

Livelog: Sensing and Inducing Japanese Idol Fan Activities with Smartphone

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Abstract. In this study, we propose and implement method for sensing the excitement action of the participant by using smartphone. Also we propose and demonstrate method for inducing fan activities to Japanese idol by using gamification through smartphone-based communication in and out live concerts. We measured the acceleration of live concert participants can be measured with their own smartphone, and revealed that the acceleration data can be used as barometer of participants' excitement by utilizing the relationship between the known heart rate and emotion. Based on this concept, we carried out long-term experiments by implementing and distributing our smartphone application via internet with promoting in live concerts, and evaluated the effectiveness of proposed inducing methods of fan activities by analyzing log data from our smartphone application.

Keywords: Live concert · Acceleration · Gamification · Excitement · Mobile computing

1 Introduction

In the music industry, while the value of production of a music title hangs low, the sales of a live concert market increase every year, annual sales proceeds will exceed 270 billion yen in 2014, and the live concert market is an important market in recent years, when making a profit. The meaning which raises a spectator's degree of satisfaction for the further development of a live concert market is large. In the live concert in the subculture field, since it becomes an important element in which a spectator heaps up and action determines a spectator's degree of satisfaction, I can mainly raise a spectator's degree of satisfaction by heaping up and promoting action.

The research for realizing a better live concert has so far been made by making a spectator use application [1]. However, in the environment which surrounds a live concert, it is thought possible to raise a spectator's degree of satisfaction by change of a business model or the spread of SNS(s), using [2] and this, since communication between a performer and a spectator and between spectators is active.

The purpose of this research is to propose the technique of heaping up by using gamification technique on communication of those which participate in a spectator's technique and live concert which heap up and carry out sensing of the action by a simple method, and inducing action.

2 Experiment 1: Sensing Excitement in Live Concert

We carried out experiment to measure psychological climax that occurs when live concert participants performing the excitement behavior by using a smartphone.

2.1 Procedure of Experiment

Humans it is known that the heart rate is changed when in the excited state [3]. Therefore, it is possible by measuring heart rate to carry out sensing of a spectator's climax. Furthermore, if acceleration is measured simultaneously with heart rate and both value is interlocking, it will become possible to measure climax by carrying out sensing of the acceleration.

In order to verify this, I attach the smart phone with which the heart rate meter was carried in the accelerometer by the breast to one subject at the thigh in the actual live concert, and acquire heart rate and acceleration. Moreover, I gave one more set of a smart phone to the hand, when it rose, I acquired mental climax time because I have a tap of the screen carried out, and I conducted the experiment which analyzes each relationship.

2.2 Results and Discussion

The time series data of the size and the heart rate and the climax time of acceleration shown in Fig. 1. From Fig. 1, the magnitude of heart rate and acceleration increases during swelling, it can read the magnitude of heart rate and acceleration are interlocked.

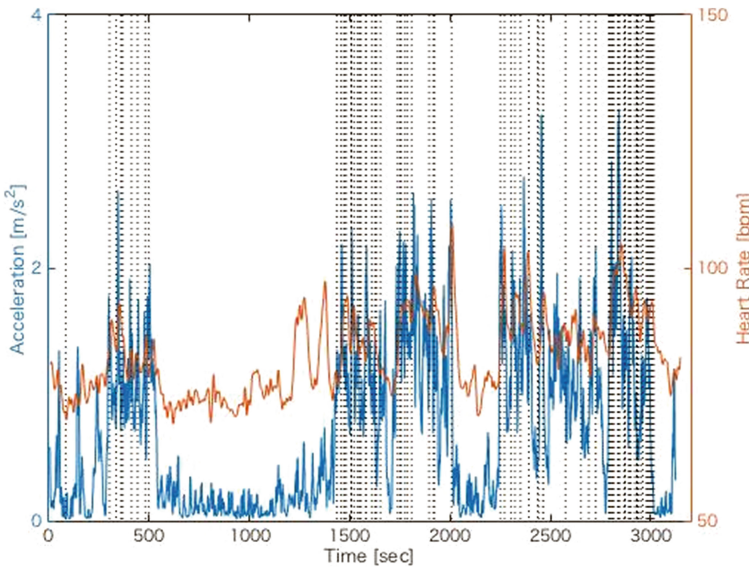


Fig. 1. Time series data of acceleration, heart rate and exciting feeling

Therefore, separate the experimental time every 30 s, the average value of each parameter included in each section was analyzed by normalizing. The correlation coefficient between the magnitude of the normalized acceleration and heart rate and at each interval is 0.725, a strong correlation was observed (Fig. 2).

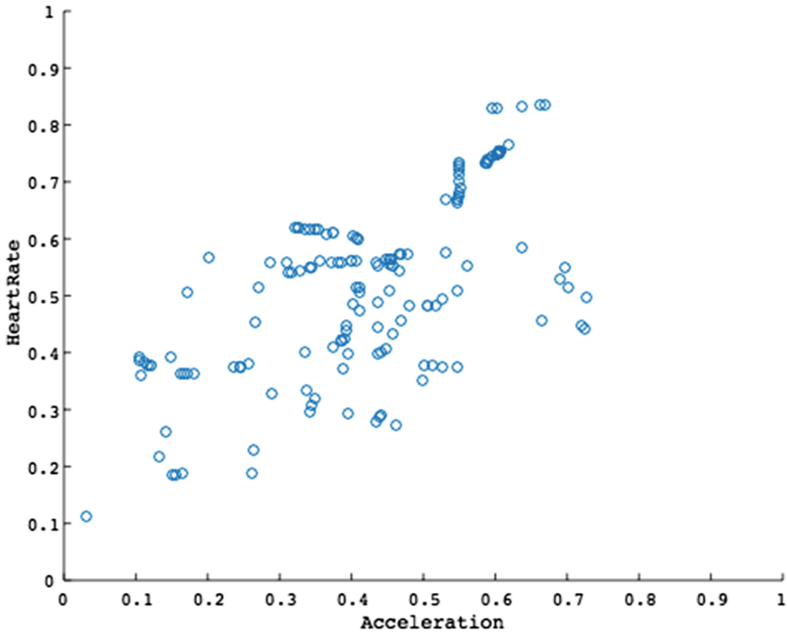


Fig. 2. Correlation between heart rate and acceleration

Furthermore, the difference value between the whole period and data including the swelling time was examined using the t-test, significant differences in any magnitude of the acceleration and heart rate were present. In other words, psychological excitement and heart rate and acceleration can be verified to be linked.

The results show that in the live concert, the magnitude of the acceleration and heart rate are linked, the size of the heart rate and the acceleration is higher than the normal state at the time of climax. Therefore, it may be possible to measure the behavioral heaped by sensing accelerations. The results utilizing, in the following chapters, using the sum of the magnitude of the acceleration as a measure of the size of excitement behavior of the participant.

3 System for Sensing and Inducing Excitement

We implement a system for sensing and inducing excitement action of the participant as a smartphone application “Livelog”.

3.1 Sensing Sub-system

“Livelog” is an application which records the log which participated in the live concert. If the application is started during the public performance, from the acceleration obtained from the accelerometer carried in the smart phone, I will compute the “excitement point” in the public performance which heaped up and turned a fixed quantity of actions, and will be referred to as one of the parameters of the log of a live concert.

We calculate as a value specifically proportional to total of the absolute value of the acceleration which acquired at intervals of 0.5 s during a live concert performance.

3.2 Inducing Sub-system

In order to realize the induction of excitement action, we implemented the following three types of Gamification technique. It is because these techniques can be presumed that appropriate as motivation for the participant to participate in a live concert performed by the stimulus to liven up by action the emotions that get in communication with other fans and performers (Fig. 3).

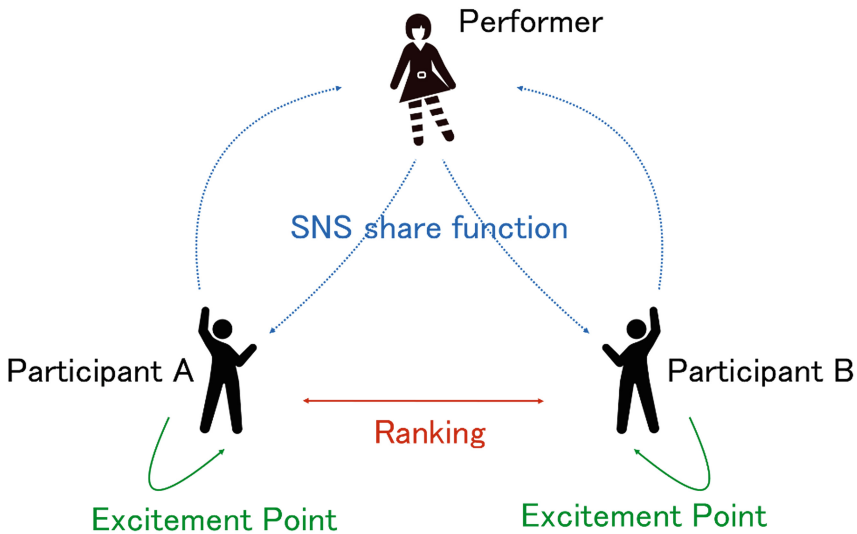


Fig. 3. Gamification technique to inducing fun activities

- Point function to present the amount of the action as a “excitement point”
- User ranking function that crowd each other using that you have a competitive spirit against each other
- SNS share function that spectators were using the feeling that I want to recognize their support to performers

In addition, the performer so that the small-scale target office is supervising the contribution to Twitter which is one of the SNS(s) by this research, and this function is realized in the origin of the premise that the spectator also recognizes it.

An overview of the typical screen transition diagram of “Livelog” shown in Fig. 4.

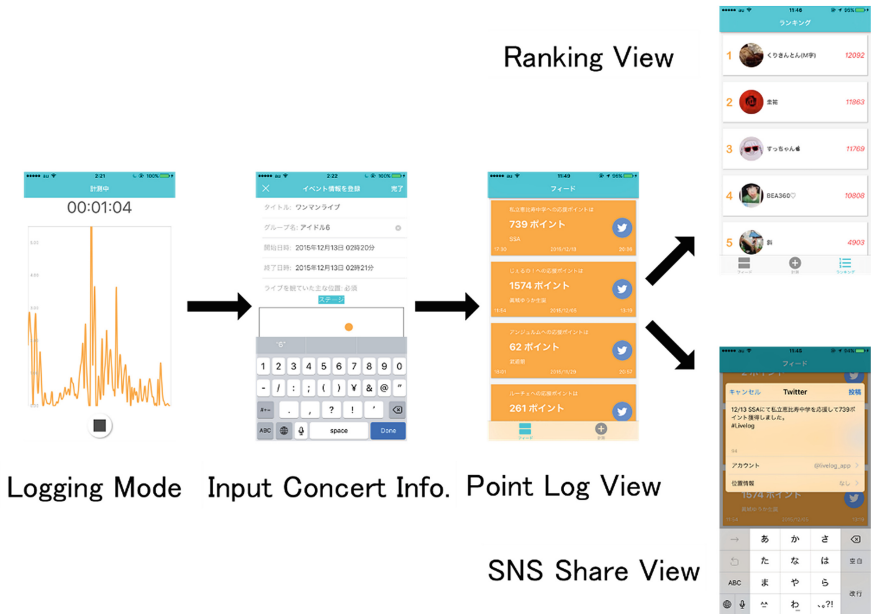


Fig. 4. Screen transition diagram in “Livelog”

4 Experiment 2: Inducing Excitement in Live Concert

4.1 Procedure of Experiment 2

The constructed the system “Livelog” distributed to subjects 42 people, Gamification approach taking into account the characteristics to compete with properties and other spectators to absolute view of the performers in the crowd, to verify that induce excitement behavior of participant the experiments were carried out over four weeks from December 13, 2015 until January 9, 2016. Delimited period by two weeks, to the period 1 and 2. Apply the only presentation of the support points in all subjects in the period 1, in the period 2, the subject, group (P group) to apply the only presentation of the support point, the group also applied presentation of user rankings (R group), divided into three groups of the group (S group) be applied granting Twitter sharing function, and analyzed changes in each user support points is indicative of excitement action. In addition, a questionnaire was examined individual characteristics of each user.

4.2 Results and Discussion

The number of live concert log that was recorded in the experimental period through our application was total 115. The number of the valid user who participated in ones or more live concerts during period 1 and 2 is 4 persons out of 14 persons of P group, 4 persons out of 14 persons of R group, and 4 persons out of 14 persons of S group, respectively.

First, in order to investigate the effects of induction by presentation of the point, for the entire effective user, with respect to the severity index in points earned per second, which is of the excitement behavior of the participant, from the period 1 to period 2, 3 where the difference between the rate of change was verified by t-test, no significant difference was observed. In addition, the difference between the change in the ratio of the support points per second of the three groups, was verified by Tukey-Kramer test, no significant difference was observed.

In addition, we carried out seven steps of questionnaires, “Are you aware of how much the evaluation from the performers”, “whether you are aware of how much the other spectators” to investigate the characteristics of communication consciousness of each user and the effect of the gamification technique. Therefore, the situation of change of the point per second in each group was shown in Fig. 5. Moreover, the correlation of a rate of change and a questionnaire result was shown in Table 1. As shown in Table 1, for a user to be aware of the performer the SNS share function was effective, and ranking function was also effective for the user to be aware of either performers and other participant. In addition, strong positive correlation also between the point of Post count and per second to Twitter shown in Fig. 6 was observed.

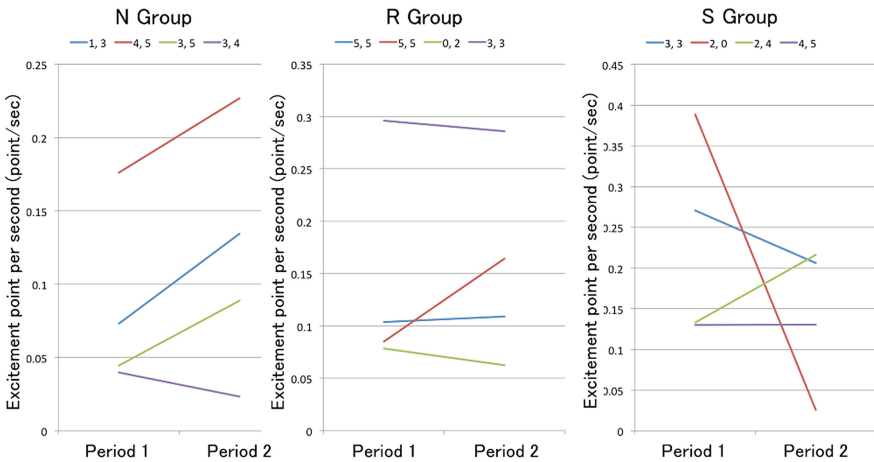


Fig. 5. Change of average point of each user in 3 experimental groups (Color figure online)

It results from, in order to increase the intensity of the crowd of excitement, that there is no effect on the presentation of the point has been suggested. In addition, the user to be aware of strong performers is effective sharing function and ranking, to the

Table 1. Correlation between average score and personal character for each experimental group

	Aware of performers	Aware of others
N group	No correlation	No correlation
R group	Strong positive correlation	Weak positive correlation
S group	Strong positive correlation	No correlation

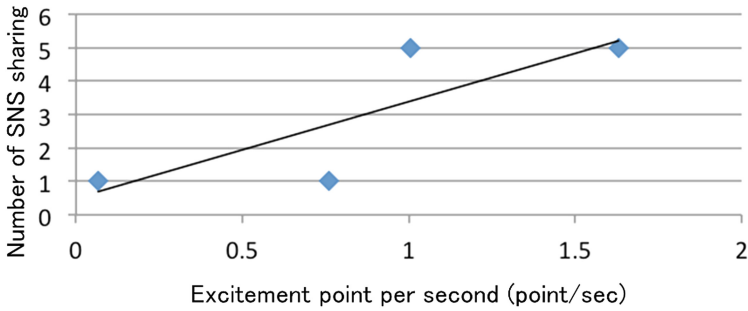


Fig. 6. Relation between the number of share and average point for group S

user to be aware of the other participant was found that the ranking is valid. Then, the difference in rate of change of points per second during the 3 groups did not occur, without taking into account the individual characteristics of the user is considered to be because the allocated users to experimental groups randomly.

5 Conclusion

In the present study, the excitement action of the participant in the live concert, a method for measuring by acceleration obtained by using a smart phone, was devised through the verification experiment. In addition, the experiments carried out to distribute the application to the general user, suggesting that it is not sufficient to present the only point in the induction of excitement action, we do not apply the Gamification method in accordance with the individual characteristics of the user shall possibility has been shown.

In the future, I want to induction of excitement action utilizing other Gamification techniques to verify whether valid or not. In addition, in the experiment, increasing the number of subjects by the general public of the application, to lengthen the duration of the experiment, devising to increase the valid data, such as lowering the withdrawal rate by reducing the burden on the application of the user.

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