



Proceedings of

# ITx 2016 CITRENZ

**July 11-13, 2016**  
**Wellington, New Zealand**



Incorporating the 7th annual conference of Computing and Information Technology  
Research and Education New Zealand (CITRENZ2016) and the 29th Annual  
Conference of the National Advisory Committee on Computing Qualifications

**Editors: Michael Verhaart, Emre Erturk, Aaron Steele, Scott Morton**





Proceedings of the ITx  
2016 (CITRENZ) 7th  
Annual Conference of  
Computing and Information  
Technology Education and  
Research in New Zealand

**Incorporating the 29th Annual  
Conference of the National  
Advisory Committee on Computing  
Qualifications**

**Wellington New Zealand  
11th-13th July 2016**

Associate Professor Dr Michael Verhaart

Dr Emre Erturk

Dr Aaron Steele

Scott Morton

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Computing and Information Technology Research and Education New Zealand (CITRENZ) was formed as an organisation in 2010 following a review of the role of the National Advisory Committee on Computing Qualifications (NACCQ).

The National Advisory Committee on Computing Qualifications was formed in 1988.

CITRENZ provides help and support to member institutions in the development, teaching and quality assurance of courses and programmes, from certificate through degree to postgraduate levels, in the field of Computing and Information Technology.

CITRENZ also supports academic staff in several different ways, such as national workshops, research seminars, APL, moderation, the publishing of a journal, and also by organising this annual conference.

This conference is an output of the Research and Professional Development Focus Group. CITRENZ activities and a digital version of these proceedings are available from

<http://www.citrenz.ac.nz>

The philosophy of the conference is the encouragement and support of new, emerging and established researchers in a safe environment while encouraging excellence and academic discourse.

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### Editorial Advisor

Dr Donald Joyce

## Theme

The conference contains papers in the following areas under the theme

“*Inspirational Computing Education*”:

- Computing education
- Computing practice
- Computing research

## Full papers (Quality Assured)

Full papers are double blind refereed on submission by at least two independent reviewers and accepted modified or rejected. An editorial panel reviews final versions. They may be rejected or returned for modification at that point.

In keeping with its supportive mission, the conference uses a system of paper proposals which are reviewed and guidance given to content, tone and structure of papers before they are formally submitted to be double blind refereed.

## Supplementary papers

Supplementary papers are editorially reviewed papers.

## Poster papers

An A1 poster is displayed at the conference along with two pages in the proceedings.

## Online

These conference proceedings, along with those since 2000, are available online at

<http://www.citrenz.ac.nz/proceedings-index/>

## 2016 Summary

- 20 papers were submitted, which resulted in 13 reaching full peer reviewed publication status.
- 15 Posters were editorially reviewed and accepted.

## Acknowledgements

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Lynda Corner, Eastern Institute of Technology

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Scott Morton	Whitireia NZ
Trevor Nesbit	

## 2016 CITRENZ Awards

The awards were judged by CITRENZ Fellows Dr Donald Joyce and Dr Noel Bridgeman.

### Student Poster - Research

(judged on quality of poster and extended abstract)

**Winner** TBA (supervised by ?)

**Commendation:** TBA (supervised by ?)

### Student Poster – Project/Internship

(judged on quality of poster and extended abstract)

**Winner** TBA (supervised by ?)

**Commendation:** TBA (supervised by ?)

### Staff Poster

(judged on quality of poster and extended abstract)

**Winner** TBA

**Commendation:** TBA

### Collaborative Research

(authors at different institutions when research conducted)

**Winner** TBA

**Commendation:** TBA

### Educational Innovation

(evaluation of innovative educational approach)

**Winner** TBA

**Commendation:** TBA

### Best Paper

**Winner** TBA

**Commendation:** TBA

## Fellows of CITRENZ / NACCQ

- 2015 Dr Stephen Corich
- 2014 Professor Dr Sam Mann
- 2009 Garry Roberton
- Dr Donald Joyce
- 2005 Keith Cowan
- 2000 Chris Goodyer
- 1999 A/Prof Alison Clear
- 1998 Dr Noel Bridgeman

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# Is that what they said?

## An automated reference finder

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### ABSTRACT

This work investigates the feasibility of using freely available online resources to create an application that can automatically discover and display original source articles that a student cites and references. A prototype application was created that used CiteSeerExtractor to extract reference details from the student work, and then used Crossref.org to return web page addresses of the original journal articles or abstracts. Initial results successfully demonstrate that the idea is effective. It is concluded that further development would result in a useful tool for assisting in the marking of student work.

**Keywords:** Staff Research, Automated Marking, Citation Checking, Crossref, CiteSeerExtractor, Digital Object Identifier.

## 1. INTRODUCTION

Assessing students' written work is often a time consuming process and various authors have investigated methods for reducing the effort needed in undertaking this task. The advent of Massive Open Online Courses (Moocs) has added to the desire to find more automated means for assessing written assessments (Balfour, 2013) and a number of tools, known as Automated Essay Scoring (AES), are being used. However the validity of these tools has been questioned (Gregory, 2013), with ongoing debate including the discussion that students will be tempted to write for the tool and exploit the poor methods that it uses such as undue emphasis on word count.

Students are often required to support their writing by referring to peer reviewed literature and this aspect of marking can be time intensive if the claims made by students are to be checked. When a Uniform Resource Locator (URL) is given, this may take the assessor directly to the source material, but often students will cite peer reviewed articles that are not as easily accessible and when a large number of journal articles need to be found, this could be a barrier to checking if the student has used the referenced material correctly. To be clear, we are not talking about plagiarism but rather did the referenced author/article really say what the student claimed?

## 2. SOFTWARE LITERATURE REVIEW

The software product EndNote (Thomson Reuters, 2016) that can be used to manage references when composing an article, has a feature for finding the full text article of a reference (Thomson Reuters, 2015) – “If you have access to PubMed LinkOut and/or OpenURL, you can point EndNote to these resources when you run the Find Full Text feature”. EndNote is not designed for assessing student work and the requirements of having access to PubMed LinkOut or an OpenURL server may limit its availability. Websites such as Google Scholar (Google, 2016) and Galileo Scholar (University System of Georgia, 2014) provide a means of searching for articles based on search terms and depending on access to the source website may lead to either an abstract or full paper article.

CiteSeerExtractor (College of Information Sciences and Technology, The Pennsylvania State University, 2013) is a website that provides “a RESTful API for extracting information from scholarly documents. It is able to extract metadata, citations, and different parts of the full text from a PDF document and return the data in a format of your choice...”.

Crossref.org (PILA INC, 2015) provides a service of locating documents based on information such as article title, authors and journal name. The service can be accessed via an API and results including URLs and the Digital Object Identifier (DOI) (International DOI Foundation, 2016) in machine readable formats (for example JSON (json.org, 2016)) are returned.

## 3. OBJECTIVES

This work investigates the feasibility of building a prototype application that automatically displays the source articles (or abstracts) that a student cites in their work. The application provides a Graphical User Interface (GUI) that allows the assessor to upload a student article and Figure 1 shows the sequence of events of firstly sending the article to the CiteSeerExtractor API to get a list of references/citations that the student used, followed by the use of the Crossref.org API to get a list of URLs of which at least one will hopefully refer to the correct source article. The GUI will then display the most likely match for each citation as well as giving the assessor a list of other possible URLs that could be a match.

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### Objectives

This work investigates the feasibility of building a prototype application that automatically displays the source articles (or abstracts) that a student cites in their work. The application provides a Graphical User Interface (GUI) that allows the assessor to upload a student article and Figure 1 shows the sequence of events of firstly sending the article to the CiteSeerExtractor API to get a list of references/citations that the student used, followed by the use of the Crossref.org API to get a list of URLs of which at least one will hopefully refer to the correct source article. The GUI will then display the most likely match for each citation as well as giving the assessor a list of other possible URLs that could be a match.

### Results

Initial results have demonstrated that the design concept works. Although CiteSeerExtractor does not always locate all the citations/references in the student work, it does find the majority of them. Likewise the URLs returned from Crossref.org, often but not always point to relevant web pages for either the full article or abstract.

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This poster appeared at ITx 2016, incorporating the 7<sup>th</sup> annual conference of Computing and Information Technology Research and Education New Zealand (CITRENZ2016) and the 29<sup>th</sup> Annual Conference of the National Advisory Committee on Computing Qualifications, Wellington, New Zealand, July 11-13, 2016. Michael Verhaar, Emre Erturk, Aaron Steele and Scott Morton (Eds).

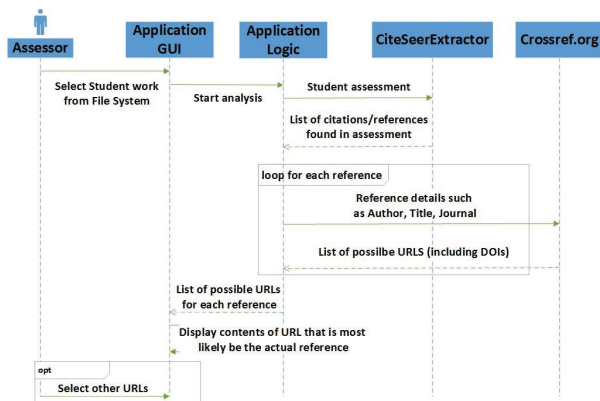


Figure 1: This Unified Modeling Language (UML) sequence diagram shows the sequence of messages that are passed between the main entities including CiteSeerExtactor and Crossref.org.

#### 4. IMPLEMENTATION

The Eclipse Integrated Development Environment (IDE) (The Eclipse Foundation, 2016) and the Scene Builder development tool (Gluon, 2016) were used to create the prototype desktop application using the Java programming language (Oracle, 2016) and FXML "... a scriptable, XML-based mark-up language ...". Scene Builder allows 'drag and drop' placement of visual components and integrates with JavaFX (Oracle, 2014b) a framework for building user interfaces. Figure 2 shows an initial design of the GUI.

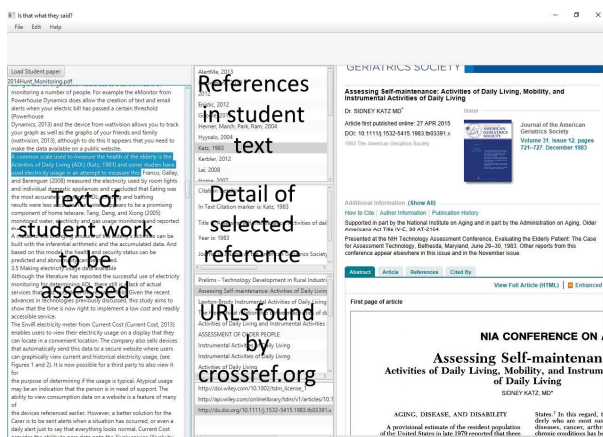


Figure 2: Initial design of GUI. The student work to be assessed is displayed on the left, the references found in the article by CiteSeerExtractor are displayed in the middle top, the URLs found by Crossref.org are displayed in the middle lower section, and the contents of the selected URL is displayed in the right hand section.

#### 5. RESULTS

Initial results have demonstrated that the design concept works. Although CiteSeerExtractor does not always locate all the citations/references in the student work, it does find the majority of them. Likewise the URLs returned from Crossref.org, often but not always point to relevant web pages for either the full article or abstract.

#### 6. FUTURE WORK AND DISCUSSION

The correct display of the results needs to be completed and the ranking of these results needs to take place in order to display the most useful result first. Currently there is a noticeable delay in obtaining the results and it is envisioned that this could be reduced by implementing parallel processing of requests to the CiteSeerExtractor and Crossref.org servers. Hosting the

application on a website or integration with learning platforms such as Moodle (Moodle, 2016) would enable easier access by the wider community.

The algorithms used by CiteSeerExtractor to extract citations and references from the submitted document are not always able to find all references in the document. This opens the possibility of improving on the algorithms used: recent successes of Artificial Neural Networks (ANNs) in solving pattern recognition tasks indicates that this approach may be able to improve on the current technique.

#### 7. ACKNOWLEDGEMENTS

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#### 8. REFERENCES

Balfour, S. P. (2013). Assessing Writing in MOOCs: Automated Essay Scoring and Calibrated Peer Review. *Research & Practice in Assessment*, 40-48.

College of Information Sciences and Technology, The Pennsylvania State University. (2013). *A RESTful API for extracting information from scholarly documents...* Retrieved from CiteSeerExtractor: <http://citesee extractor.ist.psu.edu:8080/static/index.html>

Gluon. (2016). *Scene Builder*. Retrieved from <http://gluonhq.com/open-source/scene-builder/>

Google. (2016). *Google Scholar*. Retrieved from <https://scholar.google.com/>

Gregory, M. A. (2013, 4 26). *Computer thinks you're dumb: automated essay grading in the world of MOOCs*. Retrieved from The Conversation: <http://theconversation.com/computer-thinks-youre-dumb-automated-essay-grading-in-the-world-of-moocs-13321>

International DOI Foundation. (2016, 4 4). *The DOI System*. Retrieved from doi: <https://www.doi.org/index.html>

json.org. (2016). *Introducing JSON*. Retrieved from json.org: <http://json.org/>

Moodle. (2016). *Home*. Retrieved from moodle: <https://moodle.org/>

Oracle. (2014). *Introduction to FXML*. Retrieved from [http://docs.oracle.com/javafx/2/api/javafx/fxml/doc-files/introduction\\_to\\_fxml.html](http://docs.oracle.com/javafx/2/api/javafx/fxml/doc-files/introduction_to_fxml.html)

Oracle. (2014b). *JavaFX: Getting Started with JavaFX*. Retrieved from Oracle Java Documentation.

Oracle. (2016). *Java+You, Download today!* Retrieved from Java: <https://www.java.com/en/>

PILA INC. (2015). *crossref.org*. Retrieved from <http://www.crossref.org/index.html>

The Eclipse Foundation. (2016). *eclipse*. Retrieved from eclipse: <https://eclipse.org/>

Thomson Reuters. (2015). *Quick reference guide*. Retrieved from EndNote The most effective tool for managing your research: <http://endnote.com/sites/en/files/m/pdf/enx7-win-qrg.pdf>

Thomson Reuters. (2016). *EndNote*. Retrieved from Discover Thomson Reuters: <http://endnote.com/>

University System of Georgia. (2014). *Galileo Scholar*. Retrieved from Discover articles, books, media and more: <http://www.galileo.usg.edu/scholar/valdosta/journals/cited-article/?Welcome>