Learning Analytics in Kyushu University

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Kyushu University

Downtown Fukuoka

20km

Kyushu

Downtown Fukuoka

Hokkaido

Honshu

Shikoku

Kyushu
Educational Big Data in Kyushu University

19K Students, 8K Faculty members

BYOD (2013~)

M2B Learning Support System 2014~

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54M records (as of Sep. 6, 2018)

107K records

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On-Site Lecture Support

**Educational Data**
- Learning Data

**Out-Class Activities**
- Home

**Data Analytics**
- Feedback for Support
- Modeling
- Prediction

**Teacher**
- Quiz Analytics
- Real-time Visualization
- Visualization: Learning Activity

**Student**
- Recommendation: Supplemental Materials
- Change Detection
- Prediction: Performance
- Feedback for Support
- Academic Performance Prediction

**LA Platform**
- Automatic Summarization
- Real-time Visualization
- Academic Performance Prediction

**Recommendation:**
Supplemental Materials

**Prediction:**
Performance Visualizatation
Academic Performance Prediction

• Quantification of students’ weekly activities
• Analyzing the relationships between students’ activities and their final grades
• Final grades can be predicted with the accuracy of 90% at the 6th week
• Faster and more accurate prediction than conventional methods
Area Activity Analytics

Seating capacity: 240

12 seat areas

- Most students
  - Keep the same area over weeks
- High frequency of area changes
  - Likely to be absent from classes

Color map

Seat areas over 14 weeks
Area Activity Analytics

Learning Activities: darker is higher score

Significant difference
* p<0.05, ** p<0.01

highlight  *  
memot   **
action   *  
browse  *  
diary   ** 
ic_event  *  
ic_highlight  ** 
ic_memo  ** 

out-class activities  In-class activities
Difficulty in On-site Education

- What are students doing?
  - Watching the material?
  - Following the explanation?
- The pace is good/bad?

Realtime Analytics
Realtime Feedback
Real-time Heat Map

Update minute-by-minute
Real-time Monitoring

How many students following teacher’s explanation?

The teacher controlled his lecture speed based on real-time heat map.

In the class with real-time feedback
- High synchronization with the teacher
- Put many bookmarks and markers on the e-Book
Knowledge Map

Study:
Highlight, Text Memo

Exercise:
Draw Own Knowledge Map
Integrated Knowledge Map
Comparison Analytics of Knowledge Maps
Summarization of Lecture Materials

Summarized Material

AI Extracts Important Pages

Preview Achievement

<table>
<thead>
<tr>
<th>Percentage</th>
<th>All</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>90%</td>
<td></td>
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<td>50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30%</td>
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</tbody>
</table>

Give up!

Important Pages Extracted Correctly?

About 70% F-score
Recommendation of Learning Material based on Activity Sensing

- Activity logs
- Reading logs
- Activity App
- e-Book

Recommendation

- DB
- Knowledge Map
- Summarized Learning Materials
- @Bus stop
- @Cafe

- Free Time Detection
- Recom. Timing
- New topics
- Difficulty in Understanding
Preliminary Results

Activity Sensing and Notification

Students spent time for reading the materials based on their own free time.

23 out of 35 recommendation, accepted.

Time to access (ave.): 12 min.
Reading time (ave.): 4 min.