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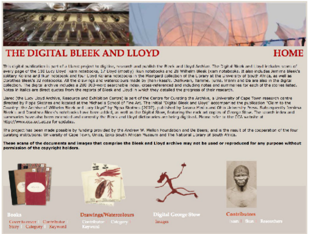
Members of the DL Lab

University of Cape Town
Department of Computer Science
Digital Libraries Laboratory @ Centre for ICT4D

May 2017

Information Retrieval Products



THE DIGITAL BLEEK AND LLOYD

HOME

This digital publication is part of a Llarec project to digitise, research and publish the Bleek and Lloyd Archive. The Digital Bleek and Lloyd includes scans of every page of the 110 Lucy Lloyd |xam notebooks, 17 Lloyd (mostly) !kun notebooks and 28 Wilhelm Bleek |xam notebooks. It also includes Jemima Bleek's solitary Korana and !kun notebook and four Lloyd Korana notebooks in the Maingard collection of the Library at the University of South Africa, as well as Dorothea Bleek's 32 notebooks. All the drawings and watercolours made by |han≠kass'o, Dia!kwain, Tamme, |uma, !nanni and Da are also in the digital collection. The digital archive includes a 280 000-word searchable index, cross-referenced and including notes and summaries for each of the stories listed. Notes in italics are direct quotes from the reports of Bleek and Lloyd in which they detailed the progress of their research.

Llarec (the Lucy Lloyd Archive, Resource and Exhibition Centre) is part of the Centre for Curating the Archive, a University of Cape Town research centre directed by Pippa Skotnes and located at the Michaelis School of Fine Art. The initial "Digital Bleek and Lloyd" accompanied the publication "Claim to the Country: the Archive of Wilhelm Bleek and Lucy Lloyd" by Pippa Skotnes (2007), published by Jacana Media and Ohio University Press. Subsequently Jemima Bleek's and Dorothea Bleek's notebooks have been added, as well as the Digital Stow, featuring the rock art copies of George Stow. The search index and summaries have also been extended and currently the Bleek and Lloyd dictionaries are being digitised. Please refer to the CCA website at http://www.cca.uct.ac.za for updates.

The project has been made possible by funding provided by the Andrew W. Mellon Foundation and De Beers; and is the result of the cooperation of the four curating institutions: University of Cape Town, Unisa, Iziko South African Museum and The National Library of South Africa.

These scans of the documents and images that comprise the Bleek and Lloyd archive may not be used or reproduced for any purpose without permission of the copyright holders.

Books
Cover to cover | Contributor | Story | Category | Keyword
Drawings/Watercolours
Contributor | Category | Keyword
Digital George Stow
Images
Contributors
|xam | !kun | Researchers

NDLTD
Global ETD Search

Search the 4,905,089 electronic theses and dissertations contained in the NDLTD archive:

Type something to start searching...
advanced search tips
how to contribute records

http://lloydbleekcollection.cs.uct.ac.za/

http://search.ndltd.org/

Digital Libraries

- Making information available to people
- Context-sensitive: low resource environment, different languages, different skills/culture, etc.
- 4 areas of interest:
  - Information Retrieval - HS
  - Educational Technology - HS
  - Knowledge Engineering - CMK
  - ICT4D Applications - various
- Some production systems / products

Knowledg**E** **EN**gineering team

- **Aim**: to contribute computing theory, methods, and techniques to the knowledge society
- **Scope**: knowledge engineering in its broad sense; includes ontology engineering, the Semantic Web, intelligent (logic-based, ontology-driven) conceptual modelling, and natural language generation.
- Some of the current topics:
  - OE: modularity, Test-Driven Development
  - NLG: Agglutinative languages in Sub-Sahara (data and knowledge, and mainly in health and weather)
  - CDM: model interoperability, temporal modelling
- More information: http://www.meteck.org/keen/

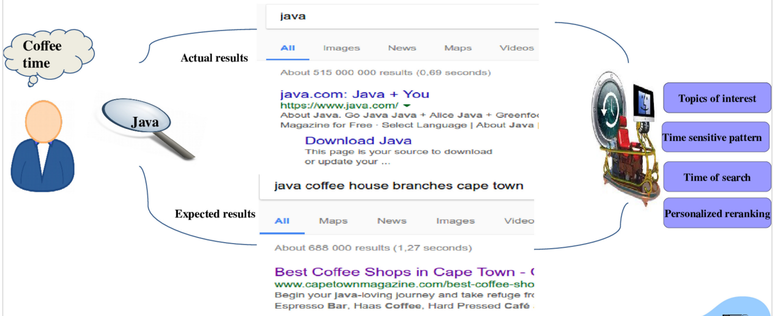
Information Retrieval and Educational Technology

- Information Retrieval (IR):
  - Search engine algorithms in African languages
  - IR for Development; Innovations in IR
  - Corpus development for African language content
  - Applied into local Digital Library applications, such as heritage archives
- Educational Technology:
  - Low-cost innovation, mobile tools
  - Focus on the teacher and not just the student
  - Modern technology and controlled studies

Information Retrieval

- Catherine Chavula (PhD)
- Selvas Mwanza (PhD)
- Jivashi Nagar (PhD)
- Gina Paihama (PhD)
- Mushashu Lumpa (M.CS)
- Jackson Moji (M.CS)
- King'ori Maina (M.CS, submitted!)
- Morebodi Modise (M.CS, submitted!)

Do Topics & Time Go Together?



java

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Retrieval for Related African Languages

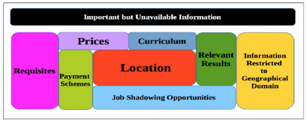
- Context
  - Low quality search results
  - Widespread multilingualism
- Approach

Language Similarities (Vocabulary and Grammar) + Search Techniques (IR Utilities and Ranking Algorithms) =

Status
  - Implementation and experiments

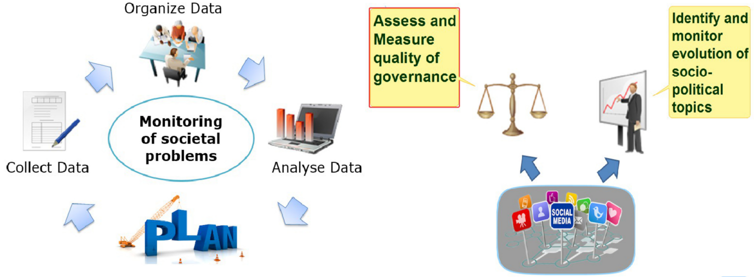
Information Retrieval for Unemployment

- Key Ideas
  - Specialised IR approaches for finding training opportunities
  - E.g.: summaries, focused search
- Status
  - early experiments


Important but Unavailable Information
Requisites
Prices
Curriculum
Payment Schemes
Location
Relevant Results
Information Restricted to Geographical Domain
Job Shadowing Opportunities

- PhD candidate: Gina Paihama

Social Media for Development (SM4D)



Organize Data

Monitoring of societal problems

Collect Data

Analyse Data

Assess and Measure quality of governance

Identify and monitor evolution of socio-political topics

By: Selvas Mwanza

Digital Libraries in Clouds

D SPACE

- Key Idea
  - Digital repositories increase sharing of content
  - Can we automate creating/installing/configuring in private clouds?
- Status
  - Some experiments done, some to do
- MSc student: Mushashu Lumpu

African Language Content Generation

- Problem
  - Lack of African language resources in digital form
  - Insufficient support for African languages in software
- Proposed Solution:
  - Create a focused archive of writings
  - Encourage translation of popular content e.g., Wikipedia
  - Use gamification for long-term sustainability
    - Research focus: Will this approach work?
- MSc student: Jackson Moji

Knowledge Engineering

- Joan Byamugisha (PhD)
- Zola Mahlaza (M.CS)
- Jarvis Mutakha (M.CS)
- Cameron Kyle (M.IT)
- Zubeida Khan (PhD)
- Yamiko Msosa (PhD)
- Iman Neguib (M.IT)

A Grammar Engine to Verbalize Ontologies in Runyankore

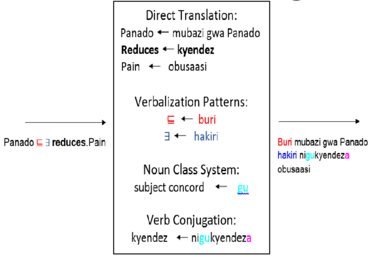
Motivation

- NLG successfully applied to generate personalized patient information

Problem

- Templates which have successfully generated personalized patient information are inapplicable to Bantu Languages

Solution: Grammar Engine



Panado ⊑ ∃ **reduces**.Pain

Direct Translation:
Panado ← mubazi gwa Panado
Reduces ← **kyendez**
Pain ← obusaasi

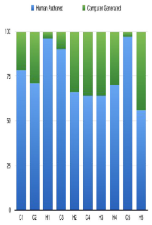
Verbalization Patterns:
⊑ ← buri
∃ ← hakiri

Noun Class System:
subject concord ← gu

Verb Conjugation:
kyendez ← nigukyendeza

Buri mubazi gwa Panado
hakiri nigukyendeza
obusaasi

Results



IsiZulu & isiXhosa weather bulletins using NLG

South African Weather Service

Met Office

- There is no fast and large scale producer, automated or otherwise, of weather summaries in Nguni languages
- 'Multilingual' natural language generation system
- Our focus:
  - 'Single' grammar compatible with isiXhosa and isiZulu
  - Grammatical similarities for isiZulu and isiXhosa verbs
  - Impact of phonological conditioning in weather-based NLG (***izaukuba -> izokuba***)

Multiple choice question generation for learners

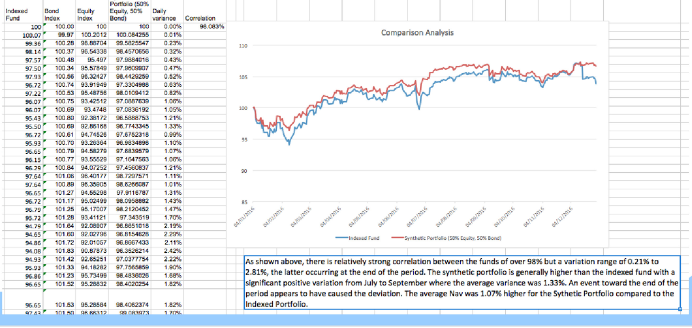
- Key Ideas
  - Using isiZulu and isiXhosa grammar engine
  - Generating MCQs from a domain using grammar engine
  - Measuring quality of MCQs
- Status
  - Proposal drafting

- MSc candidate: Jarvis Mutakha

Changes in clinical practice guidelines (Yamiko Msosa)

- CPGs change frequently to reflect updates in medical practice
- Makes it hard to maintain software systems using CPG
- Find a way to automate that
- Current main outcomes:
  - Types of changes in the (fine-grained) components of the guidelines
  - Model-driven engineering q domain-specific language (DSL) to model, annotate the computerised CPGs
  - Evaluated DSL on adequacy and usability

NLG for financial data (Cameron Kyle)



Indexed Fund	Bond Index	Equity Index	Synthetic Portfolio (50% Equity, 50% Bond)	Daily variance	Correlation
100	100.00	100	100	0.00%	98.083%
100.07	99.97	100.2012	100.084255	0.01%	
99.36	100.28	98.88704	99.5825547	0.23%	
98.14	100.37	96.54338	98.4570656	0.32%	
97.57	100.48	95.497	97.9884016	0.43%	
97.50	100.34	95.57849	97.9609907	0.47%	
97.93	100.56	96.32427	98.4429259	0.52%	
96.72	100.74	93.91949	97.3304988	0.63%	
97.22	100.53	95.48756	98.0109412	0.82%	
96.07	100.75	93.42512	97.0887639	1.06%	
96.07	100.69	93.4748	97.0836192	1.05%	
95.43	100.80	92.38172	96.5888753	1.21%	
95.50	100.69	92.86168	96.7743345	1.33%	
96.72	100.61	94.74526	97.6752318	0.99%	
95.93	100.70	93.26364	96.9834898	1.10%	
96.65	100.79	94.58279	97.6839579	1.07%	
96.15	100.77	93.55529	97.1647563	1.06%	
96.29	100.84	94.07252	97.4560837	1.21%	
97.64	101.06	96.40177	98.7297571	1.11%	
97.64	100.89	96.35905	98.6266087	1.01%	
96.65	101.27	94.55298	97.9116787	1.31%	
96.72	101.17	95.02499	98.0958882	1.43%	
96.79	101.25	95.17007	98.2120452	1.47%	
95.72	101.28	93.41121	97.343519	1.70%	
94.79	101.64	92.08907	96.8651018	2.19%	
94.65	101.60	92.02796	96.8154628	2.29%	
94.86	101.72	92.01057	96.8667433	2.11%	
94.08	101.83	90.87873	96.3526214	2.42%	
94.93	101.42	92.65251	97.0377754	2.22%	
95.93	101.33	94.18282	97.7565859	1.90%	
96.86	101.23	95.73499	98.4836026	1.68%	
96.65	101.52	95.28832	98.4020254	1.82%	
96.65	101.53	95.28584	98.4062374	1.82%	
97.43	101.50	96.66312	99.083973	1.70%	

As shown above, there is relatively strong correlation between the funds of over 98% but a variation range of 0.21% to 2.81%, the latter occurring at the end of the period. The synthetic portfolio is generally higher than the indexed fund with a significant positive variation from July to September where the average variance was 1.33%. An event toward the end of the period appears to have caused the deviation. The average Nav was 1.07% higher for the Sythetic Portfolio compared to the Indexed Portfolio.

Intelligent temporal conceptual modelling (Iman Neguib)

- Temporal data and conceptual models
  - e.g., in health, business, security
    - Dev-_{PhDStudent,Academic}: “An Academic may have been a PhD student before, but is not a PhD Student now”
    - “a HIV positive patient may not evolve into a blood donor”
- How to convert a temporal model into a temporal database?
- Expected outcome:
  - Algorithms that ensure that the constraints of the temporal model apply to the actual database

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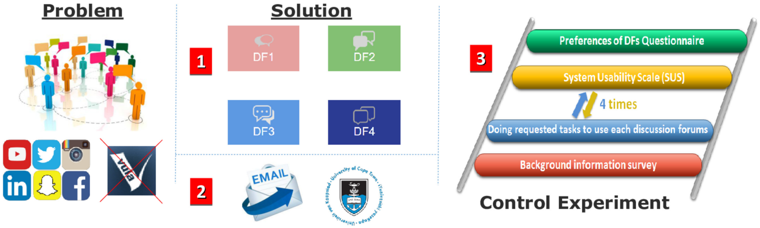
Ontology Engineering: Modularity (Zubeida Khan)

- Many ontologies, and large and/or expressive ones
- Problems: cognitive overload, scalability, reuse of fragments
- Solution: ontology modules
- How to create them? quality? maintainability? etc.
- Main achievements:
  - An empirically-based framework for ontology modularization
  - Evaluation metrics (and dependencies between them) for ontology modules
  - Novel algorithms for creating good modules
  - Swapping ODP modules (e.g., a foundational ontology)
  - Tooling support for these tasks
- More information: http://www.thezfiles.co.za/research.html

Educational Technology

- Lighton Phiri (PhD)
- Sinini Ncube (PhD)
- Maryam Almukhaylid (M.CS)
- Devan Govender (M.IT)

A Comparison of Socially-Motivated Discussion Forums Models for LMSes



Problem

Solution

1
DF1
DF2
DF3
DF4

2
EMAIL

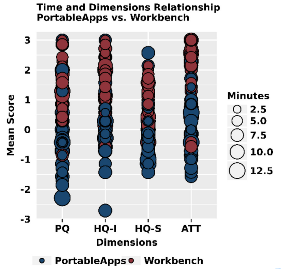
3
Preferences of DFs Questionnaire
System Usability Scale (SUS)
4 times
Doing requested tasks to use each discussion forums
Background information survey

Control Experiment

- MSc student: Maryam Almukhaylid

Streamlining Technology-driven Orchestration

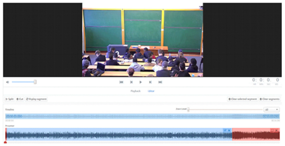
1) Activity Managment
2) Resource Management
3) Sequencing
4) Playback Sequence



- Experimental Results
  - Effectiveness & user experience
  - Orchestration load
  - Practical usage scenarios

Investigating audio classification for automating the trimming of videos in Opencast

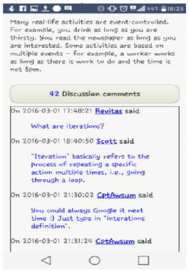
- Key Ideas
  - Classify audio into respective classes
  - Use classes to tag respective video frames for trimming
- Status
  - Training classifier



- MIT student: Devan Govender

Integrated in-Content Communication for Shared Textbook Use

- Key Ideas
  - Mobile electronic textbooks
  - Discussion forums integrated with content
    - vs. standalone discussion forums
- Status
  - Currently writing up thesis



Many real-life activities are event-controlled. For example, you drink as long as you are thirsty. You read the newspaper as long as you are interested. Some activities are based on multiple events – for example, a worker works as long as there is work to do and the time is not 5pm.

42 Discussion comments

On 2016-03-01 17:48:21 Revitas said

What are iterations?

On 2016-03-01 18:40:50 Scott said

"Iteration" basically refers to the process of repeating a specific action multiple times, i.e., going through a loop.

On 2016-03-01 21:30:02 CptAwsum said

You could always Google it next time :) Just type in "interations definition".

On 2016-03-01 21:31:24 CptAwsum said

- PhD candidate: Sinini Ncube

Applications of ICT4D

- Blessing Ojeme (PhD)
- Sarah Brittan (M.CS)
- Josiah Chavula (PhD, submitted!)
- Haji Ali Haji (PhD, submitted!)
- Jessica Mantel (M.IT, submitted!)

Multi-stakeholder design of mobile micro-enterprise financial management system

- Key Ideas
  - Design mobile banking system for micro-entrepreneurs with users/NGO
  - Multi-stakeholder design (before co-design ideas)
- Status
  - Writing up thesis

- MSc student: Sarah Brittan

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questions, comments, ...

http://dl.cs.uct.ac.za/
http://www.meteck.org/keen/index.html

enkosi
hamba kakuhle
thank you and go well