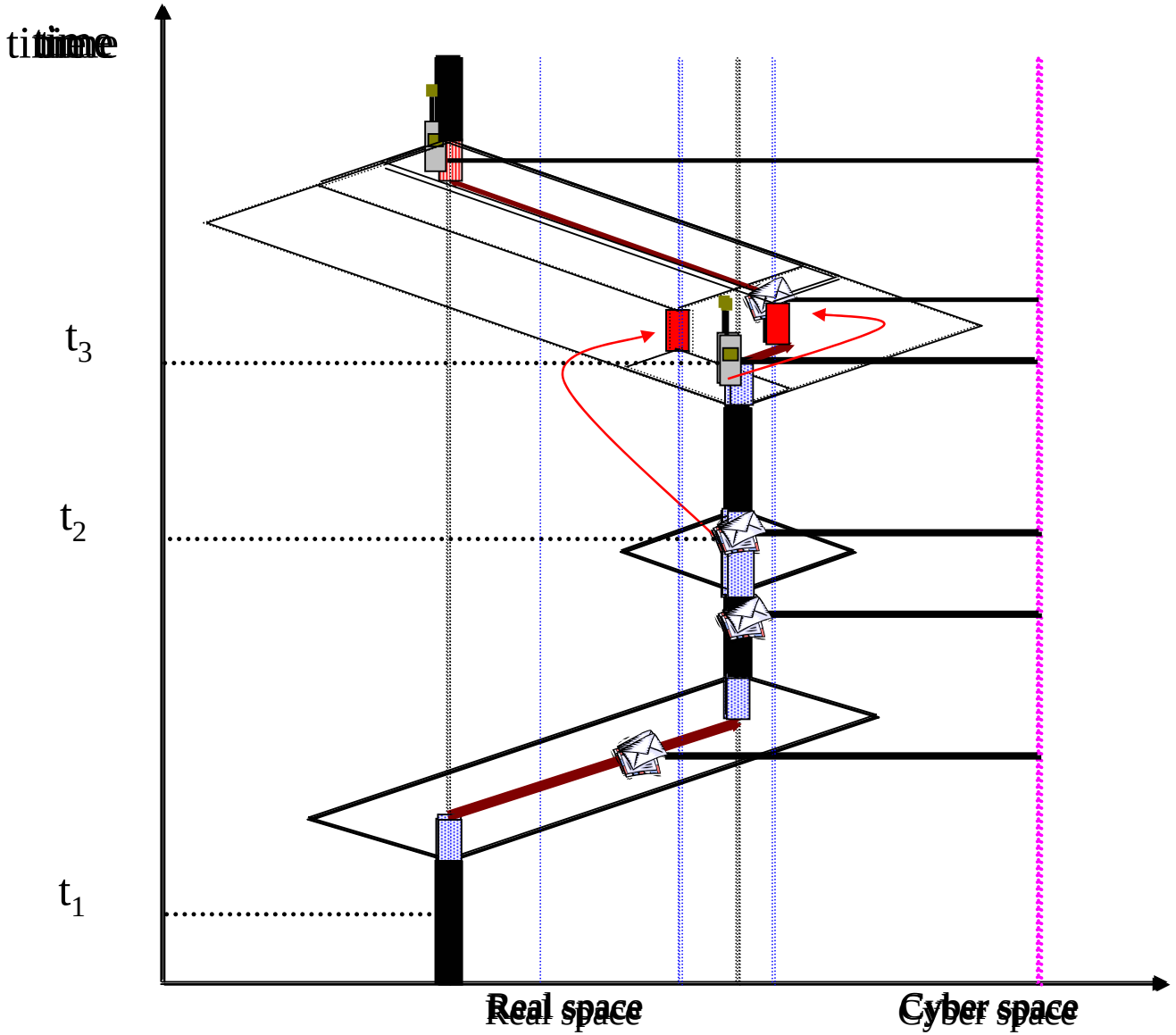
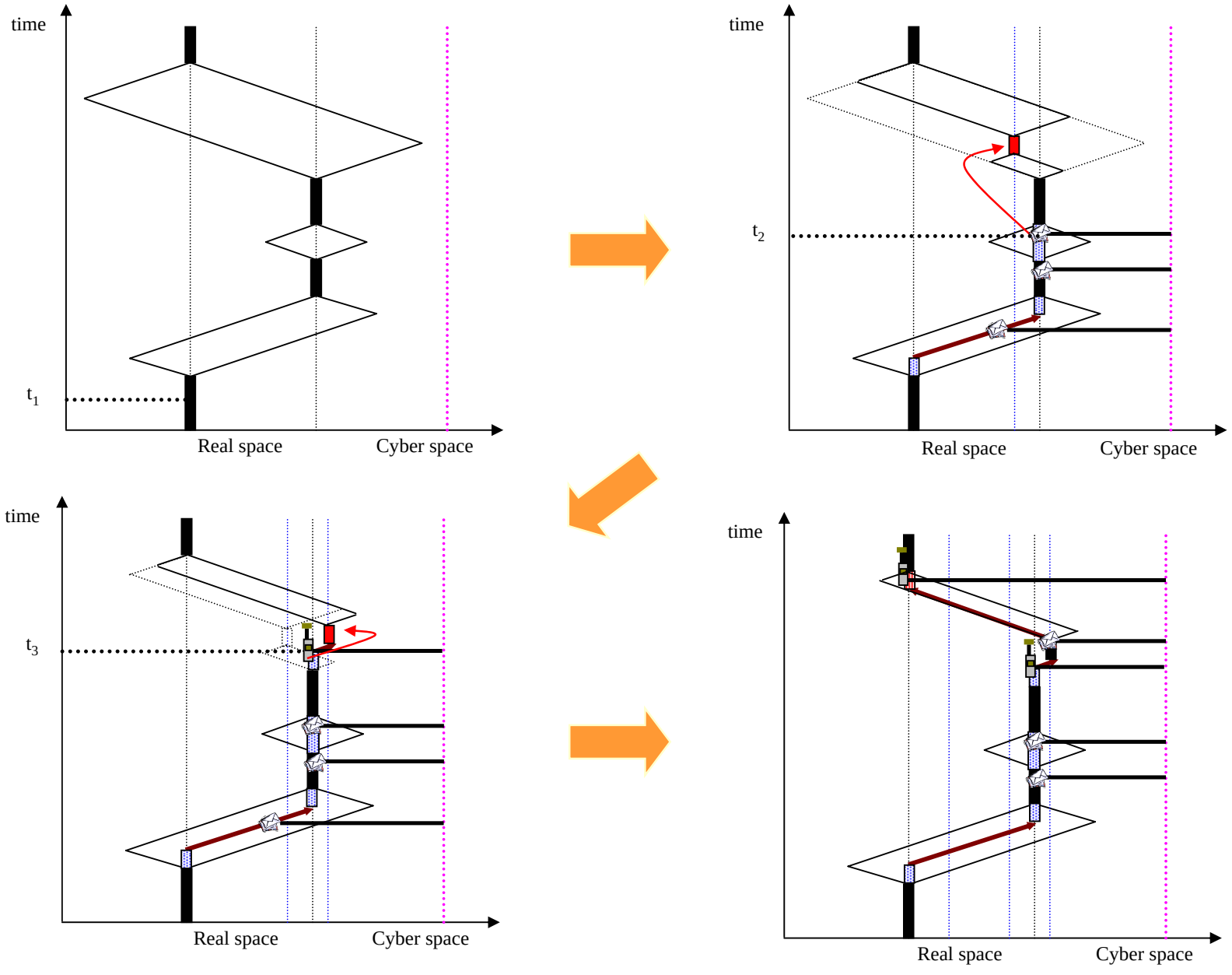


Dynamic Change of One Day Activity Schedule by Telecommunications


time
t1
Real space
Cyber space
time
t2
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Cyber space
time
t3
Real space
Cyber space
time
Real space
Cyber space

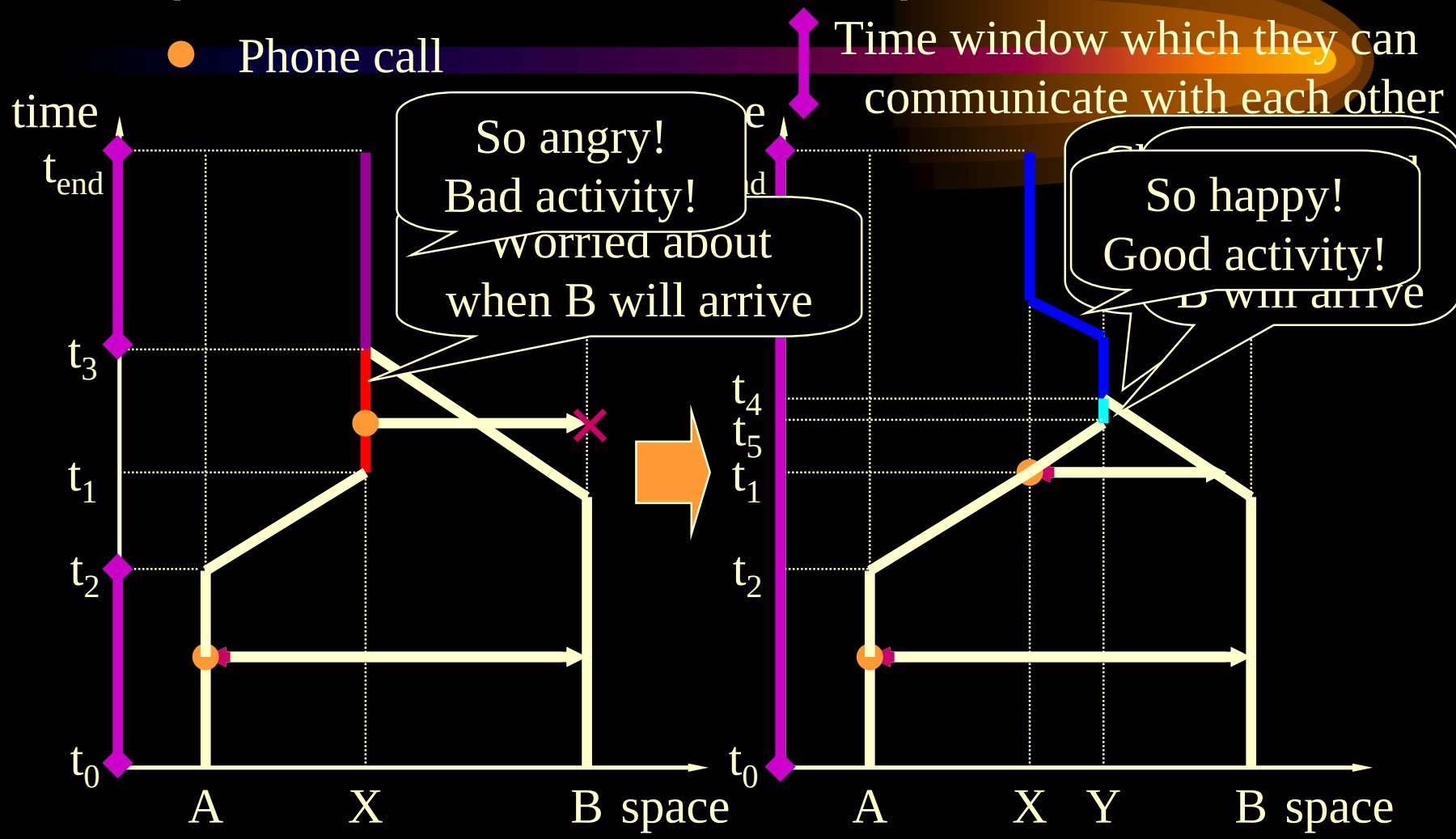
Case Studies of Two Persons' Communications

- Meeting appointment and waiting behavior using mobile phone
- Communications behavior of young couples

Case Study 1: Meeting Appointment and Waiting Behavior

- Background and research questions
  - Dramatic change in “meeting behavior”
  - How should we evaluate “waiting spaces” in cities?
- Objective
  - To investigate the way of making an meeting appointment and waiting behavior of young people using mobile phone

Change in Waiting Behavior Before and After the Introduction of Mobile Phone



Meeting Appointment and Waiting Behavior

- Survey
  - January 2004: on-site interviewing survey
  - 87 young couples who made an appointment to meet at or around the Shinjuku railway station in Tokyo
- Data
  - Activity and telecommunications diary from making the appointment to actual meeting

Conclusions of Case Study 1

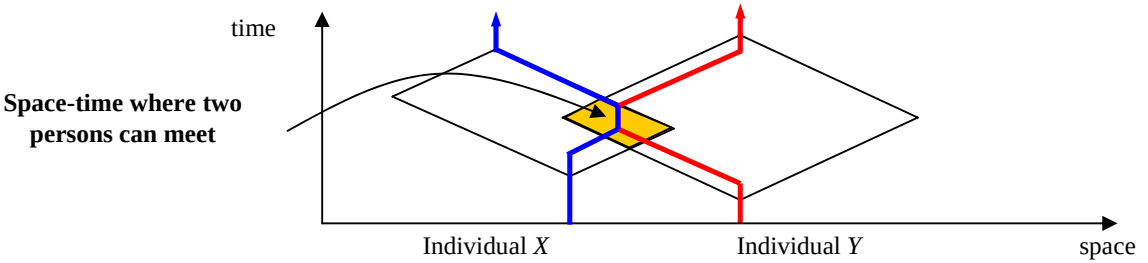
- Mobile phones have provided the option of communicating changes in meeting location and time to the partner.
- Waiting behavior vary depending on the timing to know the partner's late arrival.
- People do activities while waiting for the partner and more than half of them do activities not at the pre-planned waiting spot but at shops around the spot.

Conclusions of Case Study 1 (contd.)

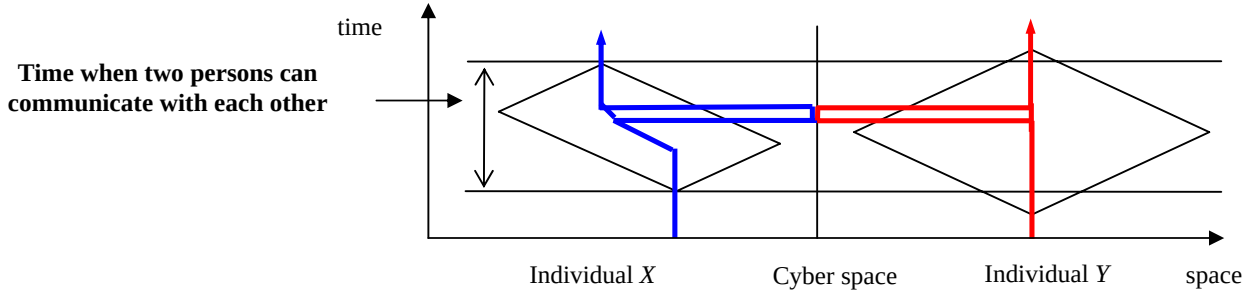
- When knowing the partner's late arrival and the expected waiting time will increase, individual characteristics and the length of the expected waiting time affect activity choice while waiting.
- The results suggest that evaluation method of waiting spaces should be reconsidered, because people's waiting behavior has dramatically changed.

Case Study 2: Communications Behavior of Young Couples

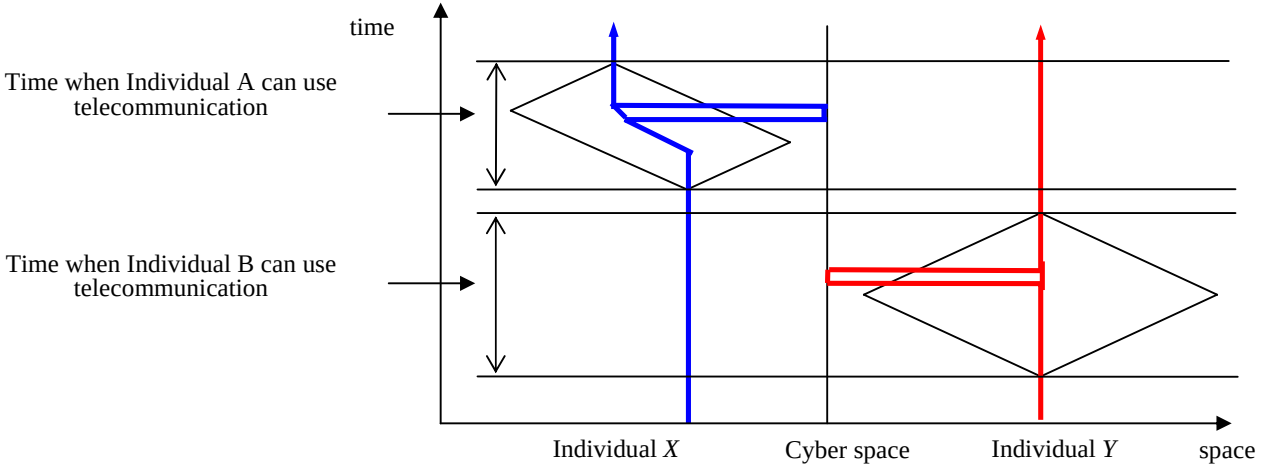
- Background and research questions
  - Are young couples, who cannot meet frequently but can telecommunicate, satisfied with their communications?
  - How can we prevent decrease in the number of children?
- Objective
  - To investigate interaction between face-to-face meeting and telecommunications of young couples (substitution or complementation?)



Meeting



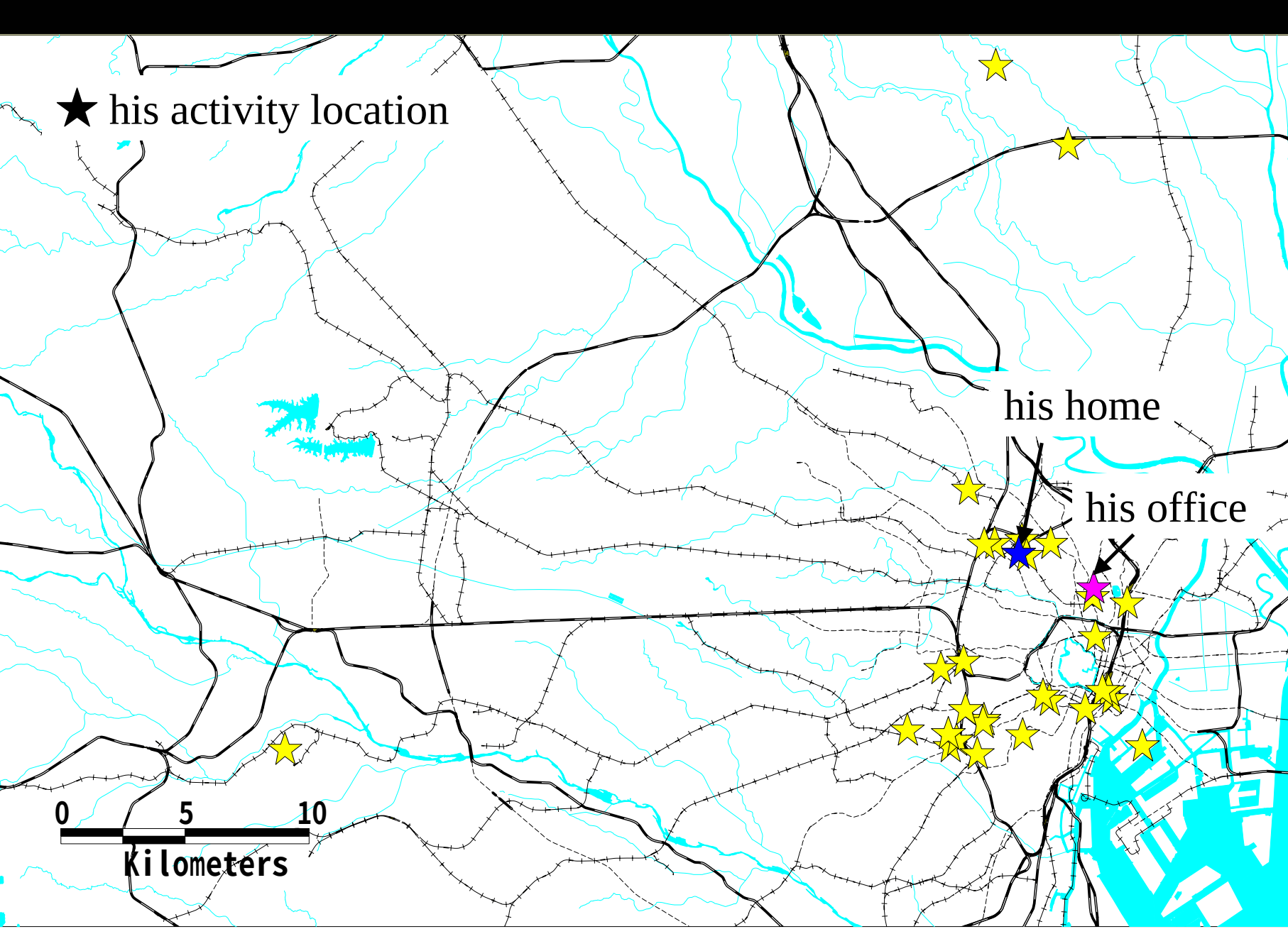
Telephone



E-mail

Communications Behavior of Young Couples

- Survey
  - In Nov. to Dec. 2003 (4 weeks): paper-based questionnaire survey and the subsequent depth interview survey
  - 15 young couples living in Tokyo (4 of them live together)
- Data
  - Activity diary with pre-planned activities and satisfaction level
  - Telecommunications diary ((mobile) phone and (mobile) e-mail)
  - Activity locations in GIS
  - Attitude toward their communications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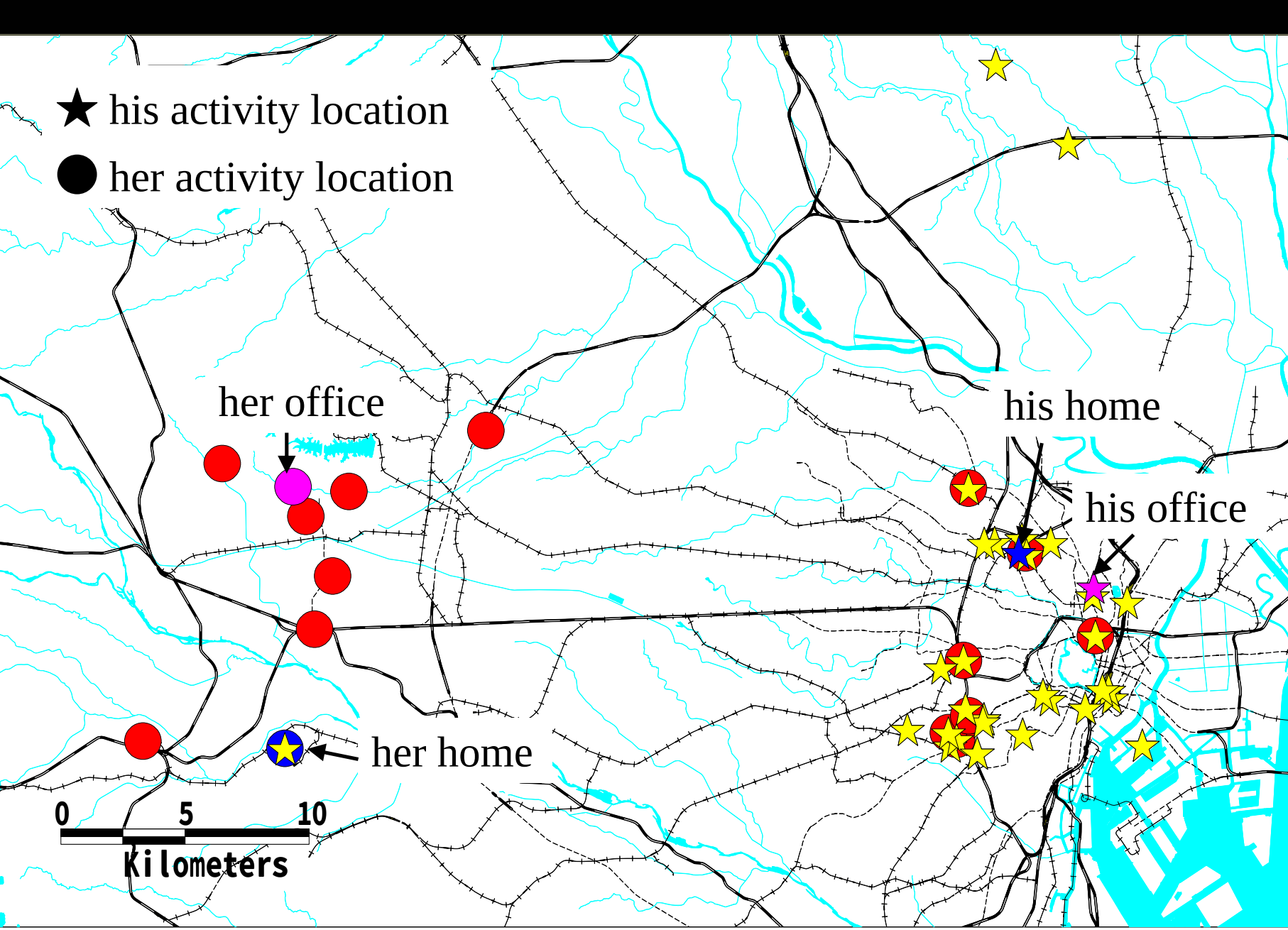
Kilometers


his activity location
her activity location
her office
his home
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Kilometers

Frequency of Mobile Communications and the Partner

		Mobile phone			Mobile e-mail		
		Ave.	Max.	Min.	Ave.	Max.	Min.
Live separately (N=22)	Frequency (/day)	1.7	3.5	0.1	14.9	34.6	1.8
	% with boyfriend/ girlfriend	48%	81%	16%	53%	91%	16%
Live together (N=8)	Frequency (/day)	0.7	3.5	0.1	3.9	34.6	0.1
	% with boyfriend/ girlfriend	60%	86%	9%	43%	91%	6%

Future Analyses of Case Study 2 (if possible)

- Relationships between the amount of face-to-face meeting and the amount of telecommunications
- Activity locations of each base stations (home and work) and of meeting together
- Relationships between communications and real/virtual accessibility
- Relationships between communications and satisfaction level of daily life

Future Research to be Addressed

- Telecommunications and activity-travel analysis
  - What kind of behavior is important?
  - How can we model dynamic scheduling behavior?
- Data collection
  - What kind of survey method should we apply for obtaining information about detailed and wide variety of telecommunication use which affect activity scheduling?
  - How can we prepare database of opportunities in cyberspace?
- How will cities change and what kind of cities should we aim at in the future?

Thank you for your attention!
Welcome your comments!

I thank to the collaborators, Mr. Takayuki Hirano for “Waiting Behavior” and Ms. Yukari Niwa for “Couple Communications.”