

Analyzing User Interactions with Music Information Retrieval System: An Eye-Tracking Approach

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METHOD · Data Collection & Analysis

BACKGROUND & GOAL

- Little research has considered eye movement as measure when assessing user interactions with MIR systems
- To investigate user's eye movement patterns and measures with 2 music retrieval tasks and 2 interface modes

RESEARCH QUESTIONS

- Q1. To what extent eye movement related to different retrieval tasks, interface modes?
- Q2. To what extent eye movement related to user effectiveness, user perception?
- Q3. To what extent eye movement related to user characteristics



• Tobii T60 Eye tracker

Search box Seed song Recommended songs Player

• Areas of Interest



METHOD · Experimental Design

- Support searching / browsing music by mood
- Display songs with similar mood
- List layout ranks the recommended songs from the top of the screen down
- Visual layout uses the size of the album covers to represent the degree of similarity

System

Tasks

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- Search Task: search to find songs whose moods are similar to the seed song
- Browse Task: browse music in a given mood
- Topics 4 Topics: 2 tasks *{search, browse} x* 2 interface modes *{list, visual}*

RESULTS (N = 16; 8F, 8M)

Q1: Eye movement & task type

EM measure	Browse	Search	<i>p</i> value
FixDur in SeedSong	16.22 (10.91)	27.66 (15.33)	.001*
FixCnt in Seedsong	69.56 (39.37)	109.72 (59.86)	.001*
VisCnt in Total	114.22 (48.98)	152.69 (69.50)	.000*

Q1: Eye fixation heat maps



Q2: Eye movement & user effectiveness/perception

UE/UP measure	EM measure	Correlation	<i>p</i> value
Completion Time	TotVisDur in	.416	001*
	RecomSong		.001
	TotVisDur in Total	.476	.000*
Satisfaction with Songs Found	VisDur in Total	.396	.001*
	VisCnt in SeedSong	403	.001*





Japan Society for the **Promotion of Science**



National Natural Science Foundation of China

Research Grants Council of Hong Kong 香港 研究資助局

Q2: Predict user perception via eye movement

Perception	EM/UE measure	Coefficient	<i>p</i> value
Task Easiness	# SngFnd	.443	.021*
Satisfy with Songs Found	VisDur in Player	.533	.026*
	VisDur in Total	.774	.004*
	VisCnt in Search Box	984	.024*
	VisCnt in RecomSong	.718	.040*
	# SngFnd	.510	.001*
Like Seed Song	# SngFnd	.453	.014*
$R^2 = 0.334.0.586.0$.394		

Q3: Eye movement & user characteristics

Characteristics	Eye Movement	Coefficient	<i>p</i> value
Listening Freq	VisCnt in Total	0.436	.001*
	VisCnt in SeedSong	0.485	.001*

CONCLUSIONS

- Effectiveness of eye tracking in MIR research
- Eye movement can be used to predict user perception

