

Forecast and Visualization of Future Expenditure with Logging and Analyzing Receipts

Toshiki Takeuchi[†],
Graduate School of
Interdisciplinary
Information Studies,
the University of Tokyo

Takuji Narumi[†],
Graduate School of
Engineering,
the University of
Tokyo

Kunihiro Nishimura[†],
Graduate School of
Information Science and
Technology,
the University of Tokyo

Tomohiro Tanikawa[†],
Graduate School of
Information Science and
Technology,
the University of Tokyo

Michitaka Hirose[†]
Graduate School of
Information Science and
Technology,
the University of Tokyo

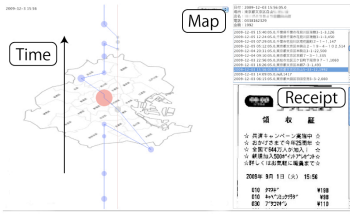


Fig. 1 Receiptlog Viewer



Fig. 2 Expenditure Forecast 1

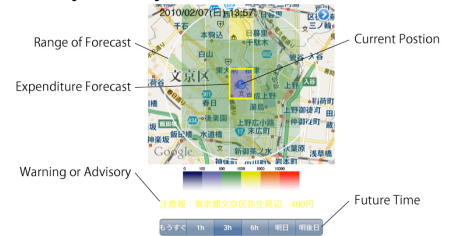


Fig. 3 Expenditure Forecast 2

1. Introduction

Logging images, voices, etc. of one's daily life is called "lifelog". Recently, it is done research by many researchers because of rapid increasing information with a highly information-oriented society and increasing capacity and lowering price of logging device.

So far, most of lifelog research has been done for reading the past log efficiently by analyzing and ordering a lot of lifelog data. Our hypothesis is that utilizing lifelog and providing "future" information not "past" to users is also useful for improving personal life [1].

We focused on an expenditure behavior in daily life, and collect data from receipts. We call its log system "Receiptlog". We developed a system "Expenditure Forecast" that forecast future information about expenditure behavior from receipts log data and present a user it to understand easily. In this poster, we explain the system of Receiptlog and Expenditure Forecast, the method for forecast of future expenditure, and influence on user's balance of expenditure by using Expenditure Forecast.

2. Receiptlog

A receipt is usually made out whenever you buy something. It contains information of the store name, the date and time, the address, the telephone number, the commodities and prices, the expenditure, etc.

We logged many people's expenditure behavior by reading their receipts with OCR (Optical Character Recognition). We used "Yasashiku Kakeibo" [2] as OCR software, because it had high level OCR function and the internal table of telephone number – address. We succeeded in logging 2191 receipts data from 27 persons until Feb. 28, 2010.

For forecast of expenditure, we needed to know something of rules about expenditure behavior. Therefore we developed "Receiptlog Viewer" (Fig. 1), and the cycles of time (weekly,

daily, etc.) and place were found out in expenditure behavior.

3. Expenditure Forecast

From the expenditure cycle, we supposed that nearer future situation is to past one, more likely the similar expenditure occurs. We selected the day, day of week, time, longitude and latitude as features expressing the situation, and proposed the algorithm that forecast the future amount of money and possibility of expenditure, utilizing the information about date, time, position, and amount of money in Receiptlog.

Next, we developed an application for iPhone called "Expenditure Forecast" to present the forecast to users (Fig. 2). It shows the amount of money and possibility of expenditure by place visually like a weather chart, and the warning and advisory. For example, Fig. 3 shows that "You will spend 100-500 yen at current position after three hours. Advisory: Yayoicho, Bunkyo, Tokyo 400 yen".

We had user test with nine users for eleven days. They thought that the forecast was almost right, and some of them spent different amount of money from they would after seeing the forecast. To be concrete, two persons of them spent more money, and other two persons spent less. And most of them had opinions that they paid much more attention to the expenditure. We conclude that user's balance of expenditure can be improved by seeing one's forecast.

Future works are that we spread Receiptlog and Expenditure Forecast over the society, and a large number of people use them. Then, we observe their effects on not only the close society like a laboratory, but also open one.

References

- [1] Daniel ASHBROOK. Using GPS to Learn Significant Locations and Predict Movement across Multiple Users. *Pers Ubiquit Comput*, Vol. 7, pp. 275–286, 2003
- [2] *Yasashiku Kakeibo*:
<http://mediadrive.jp/products/ykakeibo/index.html>

[†] email: {take, narumi, kuni, tani, hirose}@cyber.t.u-tokyo.ac.jp