Pattern Detection in Lifelog Data

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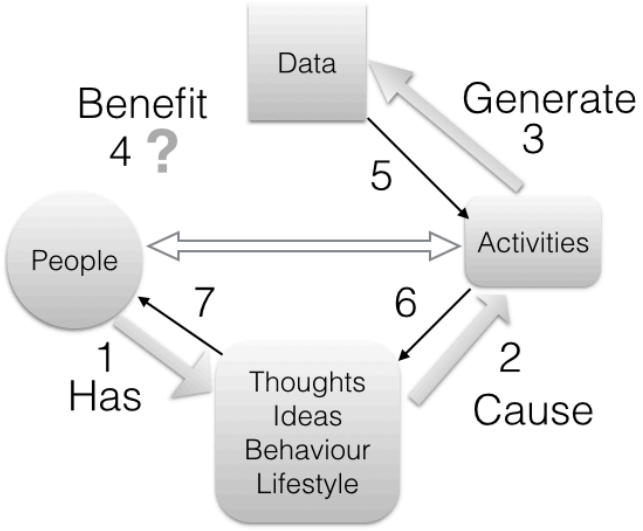
Insight

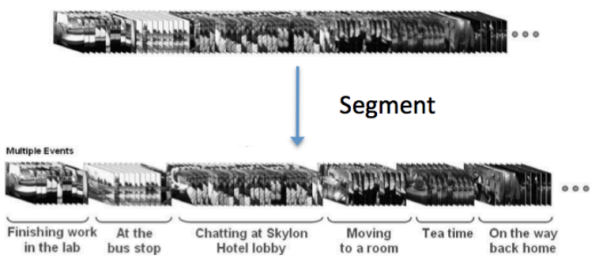
Lifelog Technology

Lifelogging technology is getting attention from industry, academic and the market, such as wearable sensors and the concept of a smart home. The future trend of lifelog technology is aggregating longitudianal data from multi-modalities.

We propose a framework which could handle those aggregated multimodal and longitudinal data. The framework takes advantage of the rich information carried chronologically and implements process such as data cleaning, low and high level pattern detection feedback to users.



Previous researchers have developed methods which segment and detect events in lifelog data. The event based analysis of lifelog data builds a bridge between user and activities so that users are able to search or retrive activities.

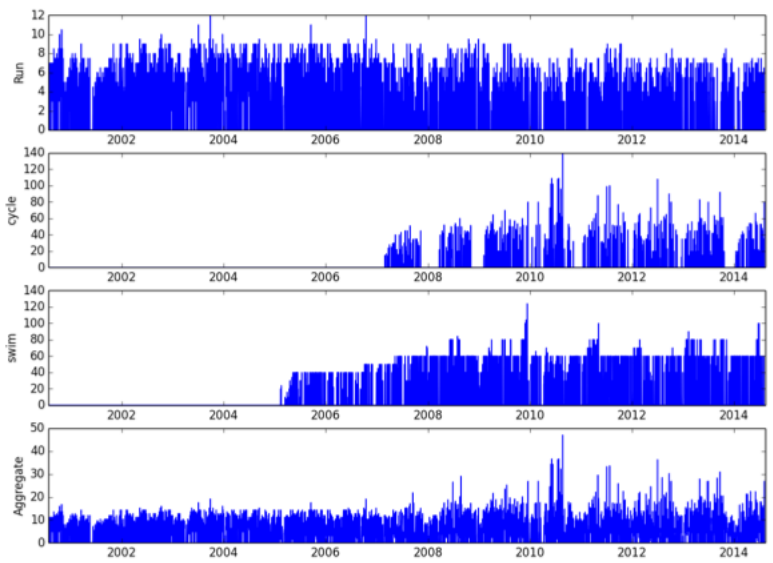


Activity Data

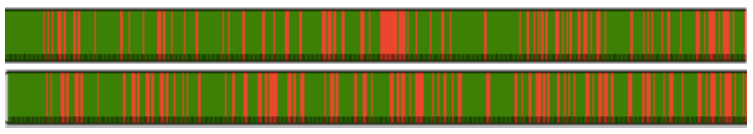
We apply periodicity detection on 4 different datasets

- Athletic and sporting activity dataset from an international athlete (10 years)
- Sleep dataset from a normal male adult (2.5 years)
- Data captured from People with early stage Dementia (1.5 years)
- Lifelog Data collected by SenseCam (2.5 years)

In this poster we focus on the first dataset containing information on distance of running, cycling, and swimming for about 10 years. The record is chronological and updated daily and the subject has made comments on some dates. 4 annotators annotated these text comments and scored for mood and performance indicated in the user comments made in the year 2007.



Fusion strategy based on inter-annotator aggrement aggregatse annotation from the 4 annotators. The result of fusion showed the data is sparse for both mood and performance.



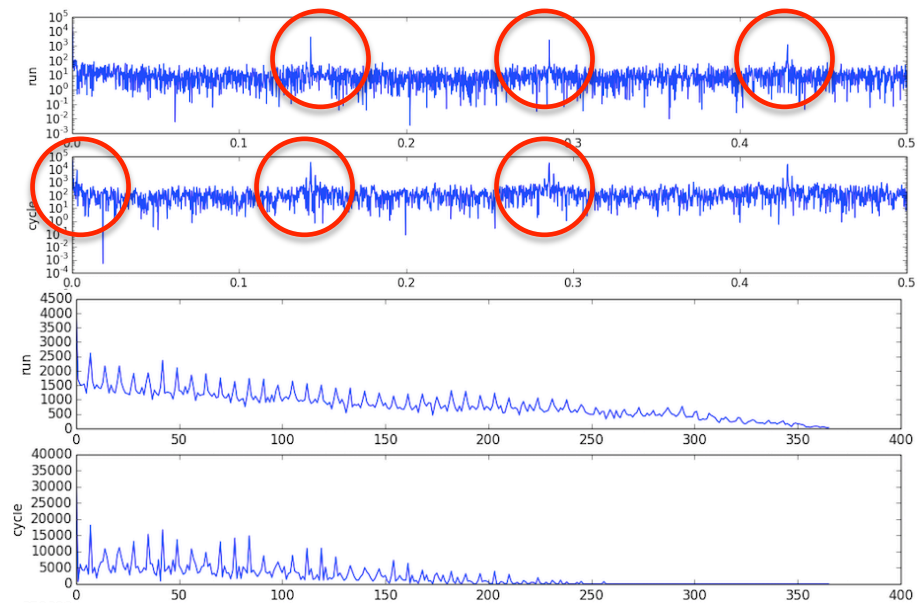
Periodicity Patterns:

There are periodicities in naurel, such as infradian rhythm, circatidal rhythm, ultradian rhythm and circadian rhythm. Scientist use periodicity detection to look for new pulsars. Also periodicity of DNA sequence are used to study the repeating patterns of DNA in biology.

Based on natural periodic phenomena, we hypothesize that *human lifestyles have in-built periodicities of various frequencies including daily, weekly, monthly, seasonal, and annual and that using lifelogging sensors to collect data, even though it will have gaps in coverage, we can use data analysis techniques to detect these periodicities and use them to good effect.*

Analysis such as Periodogram and Autocorrelation plots are often used to detect periodicities in a signal. But one challenge for us is that some datasets we collect might be incomplete and have gaps in the data. More sophisticated periodograms such as Lomb-Scargle Periodogram could be used to detect periodicity from unevenly sampled data.

Periodicity detection for activity data



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