

Predictors of Life Satisfaction Based on Daily Activities from Mobile Sensor Data

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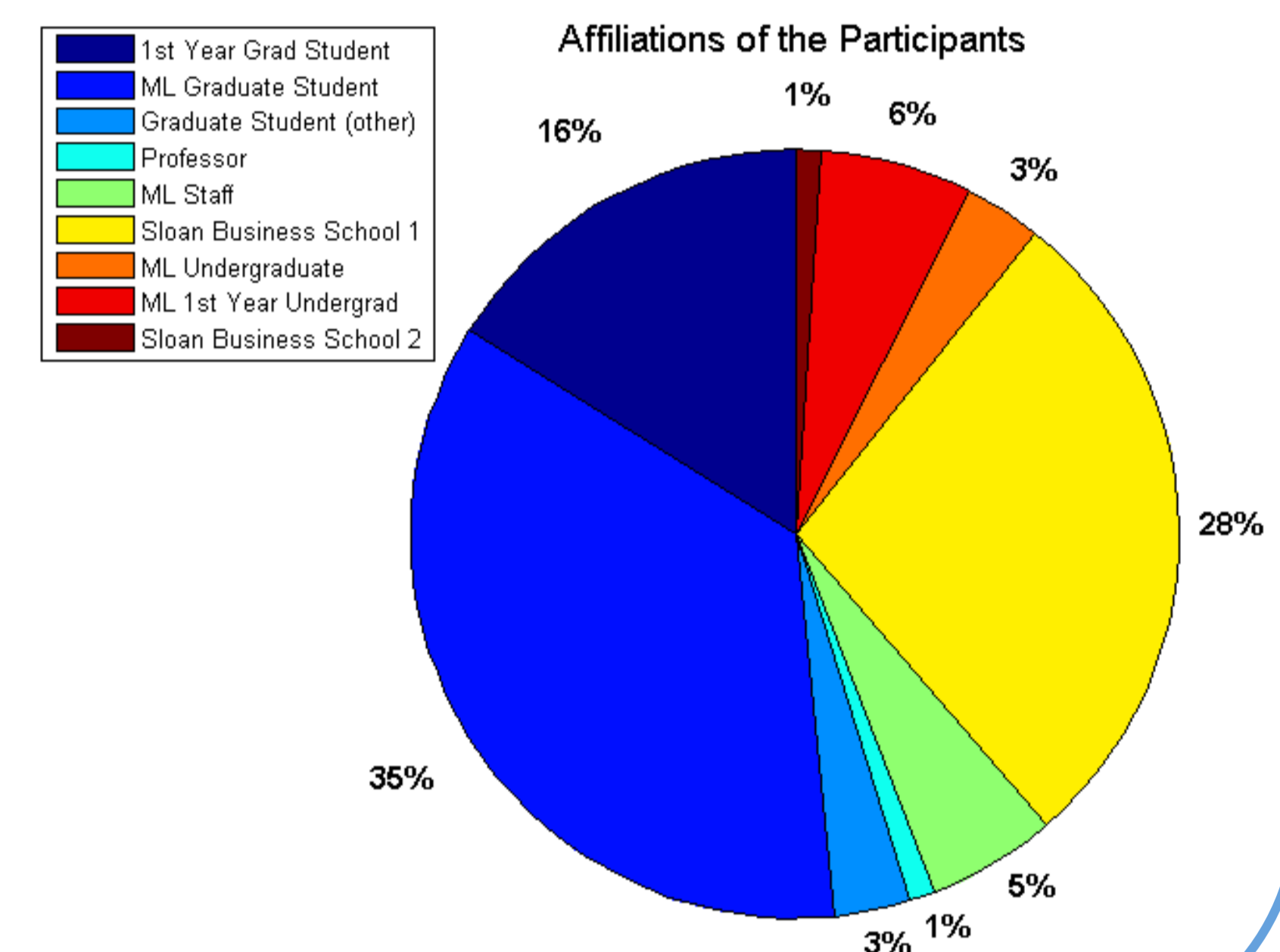
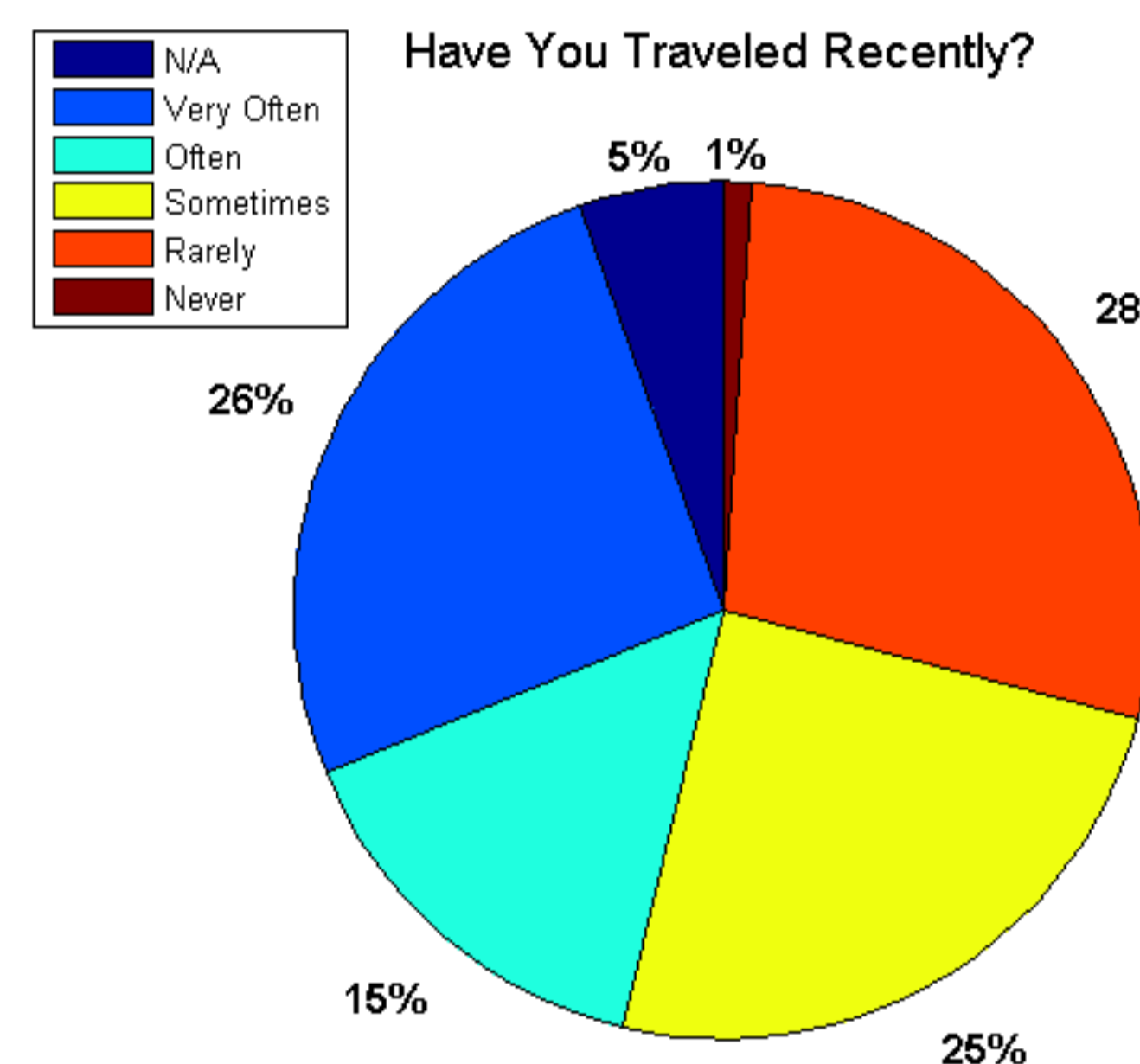
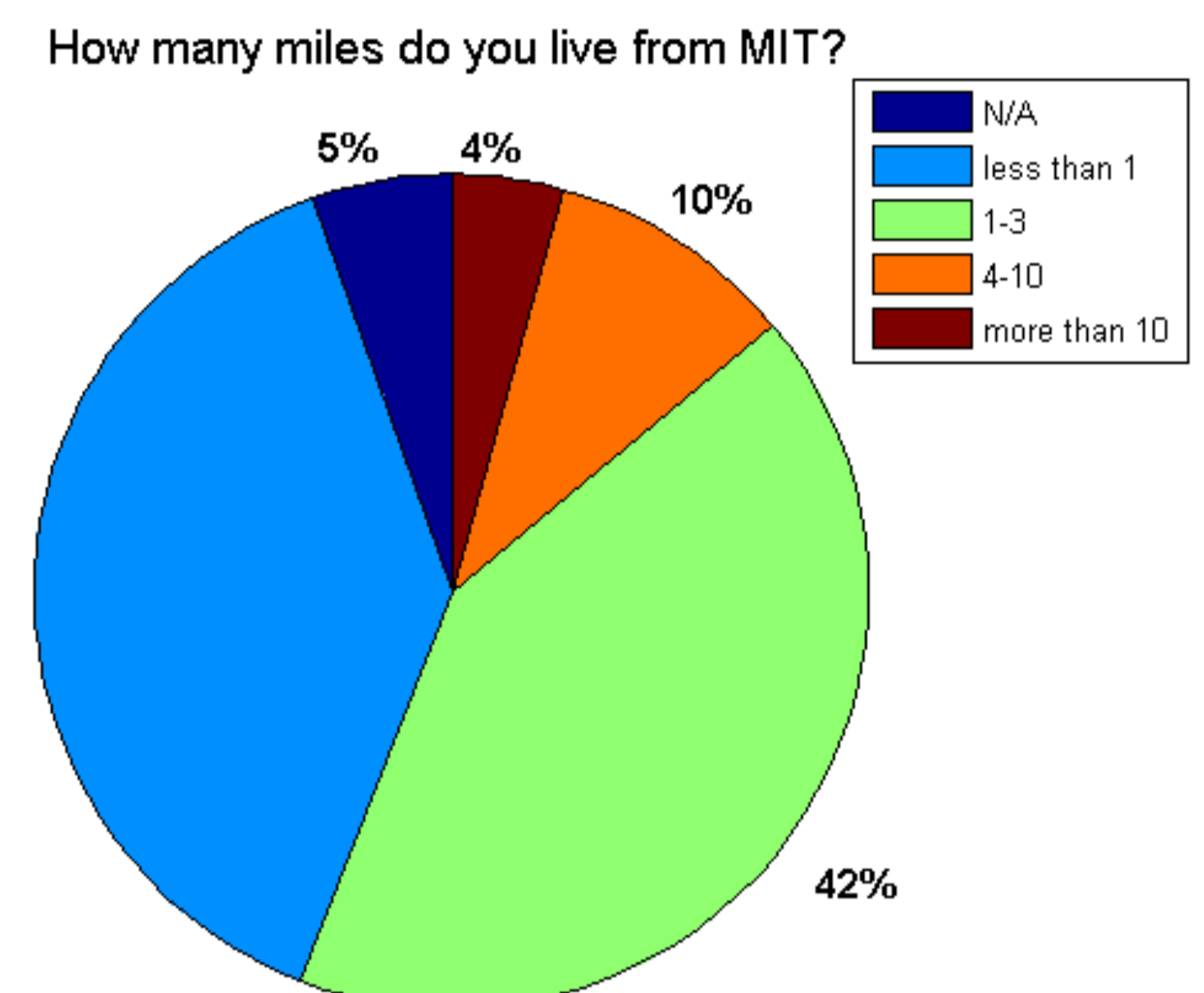
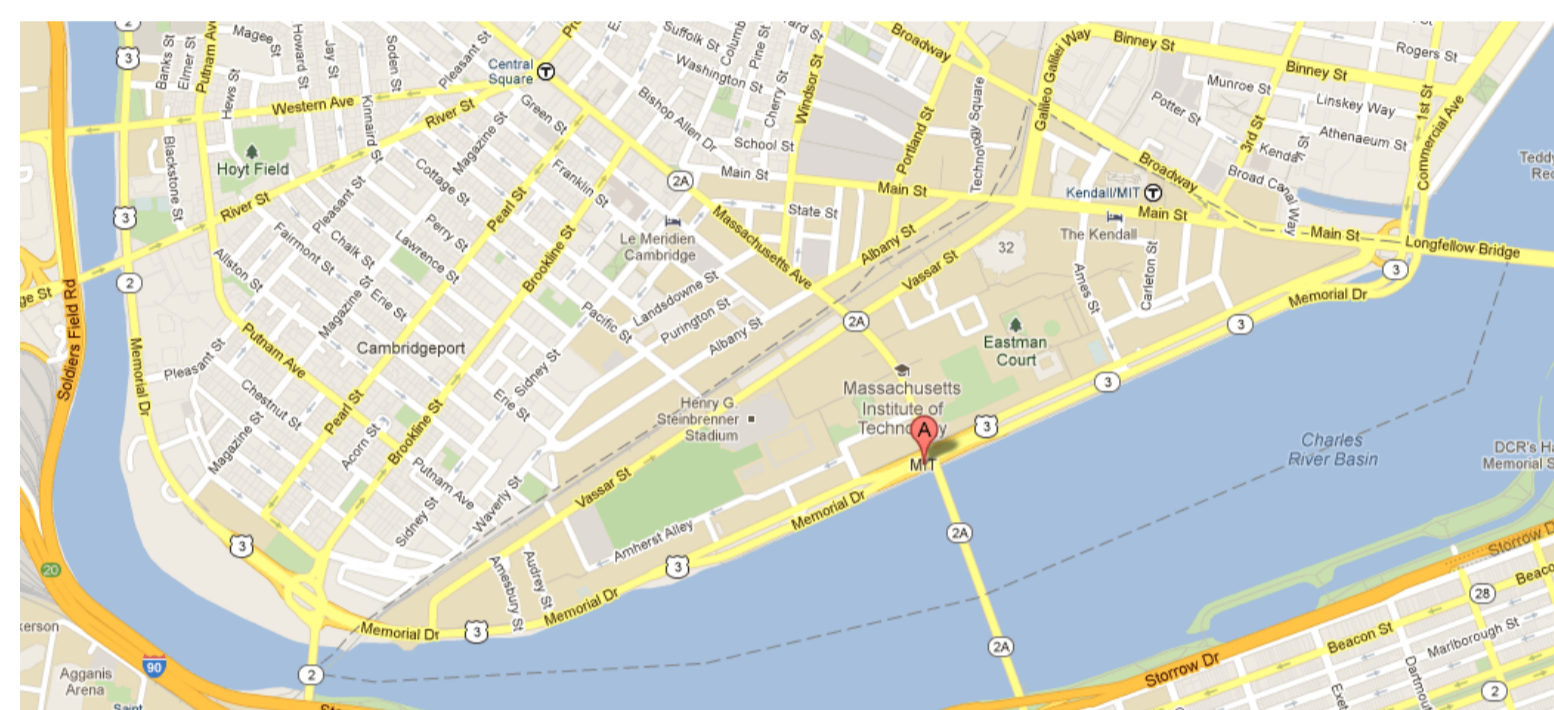
Objectives

- Study the relevance of users' lifestyle behaviors to their happiness
- Develop a recommender system to help enhance users' wellness

The Reality Mining Dataset

Some Demographics:

- 94 Participants from MIT
- Collected in 2004-2005



Methods

1. **Data Collection:** Collect Location, Proximity and Survey data from the dataset.

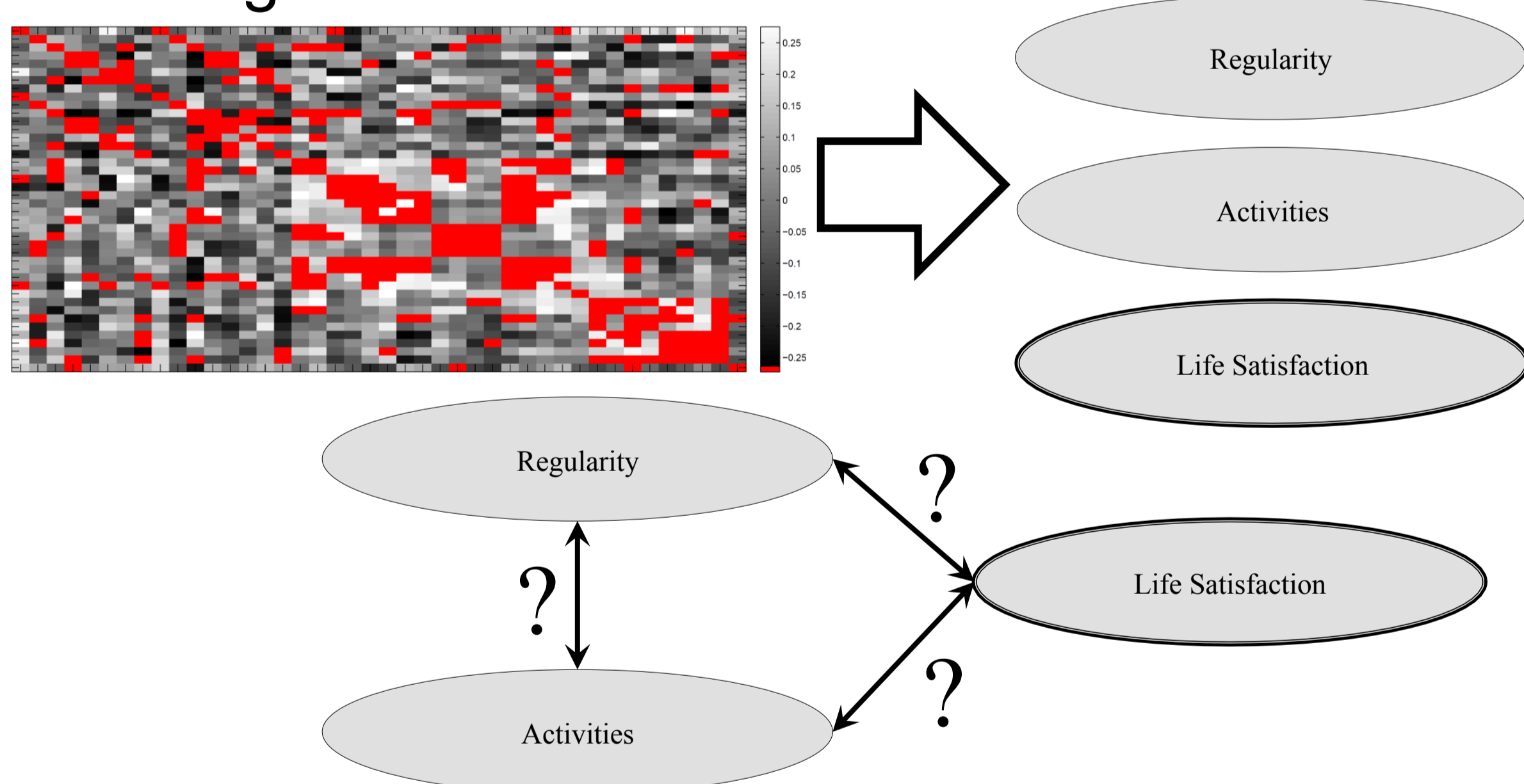
2. **Feature Extraction:**

- Compute **Activities (sleep, work, break, leisure)** and Their **Distributions** for Each User
- Calculate **Entropy**:

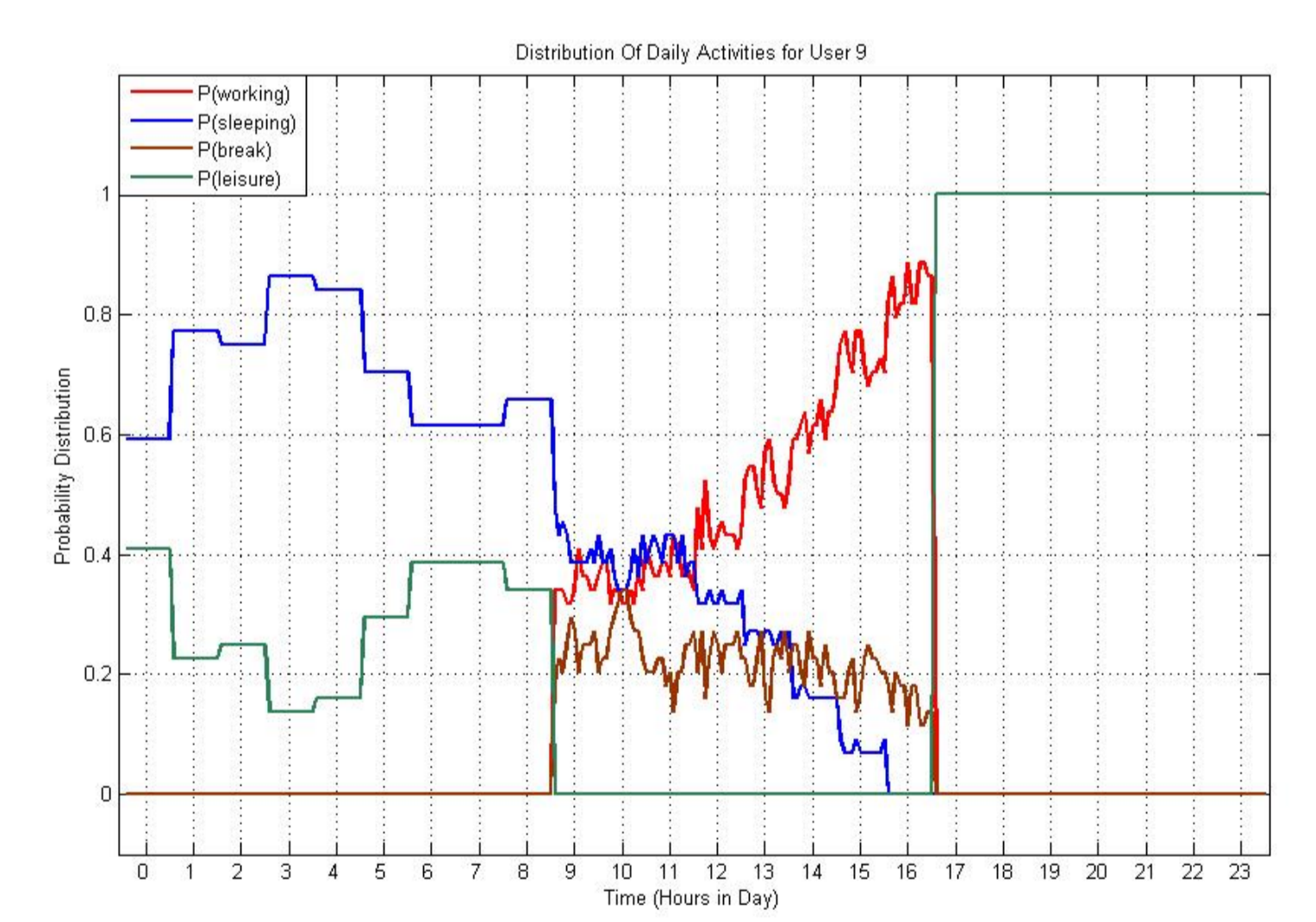
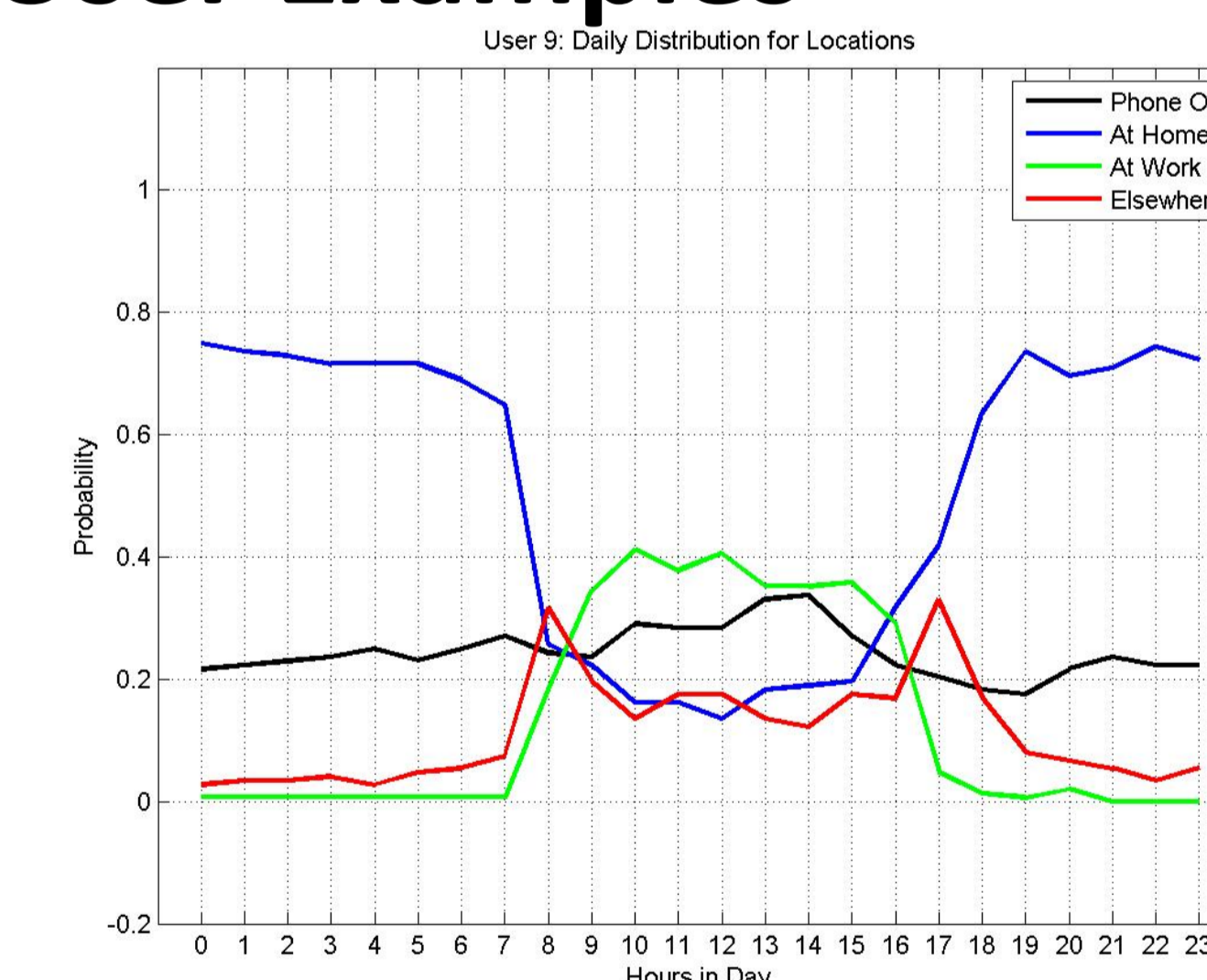
$$H(x) = -\sum_{t \in [1,24]} \sum_{c \in C(x)} p(c|t) \log(p(c|t))$$

3. **Factor Analysis:**

Correlation → PCA → Structural Equation Modeling



User Examples



Results

	Component					
	1	2	3	4	5	6
Proximity Entropy						
weekdayProximityEntropy	.920	-.034	-.031	-.094	.145	-.085
weekendsBluetoothTime	.858	-.270	.110	-.010	-.091	.013
weekendProximityEntropy	.858	.048	-.077	-.089	-.025	-.201
weekdaysBluetoothTime	.805	-.166	.001	.060	.093	.100
weekendsBluetoothCount	-.750	-.071	.020	-.056	.072	.117
weekdaysBluetoothCount	-.750	-.188	-.001	-.130	-.080	.140
Communication Activities						
weekendsVoiceCount	-.006	-.853	.137	.052	.010	.127
weekdaysSMSCount	-.015	.841	-.093	.172	.064	-.048
weekdaysVoiceCount	.050	-.819	.156	.110	.114	.018
weekendsSMS	.013	.798	.006	.148	.101	-.121
weekendActivityEntropy	.325	.567	-.358	-.302	.276	.120
Leisure and Sleep Activities						
weekendSocialEntropy	-.372	-.455	.411	.217	-.017	-.265
weekdayHomeRest	-.148	.291	.167	.021	-.145	.014
weekendHomeSleep	-.078	.123	-.798	-.044	.089	-.192
weekdayLeisureing	.064	-.029	.763	-.376	.266	.091
weekendLeisureing	.050	-.018	.758	-.394	.231	.207
weekdayHomeSleep	-.040	.116	.687	.449	-.287	-.187
weekendActivityEntropy	-.273	-.334	.579	.322	-.186	-.079
weekendLeisureSocial	-.065	.312	-.440	-.021	-.097	.271
weekdayLeisureSocial	.327	.113	-.421	-.288	.082	.227
Working Activities						
weekdayWorking	.120	.072	-.113	-.865	.259	.124
weekdayWorkSocial	-.129	.108	.106	.789	-.015	.042
weekendWorking	.272	-.017	.076	.742	.218	.078
weekendWorkSocial	.099	.051	.032	-.553	-.059	.069
weekendHomeRest	.070	-.140	-.125	-.178	-.162	-.134
Location Entropy						
weekendPrivateActivity	.016	.034	.016	-.039	-.799	.030
weekdayPrivateActivity	-.126	.005	.012	-.334	-.707	-.036
weekdaySocialEntropy	.461	.182	-.195	-.163	.565	.060
weekendHomeSocial	-.078	.020	.159	.199	.551	-.373
weekdayLocationEntropy	-.223	-.226	.186	.058	-.031	.839
weekendLocationEntropy	-.309	-.189	.166	.221	-.011	.808
weekdayHomeSocial	.113	.239	-.065	-.156	-.400	.441

	Component	
	1	2
Social Life Satisfaction		
SAT.GroupInteractPersonal	.848	-.223
SAT.SupportFromGroupMembers	.786	-.151
SAT.GroupMeetings	-.738	.035
SAT.SupportFromFriends	.735	-.056
SAT.SocialCircle	-.457	.033
Research Satisfaction		
SAT.Learning	-.399	.707
SAT.ResearchContentAndDirection	-.277	.682
SAT.Overall.MIT	-.270	.634
Health		
TravelFrequency	-.043	-.513
	-.111	-.473

- Well amount of Sleep, work and Leisure for happiness
- Regularity is very relevant for satisfaction
- Social life satisfaction fuels research satisfaction

