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Supporting Ethnographic Studies of Ubiquitous Computing in the Wild



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cord/



The Challenge of UbiComp

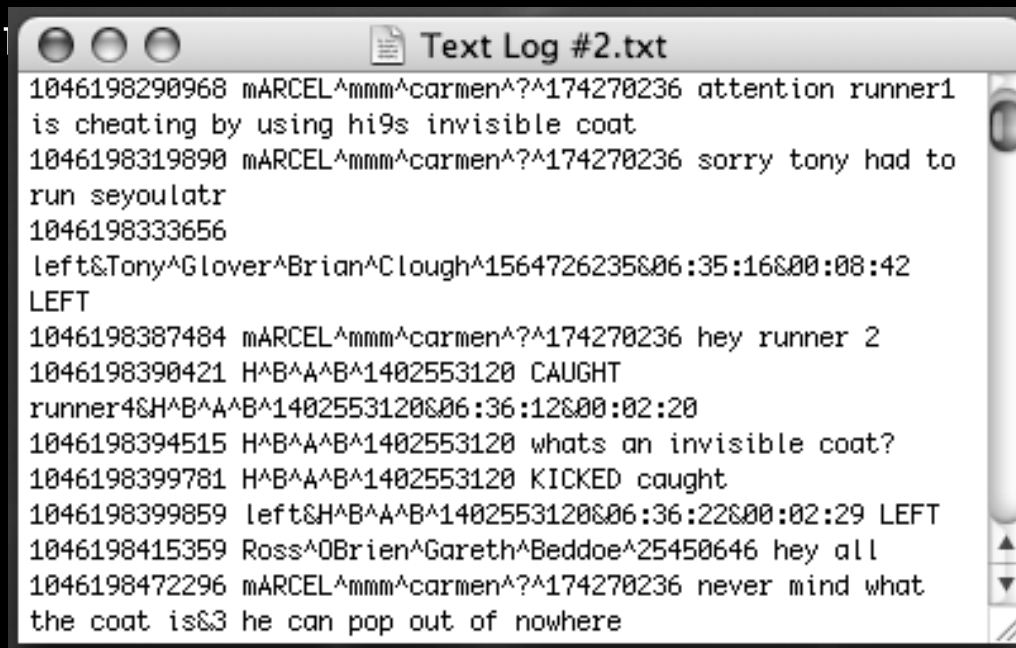
- 'Fragmented' Interaction
 - In the sense that it is distributed across different and differentially distributed mechanisms of interaction
 - E.g., online environments and text messages, mobile devices and audio messages
 - Need to RECONCILE differentially distributed fragments to develop a coherent understanding of interaction

Reconciling fragments of interaction

- 4 Experiences
 - Can You See Me Now?
 - Uncle Roy All Around You
 - Savannah
 - Treasure
- Examine efforts and troubles involved in what Weiser called “reconciling fragments of embodied virtuality”

Can You See Me Now?

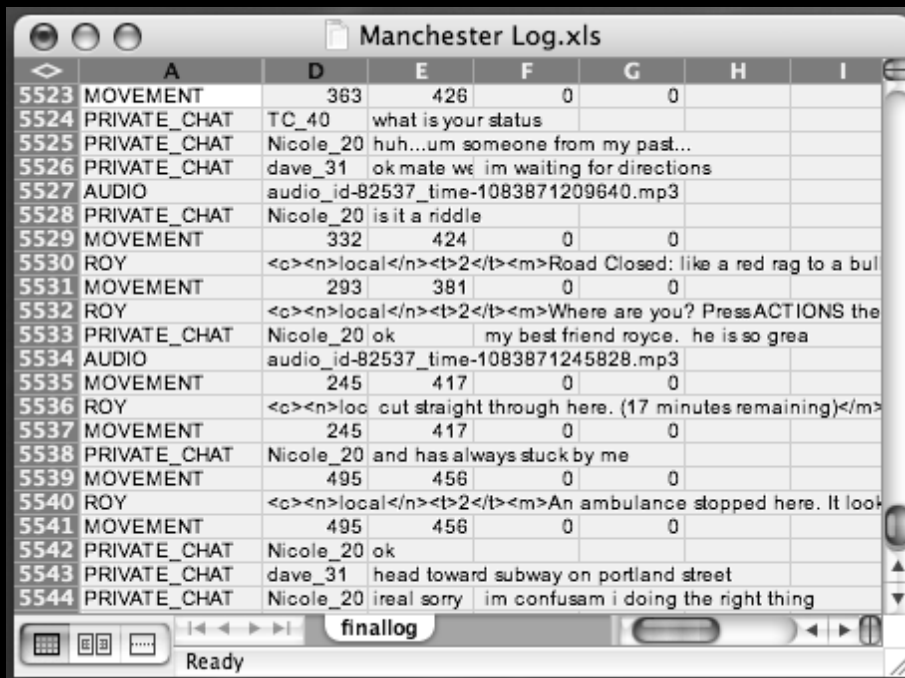
- Video of runners on the streets complemented by text logs of player



```
1046198290968 mARCEL^mmm^carmen^?^174270236 attention runner1
is cheating by using hi9s invisible coat
1046198319890 mARCEL^mmm^carmen^?^174270236 sorry tony had to
run seyoulatr
1046198333656
left&Tony^Glover^Brian^Clough^1564726235&06:35:16&00:08:42
LEFT
1046198387484 mARCEL^mmm^carmen^?^174270236 hey runner 2
1046198390421 H^B^A^B^1402553120 CAUGHT
runner4&H^B^A^B^1402553120&06:36:12&00:02:20
1046198394515 H^B^A^B^1402553120 whats an invisible coat?
1046198399781 H^B^A^B^1402553120 KICKED caught
1046198399859 left&H^B^A^B^1402553120&06:36:22&00:02:29 LEFT
1046198415359 Ross^OBrien^Gareth^Beddoe^25450646 hey all
1046198472296 mARCEL^mmm^carmen^?^174270236 never mind what
the coat is&3 he can pop out of nowhere
```

Uncle Roy All Around You

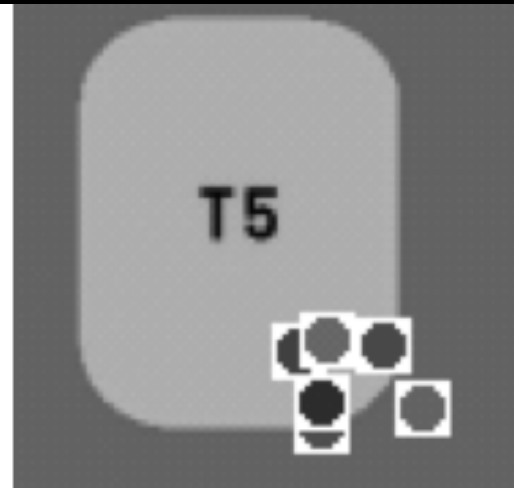
- Logs this time include audio from street players as well



	A	D	E	F	G	H	I
5523	MOVEMENT	363	426	0	0		
5524	PRIVATE_CHAT	TC_40	what is your status				
5525	PRIVATE_CHAT	Nicole_20	huh...um someone from my past...				
5526	PRIVATE_CHAT	dave_31	ok mate we im waiting for directions				
5527	AUDIO	audio_id-82537_time-1083871209640.mp3					
5528	PRIVATE_CHAT	Nicole_20	is it a riddle				
5529	MOVEMENT	332	424	0	0		
5530	ROY	<c><n>local</n><t>2</t><m>Road Closed: like a red rag to a bul					
5531	MOVEMENT	293	381	0	0		
5532	ROY	<c><n>local</n><t>2</t><m>Where are you? PressACTIONS the					
5533	PRIVATE_CHAT	Nicole_20	ok my best friend royce. he is so grea				
5534	AUDIO	audio_id-82537_time-1083871245828.mp3					
5535	MOVEMENT	245	417	0	0		
5536	ROY	<c><n>loc cut straight through here. (17 minutes remaining)</m>					
5537	MOVEMENT	245	417	0	0		
5538	PRIVATE_CHAT	Nicole_20	and has always stuck by me				
5539	MOVEMENT	495	456	0	0		
5540	ROY	<c><n>local</n><t>2</t><m>An ambulance stopped here. It look					
5541	MOVEMENT	495	456	0	0		
5542	PRIVATE_CHAT	Nicole_20	ok				
5543	PRIVATE_CHAT	dave_31	head toward subway on portland street				
5544	PRIVATE_CHAT	Nicole_20	ireal sorry im confusam i doing the right thing				

Savannah

- Logs and visualizes GPS data



Treasure

- Logs and visualizes video, text, audio,



Reconciling Fragments of Interaction

- Some practical troubles
 - Exploiting logs or system recordings
 - Requires a great deal of manual labour
 - Synchronizing media and logs
 - Need to temporally align media and logs in order to replay them and marry diverse resources together
 - Using replay tools
 - Developed by designers, not ethnographers

The Danger of Reification

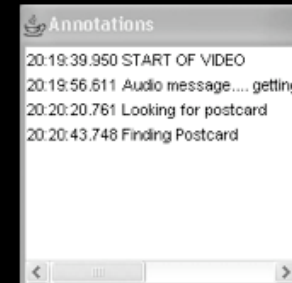
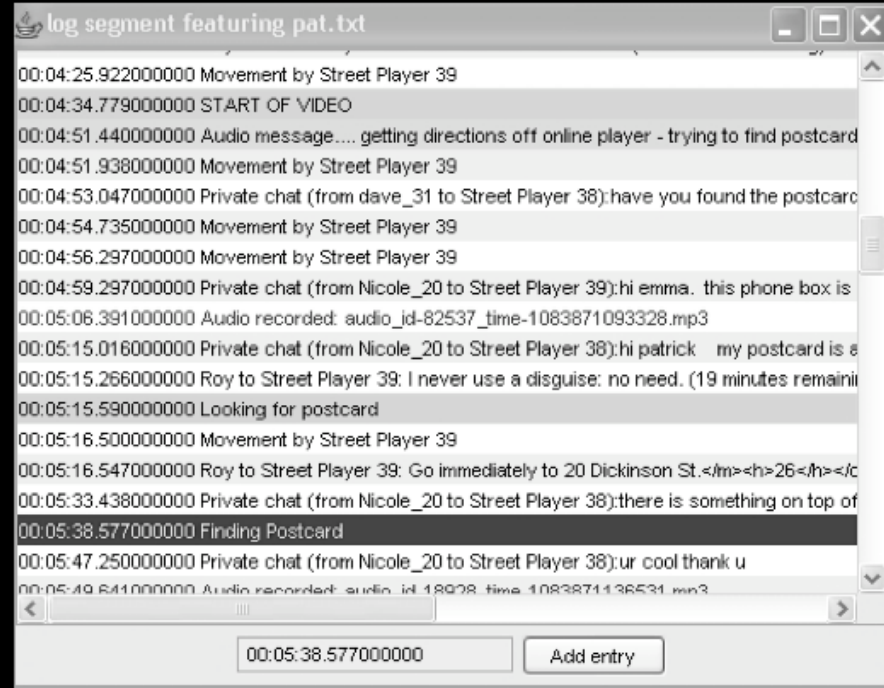
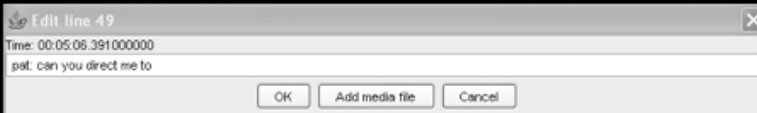
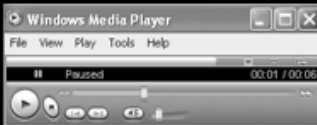
- System time vs. interaction time
 - System logs offer a seductive representation of interactional order
 - System time is not the same as interaction time, however
 - E.g., text messaging
 - Thus, the order of interaction represented by system logs is not commensurate with the actual order of interaction

Tool Development

- Need to develop tools that:
 - Support the work involved in “making logs work” (cleaning up logs, identifying salient features, removing non-relevant features, etc.)
 - Support the synchronization of logs and other media
 - Support the production of new representations of interaction
 - Support ethnographers rather than designers

Synchronizing Logs and Media

(2)



Producing new representations (2)

- Supporting “structured” forms of analysis
 - Coding mechanisms
 - Production of statistical representations
 - Flexible transitions between qualitative and quantitative data sets

So what?

- Anvil, Atlas, etc.
 - Existing tools enable researchers to work with video and audio, even in structured form
 - But they do not enable researchers to examine system recordings or logs
 - Or to combine those recordings with other media
 - Existing software packages do not support the reconciliation of fragmented interaction and study of the social character of ubiquitous computing

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Summary

- Challenge of UbiComp: fragmented interaction
- Proposed solution: "record and replay"
- Tools to support collation, synchronization, representation of internal and external resources
- Reconciling fragments of interaction through "thick description" to marry resources together

• ReplayTool soon available for public release:

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<https://sourceforge.net/projects/replaytool>