

# Towards inferring language expertise using eye tracking

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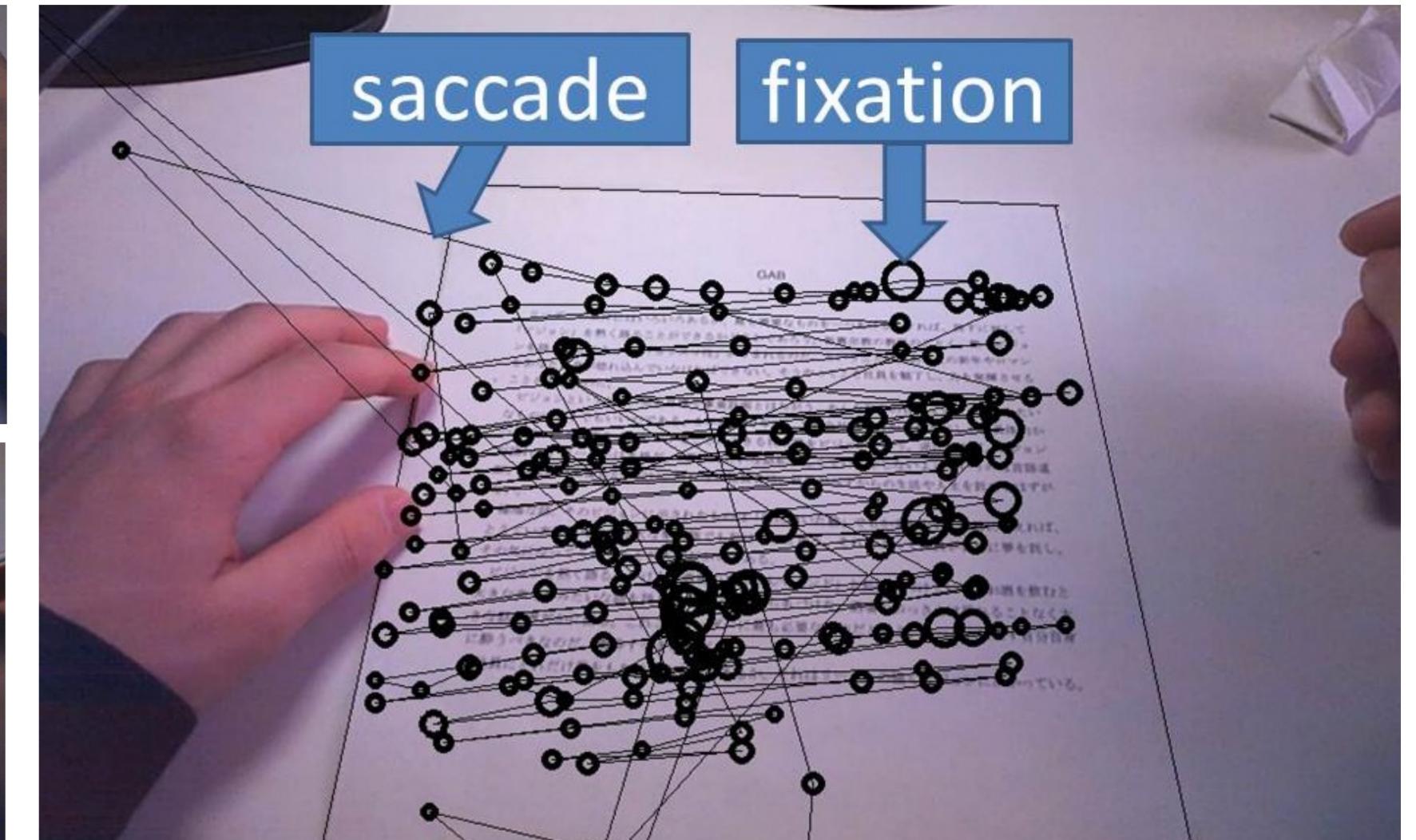
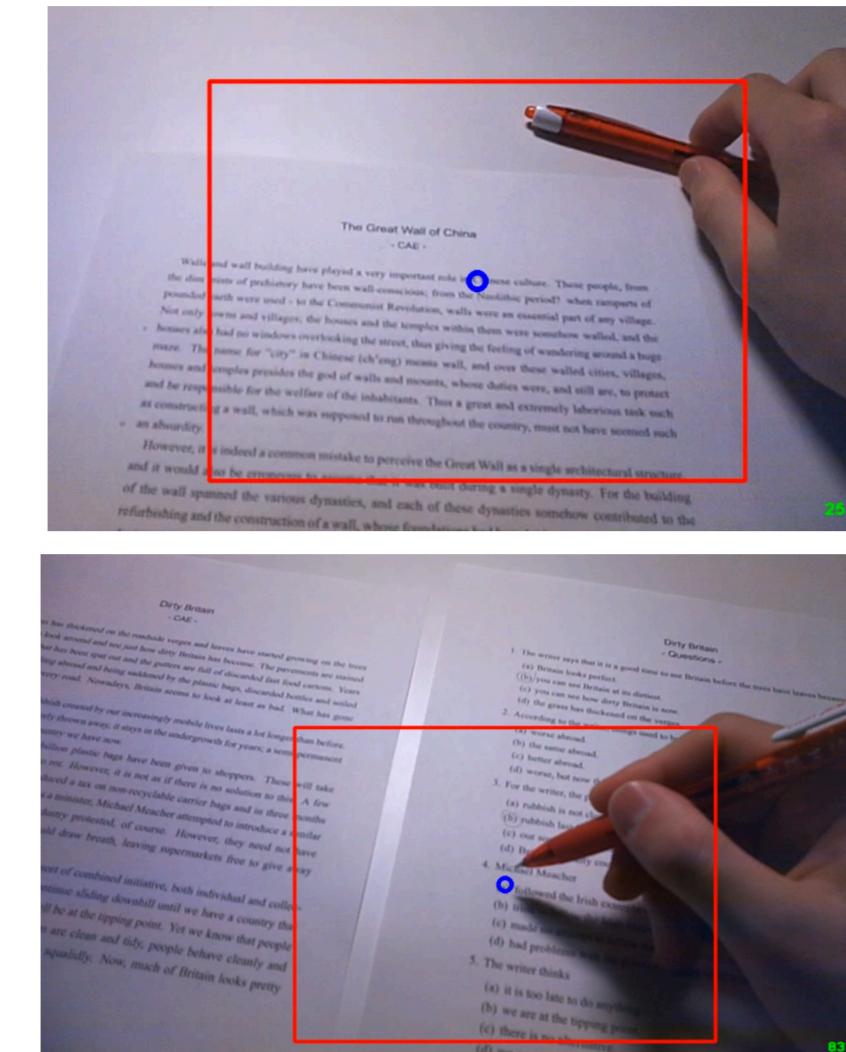
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## motivation

This poster describes our efforts to help users to gain a better understanding of the text, by detecting their English skill level and automatic inferring which words are difficult for them to understand.

We present an initial study of 5 students and show our findings regarding the skill level assessment.

We explain a method to spot difficult words.



Pictures from the experimental recordings. The blue circle shows the current eye fixation.

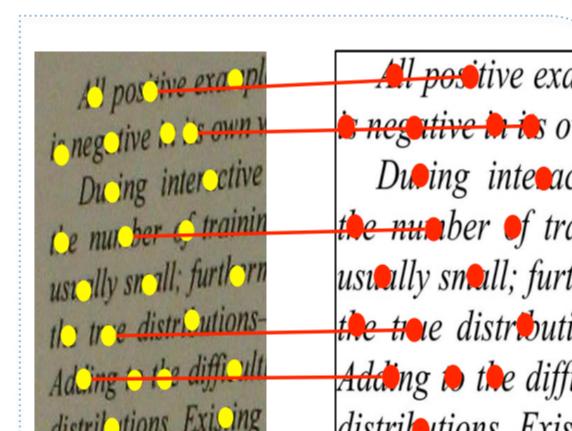
## experiments

## findings

We can identify the difficult words a student marked on the text using the eye fixations.

1. The raw eye trace as recorded by the MSI eye tracker for one line joint with the document using document image retrieval (feature point matching).

old saying: neither a borrower nor a lender be.  
Last year people with poor credit ratings borrowed \$605 billion in mortgages, a figure that is about 20% of the home-loan market. It includes people who cannot afford to meet the mortgage payments on



Feature point matching between the digital and the printed version of a document.

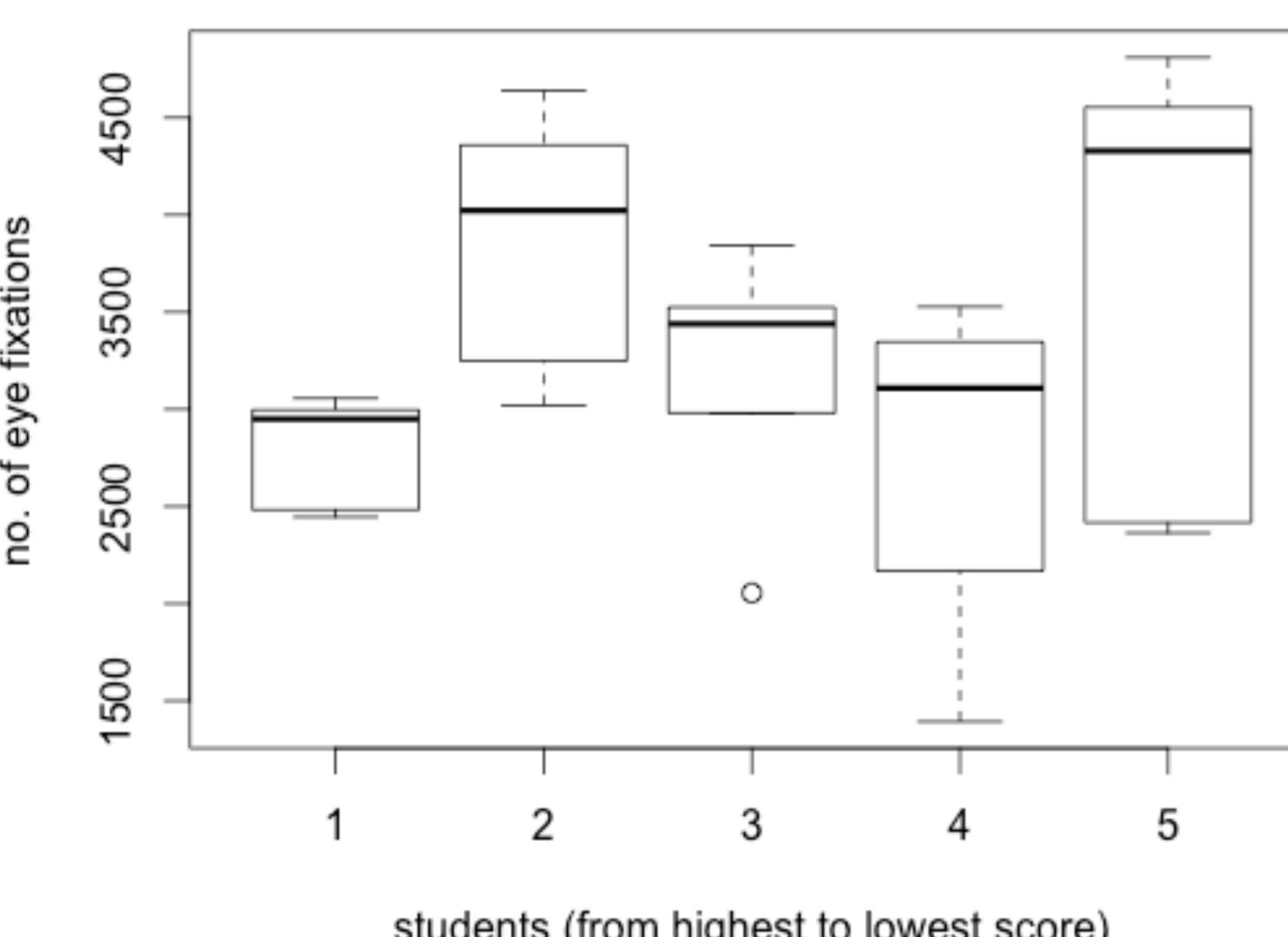
2. We apply a horizontal projection of the fixations on the words of the line.

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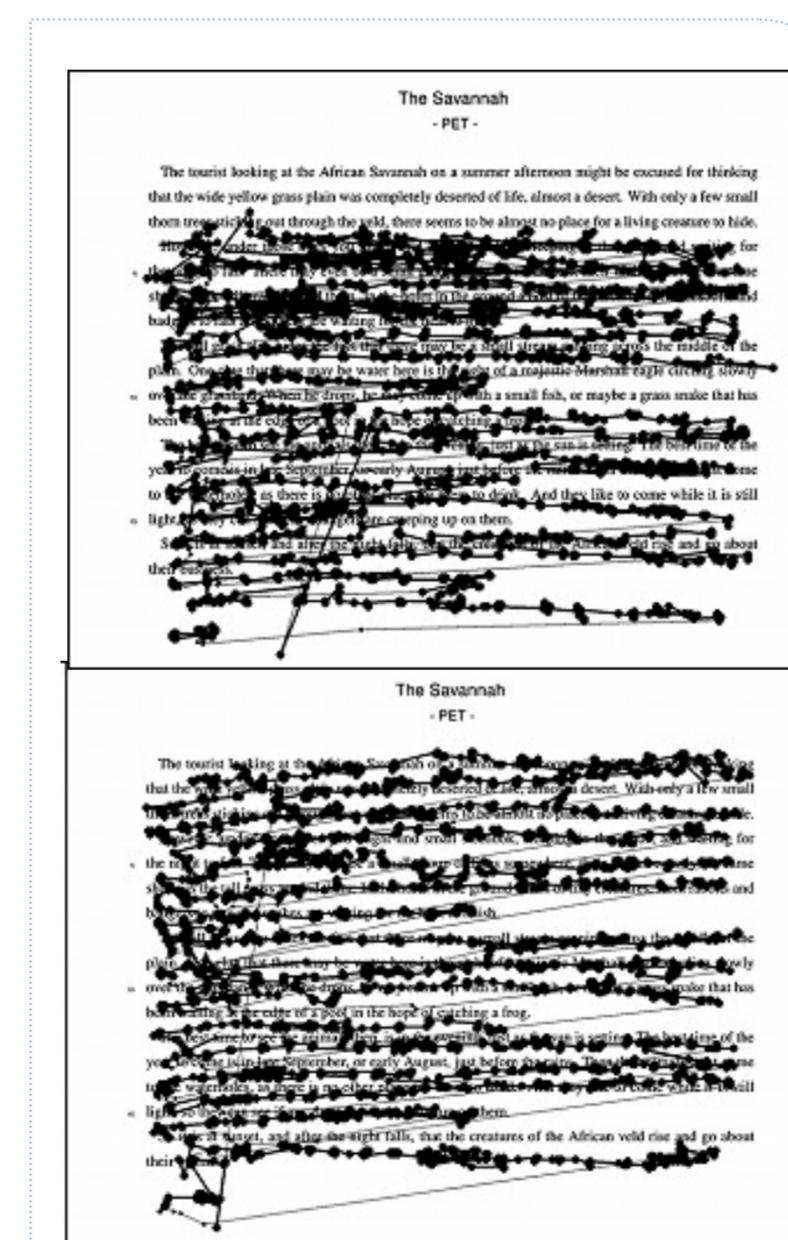
3. We generate a histogram for eye fixations for one line. "Mortgages", the difficult word, is easy to identify.

Both borrowers and lenders in the sub-prime mortgage market are wishing they had listened to the old saying: neither a borrower nor a lender be.

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Average number of fixations with standard deviation for each student ordered by language skills according to the TOEIC and the correctly answered questions (starting with 1 for the best)

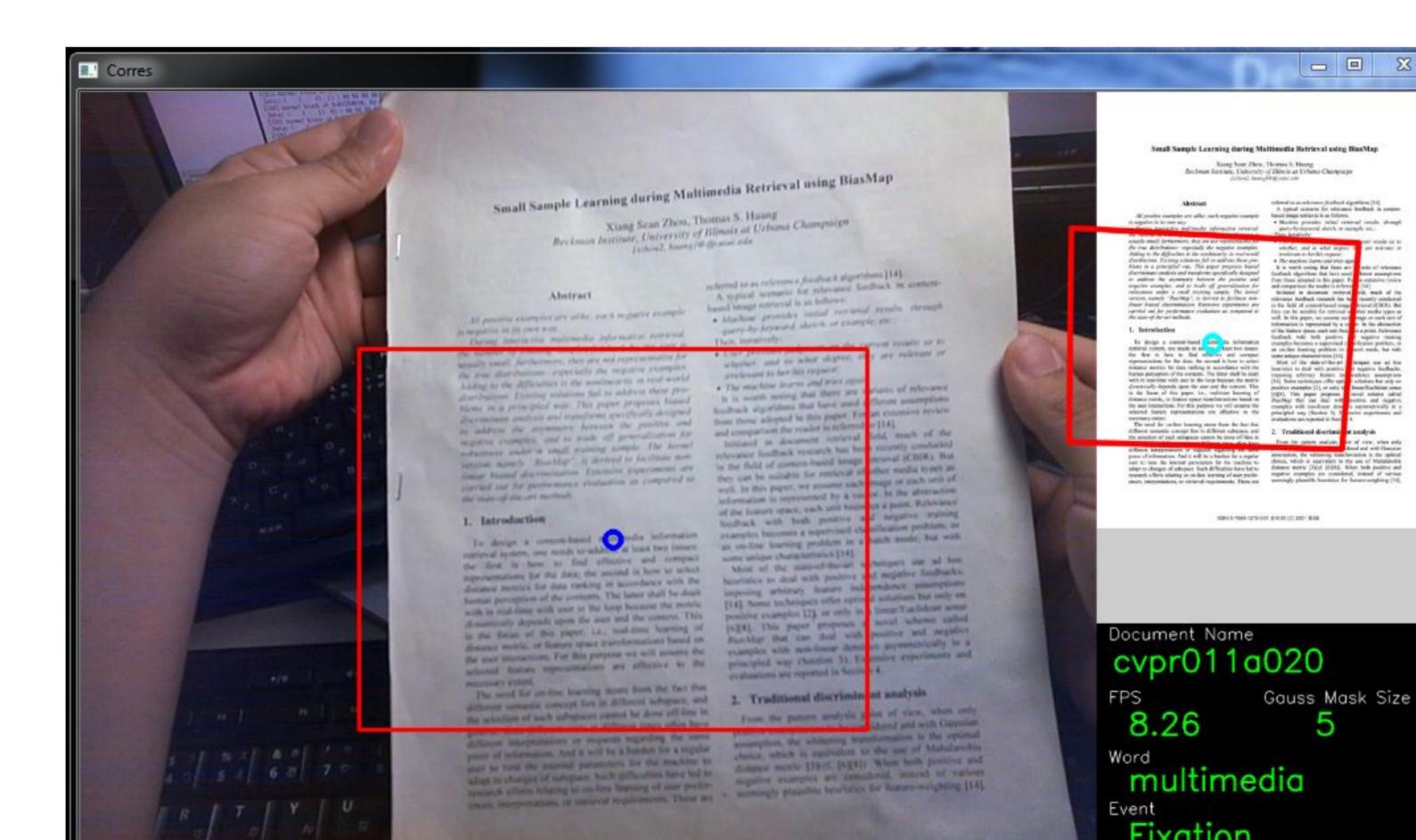


Two examples of an eye gaze conversion by using LLAH. The lower sample works very well, in the top sample an offset is introduced.

## conclusion

We have shown our initial studies towards assessing the language expertise using mobile eyetracking. We can detect words that are hard to understand for the participants using the histogram of eye fixations.

The LLAH software to identify and retrieve registered digital documents with their paper equivalent is publicly available and can be used by the community for non-commercial purposes:  
<http://imlab.jp/LLAH/>



Conversion of an eye gaze from paper to digital document by using LLAH.

## questions, remarks, violent dissent?

Link to paper (pdf):  
<http://kaikunze.de/papers/2013kunze.pdf>



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