



**DURBAN UNIVERSITY OF TECHNOLOGY**  
**INYUVESI YASETHEKWINI YEZOBUCHWEPHESHE**

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**1 DECEMBER 2021 | 12:00**



**FACULTY OF  
ACCOUNTING  
& INFORMATICS**



# ORDER OF PROCEEDINGS

## **FACULTY OF ACCOUNTING AND INFORMATICS**

### **Opening Remarks**

Mr C Edeh

Alumnus: Durban University of Technology

### **Constitution of the Congregation and Official Welcome**

Ms N Nyembezi

Chancellor

### **Musical Interlude**

Department of Drama and Production Studies

### **Presentation of Graduands and Diplomandi**

Professor O O Olugbara

Executive Dean: Faculty of Accounting and Informatics

### **Conferment of Degrees and Diplomas**

Ms N Nyembezi

Chancellor

### **Congratulatory Message and Vote of Thanks**

Professor TZ Mthembu

Vice-Chancellor and Principal

### **National Anthem**

### **Dissolution of the Congregation**

Ms N Nyembezi

Chancellor



## MESSAGE FROM THE CHANCELLOR

**Ms Nonkululeko Nyembezi**

Dear Graduating students, class of 2021

Congratulations to our newest alumni, the graduating class of 2021. You have accomplished an enormous amount and you have even greater potential than when you began your studies here at Durban University of Technology. You have earned your qualification and you have accomplished so much.

For some, you will be earning your undergraduate degrees, for others, this will mark the culmination of your postgraduate and professional degrees. For all of us though, I am fully aware that our actions to prevent the further spread of COVID-19 may have caused a disruption to this special occasion. I am as heartbroken as you are that your graduation from the Durban University of Technology has been impacted by this global pandemic.

It is my utmost wish that you remain connected with your lecturers, your friends and your classmates. Remain steadfast, as I am in the knowledge that your DUT education and the relationships you made, the learning you achieved and the experiences you had during your time at DUT will serve you well in the years to come.

You are DUT for Life.

Ms Nonkululeko Nyembezi

Chancellor



Sibingelela abazokwethweswa iziqu zonyaka ka-2021

Siyanibingelela

Igama lami nginguNonkululeko Nyembezi, nginguShansela weNyuvezi yaseThekwini yezobuChwepheshe. Ngamandla enginikwe wona njengoShansela, ngithi usungaqala umcimbi wokwethweswa kweziqu weNyuvezi yaseThekwini yezobuChwepheshe ozobe ubonakala kumabonakude.

Halala kubafundi bethu abozokwethweswa iziqu, labo abaqede izifundo zabo ngonyaka ka-2021. Nizuze okukhulu kakhulu futhi seniqeqesheke kakhulu okudlula ngesikhathi niqala izifundo zenu lapha eNyuvesi yaseThekwini yezobuChwepheshe. Nizisebenzele iziqu zenu futhi nizuze okukhulu.

Abanye, iziqu zabo zokuqala lezi, abanye bazogogoda. Lokhu kuzokhombisa umphumela weziqu eziphezulu neziphathelene nomsebenzi enizowenza. Kithi sonke nokho, ngiyazi ukuthi ukwenza kwethu ukuvikela ukubhebhetheka kokhuvethe kungenzeka ukuthi kudale ukuphazamiseka kulomcimbi osemqoka kangaka. Nakumina kubuhlungu lokhu njengakunina ukuthi umcimbi wenu wokwethweswa iziqu waseNyuvesi yaseThekwini yezobuChwepheshe uphazamisekile ilolu bhubhane olusemhlabeni wonke.

Kuyisifiso sami ukuthi bungapheli ubudlelwano phakathi kwenu nothisha benu, abangani benu kanye nozakwenu. Ningaguquki, njengoba ngazi ukuthi imfundo yase-DUT kanye nobudlelwano enibenzile, enikufundile kanye nezinto enihlangabezane nazo ngesikhathi nisesa-DUT konke lokhu konisebenzela eminyakeni eyazo.

Niyohlezi ningabase-DUT.



## MESSAGE FROM THE VICE-CHANCELLOR AND PRINCIPAL

Professor Thandwa Zizwe Mthembu

As we are all aware, Durban University of Technology (DUT) has produced thousands of graduates over the years. However, the 2021 cohort is the first since the start of implementation of *ENVISION2030* and the emergence of Covid-19 and all its ramifications on our teaching-learning arrangements we had to pivot from.

With the launch of **ENVISION2030** early last year, you would have had a taste of it including the idea of DUT's DNA and the DUT-Way that emanates from it. In future, when we reflect on the impact of the new strategy in all its facets, you will be the baseline cohort.

On behalf of DUT people, I take this opportunity to congratulate you on your important personal accomplishment. We recognize that this milestone carries with it important meanings, part of which suggests you have maintained the discipline of your thoughts and behaviour characteristic of DUT people. Without the requirement of discipline, this day may not have been possible for many of you. For this reason, I dare say that the very discipline you have demonstrated thus far will carry you through your next personal growth trajectories, ranging from further studies, starting a career, starting your own business to even starting a family.

To borrow from Jim Collins, a combination of a culture of discipline and an ethic of entrepreneurship produces "*the magical alchemy of great performance*". We, thus, have no doubt that focused and disciplined as you were during your studies, and with DUT entrepreneurial flair we have been instilling over a number of years now, you will be greatly successful in your pursuits.

More especially over the last few years of study at DUT, you would have appreciated the strategic approach, outcomes and impacts of our teaching-learning and research-innovation philosophy. We have sought to position DUT as a university of and for its broader society. We exist because our people must use their individual and collective creativity, innovation and entrepreneurial flair to solve perennial and new problems our broader society faces. Solutions to these must contribute towards improving the lives and livelihoods in our society. Through our '*Innovative Research and Curricula*', we expect you to become a model DUT '*Adaptive Graduate*' who will unleash your creativity and imagination to become the source of change and advancement. By 2030 we will be a vanguard of that change and advancement in society. We see you as an equal partner in this historic voyage we have just embarked upon.

Your graduation coincides with a myriad of challenges confronting the world, the African continent and South Africa as a nation. We do not expect you to feel sorry for yourselves or mourn the persistence of these problems. As DUT, we have accepted Pascal Finette's assertion that people are a source of everything that happens across all institutions of society. This means that it is people who are behind the problems we know. Similarly, we know that it is a different type of people who contribute ideas that will lead to lasting solutions. In the recent past, I said the following when unpacking the Stewardship Perspective of *ENVISION2030*:

*It is about being true and selfless stewards of everyone and everything we are custodians of. It is about our deep conviction and purity of character in our collective quest to reach our ultimate goal. It is about something deeper, irreducible, somewhat intangible, that will sustain us on a flight to greatness. Allow me to say Stewardship is essentially our compass towards our ultimate and shared destiny of greatness.*

As a DUT graduate, you should enthusiastically contribute towards the lives and livelihoods of all our people. In everything you do and will do onwards, may you demonstrate DUT's DNA and the DUT-Way. May you live all DUT's Values and Principles as part of your way of life. That way, you will stand out and be seen to be a distinctive DUT graduate that all will wish to associate with, perhaps employ and perhaps partner with on big and innovative projects.

We wish you all the best in your future endeavours. Become the change you have always yearned for.

# UMLAYEZO KASEKELA SHANSELA NOPHINDE ABE NGUTHISHANHLOKO



Njengoba sonke sazi, iNyuvesi yaseThekwini yezobuChwepheshe (DUT) isikhiqize izinkulungwane zezitshudeni eminyakeni eyedlule. Noma kunjalo, labo abathweswa iziqu ngo-2021 bangabokuqala selokhu kusungulwe uhlelo olubizwa nge-ENVISION2030 kanye nokuvela kokhuvethe nezinguquko-ke obekufanele zenziwe ekufundiseni nokufunda.

Ngesikhathi kuqala i-ENVISION2030 ekuqaleni konyaka odlule, ngaleso sikhathi ubungabe usutholile ukuthi iyini yona okubandakanya nomqondo wolibofuzo lwe-DUT neNdlela ye-DUT esuka kuyo. Ngesikhathi esizayo uma sesibuka okwenziwe yileli su elisha kuzo zonke izinhlangathi zalo, niyoba yiqembu lokuqala okweqhathaniswa nalo.

Uma ngikhulumela abantu base-DUT, ngithatha lelithuba ukunihalalisela empumelelweni yenu emqoka kangaka. Siyaqonda ukuthi lempumelelo isho lukhulu kini, okunye kwakho kusho ukuthi nikwazile ukuqoqa imicabango yenu kanye nendlela yokuziphatha okuyinto efana nabantu base-DUT. Ngaphandle kokukwazi ukuziphatha ngendlela, lolusuku bekungenzeka lungabi yimpumelelo kwabaningi benu. Ngalokho ngithi, lindlela enikwaze ukuziphatha ngayo kuze kubemanje izoniqhuba kwenizokwenza kusukela manje, kungaba ukuqhubeba nezifundo, ukusebenza, ukuqala amabhizinisi enu noma ukuqala imindeni.

Ukuthatha emazwini ka-Jim Collins, isiko lokukwazi ukuziphatha kanye nendlela yokukwazi ukuphatha amabhizinisi lokhu kokubili kukhiqiza, *“the magical alchemy of great of performance”* okusho ukuthi “umlingo wenqubo yoguquko yokukhulu kokwenza umsebenzi”. Ngakho, asingabazi ukuthi indlela enikwaze ngayo ukugxila kwenikwenzayo nokuziphatha njengoba benenza ngesikhathi sezifundo zenu kanye nobuhle bokusungula amabhizinisi ebekufakwa ezingqondweni zenu e-DUT enqwabeni yeminyaka eyedlule, ngaleyo ndlela niyophumelela kukho konke enihlela ukukwenza.

Ikakhulukazi eminyakeni yokugcina yokufunda e-DUT, kufanele ngabe nithakasele izindlela zokwenza izinto, imiphumela yendlela izinto ezenzeka ngayo, kanye nemiphumela yendlela yokufunda-nokufundisa kanye nezindlela ezintsha zocwaningo zobunjalo bolwazi nezinto eziyiqiniso nezikhona. Sizame ukuthola indlela yokubeka i-DUT njengenyuvesi yomphakathi wonkana. Sikhona ukuze abantu bakwazi ukusebenzisa amakhono abo ngabanye nanoma futhi besebenzisana nabanye, ukukwazi ukufika namacebo okwenza izinto ngcono kanye nokukwazi ukwenza kahle kwezamabhizinisi bakwazi ukuxazulula izinkinga ezintsha kanye nalezo umphakathi wonkana osubhekene nazo inqwaba yeminyaka. Lezi zisombululo kufanele kube ukuthi zibe negalelo ekwenzeni ngcono izimpilo zabantu kanye nendlela yabo yokuphila emphakathini yethu. Nge, “Innovative Research and Curricular” silindele ukuthi nibe yisibonelo se-DUT, “izitshudeni esezigodile ezikwazi ukumelana noshintsho” ezizokwazi ukucabanga ngokusabalalisa umqondo kanye nekhono lokudala ukuze nibe umsuka woshintsho nokuthuthuka. Ngonyaka ka-2030 kuyobe kuyithi esihamba phambii ngezindlela ezintsha zokuthuthukisa umphakathi. Sinibona njengabalingani bethu kulomlando wohambo esilulaqalayo.

Ukuthweswa kwenu iziqu kwenzeke ngesikhathi izwe libhekene nenqwaba yezingqinamba, izwekazi lase-Afrika kanye neNingizimu Afrika njengesizwe. Asilindele ukunibona nidabukisa okanye nikhungathwe ukuba khona kwalezi zinkinga ezingapheli. Njenge DUT, sesiwamukele umbono ka-Pascal Finnet othi abantu bawumsuka wayo yonke into eyenzakalayo kuzo zonke izikhungo zomphakathi. Lokhu kusho ukuthi ngabantu abayimbangela yezinkinga esizaziyo. Kuyefana nokuthi, siyazi ukuthi ngabantu abathile abayobamba iqhaza ngemibono eyoholela ezisombululweni ezohlala zikhona njalo. Esikhathini esingasingakanani esedlule, ngasho lokhu okulandelayo uma ngichaza ngoMbono wokuPhatha we-ENVISION2030:

*Kumayelana nokuba ngumholi weqiniso nongayena ugombela kwesakhe kubantu nakho konke lokhu okudinga ukunakekelwa yithi. Kumayelana nokujula nokukholelwa kwethu kanye nobumsulwa bobuthina ekubambisaneni ekufuneni lokho okuwumgomo wokugcina, ongehliseki, ongasho nje ukuthi into engabambeki, lokho kuyosilondoloza size sifinyelele kokukhulu. Ngivumeleni ngisho ukuthi uBuholi buyinkombandlela bendawo yethu esiphokophelele kuyo neyokugcina yethu sonke yobukhulu.*

Njengomfundi wase-DUT othweswe iziqu, kufanele niphonse esivivaneni ezimpilweni zabantu bethu kanye nendlela abaziphilisa ngayo. Kukho konke enikwenzayo nenizokwenza ukuya phambili, sengathi ningakhombisa uLibofuzo lwe-DUT neNdlela ye-DUT. Sengathi ningaphila ngazo zonke izinto ezibalulekile neziyigugu nezimiso ze-DUT njengengxenywe yempilo yenu. Ngaleyo ndlela, niyogqama niphinde nibonakale ukuthi ningabafundi abathweswe iziqu e-DUT abantu bonke abayofisa ukwazana nabo, mhlampe babaqashe okanye babe ngabalingani babo emisebenzini emikhulu yokuqhamuka nezinto ezintsha.

Sinifisela okuhle kodwa kulokhu enizokwenza kusasa. Yibani ushinto enanikade nifisa ukuba yilo.





## MESSAGE FROM THE PRESIDENT OF CONVOCATION

Mr Siyabonga Vezi

Class of 2021. Congratulations on your well-deserved success!

You should be extremely proud of your accomplishment. One's graduation is always a momentous occasion, but completing your studies and graduating during the midst of a world-wide pandemic is nothing short of extraordinary. You have made it through a very challenging time. Your indomitable spirit and a thirst for success has propelled you to work hard and see this through. Well done! These are the very skills that will hold you in good stead and give you the confidence to overcome hurdles and continue with the journey ahead.

ENVISION2030 speaks of producing adaptive graduates – developing graduates with the acumen to initiate and/or respond to change. The Class of 2021 epitomises that. You were faced with uncertain times but your resilience and fortitude endured and here you are, today, celebrating all the hard work that led to this victory. As you celebrate let us pay homage to those that have made sacrifices to ensure you fulfil your potential as a contributing member of society. Pay it forward as you, too, seek to *Improve Lives and Livelihoods*. To make a donation to DUT go to [www.dutalumni.com](http://www.dutalumni.com) and click on “Ways to Give”. Select one of the three payment options. It is that easy.

Having being ranked among the top five Universities in South Africa, according to the Times Higher Education World Rankings, as DUT we are confident that we have produced graduates with a social conscience who will make an indelible mark on the world and who will certainly become members of a global community.

We hope that you have created fond memories of your time at DUT and we look forward to welcoming you back should you choose to continue with postgraduate studies. The Executive Committee of Convocation is proud to be part of one of your greatest achievements. We look forward to great things from the graduating Class of 2021. I humbly request that you make contact by continuously updating your details so that you maintain your lifelong link with DUT, your *Alma Mater*.

# UMLAYEZO KAMENGAMELI WENHLANGANO YABAFUNDI ASEBETHWESWE IZISU



Ukwethweswa kwezisu kwasebusika 2021

Bafundi bango-2021. Halala empumelelweni yenu enifanele!

Kufanele niziqhenye ngesenikuzuzile. Umcimbi wokwethweswa izisu ungumcimbi uhlale ungomqoka kakhulu, kodwa-ke ukuqeda izifundo zenu niphinde nithweswe izisu ngesikhathi izwe libhekene nobhubhane emhlabeni wonke lokho kuyisimanga esikhulu. Niphumelele kunzima. Umoya wokuphikelela kanye nokomela impumelelo kunenze nasebenza kanzima kwaze kwaba manje. Nisebenzile! Lawa ngamakhono ayonigcina aphinde aninike ukuzethemba okuyonenza nikwazi ukumelana nezingqinamba niphinde niqhubeke nohambo enibhekene nalo.

Uhlelo i-ENVISION2030 lukhuluma ngokukhiqiza izitshudeni ezikwazi ukumelana nezimo ezahlukeneyo ukuthuthukisa izitshudeni ngobuchule ukuze zikwazi ukuqala kanye/noma zikwazi ukuthi zenzenjani uma kufika ushintsho. Abafundi baka-2021 bayisibonelo esihle ngokweqile salokho. Benibhekene nesikhathi esinzima kodwa nibekezele ngenxa yamandla nesibindi, namhlanje nizobungaza ukusebenza ngokuzikhandla okuholele kulempumelelo. Nisabungaza, ningakhohlwa ilabo abadele konke ukuqinisekisa ukuthi ningalabantu eniyibona namhlanje abaneqhaza abalibambayo njengamalungu omphakathi. Khokha ngendlela yokuthi nawe uyafuna ukuthi *Izimpilo zabantu zibe ngcono kanye neNdlela abantu abaphila ngayo*. Uma ufuna ukuphonsa esivivaneni e-DUT ungangena ekhasini le-internet: [www.dutalumni.com](http://www.dutalumni.com) bese ucofa lakuthi, “iziNdlela zokuNikela.

Ukubekwa kanye namanyuvesi amahlanu aphezulu ohlwini eNingizimu Afrika, ngokwe-Times Higher Education Worlds Rankings, njenge-DUT siyazethemba ukuthi sikhiqize izitshudeni ezikwaziyo ukuphila nabantu eziyoyibeka induku ebandla, futhi ezizoba amalungu omphakathi omhlaba jikelele.

Sithemba ukuthi nizenzele izinkumbulo ezithandekayo zesikhathi senu e-DUT kanti singakuthokozela ukubuya kwenu uma nikhetha ukuqhubeka nezifundo zenu. Ikomidi Elikhethekile leNhlango yasebethweswe izisu liyaziqhenya ngokuba yingxenywe yenye yempumelelo yenu enkulu kangaka. Sibheke okuhle kodwa ezitshudenini zango-2021 ebezithweswa izisu. Nginyaninxusa ukuthi nixhumane nathi ngokuthi niqhubeke nokubuyekeza imininingwane yenu ukuze nigcine ubudlelwano benu ne-DUT njalo, inyuvesi yenu ebenifunda kuyo.

Khumbulani ukuhlala ngokuqhelelana, ukugeza izandla imizuzwana engama-20 bese-ke njalo nifaka isimfoyo uma niphumela phandle.

Niphephe. Nibusiseke.



## COUNCIL MEMBERS

Mr N Z W Madinane

Chairperson of Council

Ms B Ntombela

Vice-Chairperson of Council

### EXTERNAL COUNCIL MEMBERS

Mr MF Gumede

Convocation

Mr M Shange

Convocation

Mr D Makaya

Convocation

Mr SH Vezi

Council Appointee

Mr Z Gumede

Council Appointee

Ms B Chiliza

Council Appointee

Prof L Molamu

Council Appointee

Mr S Sibiya

Council Appointee

Mr B Singh

Council Appointee

Ms G Twala

Council Appointee

Cllr. W Mapena

eThekweni Municipality

Vacant

Minister of Higher Education

Vacant

Minister of Higher Education

Dr N Makhanya

Minister of Higher Education

Ms B Masinga

Minister of Higher Education

Mr L Longwe

Minister of Higher Education

Mr LKT Mehta

ML Sultan Charitable and Education Trust

### INTERNAL COUNCIL MEMBERS

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Vice-Chancellor and Principal

Prof MN Sibiya

Deputy Vice-Chancellor: Teaching and Learning

Vacant

Deputy Vice-Chancellor: People and Operations

Prof J Mellen

Academic Staff

Mr M Estrice

Institutional Forum

Mr N Mthembu

Professional and Administrative Staff

Mr L Masethi

Student Representative Council

Mr S Dlamini

Student Representative Council

Prof V Rawjee

Senate

Prof FG Netswera

Senate

Mr NG Munsamy

Support and Service Staff

## OFFICE BEARERS

Ms N Nyembezi

Chancellor

### EXECUTIVE AND SENIOR MANAGEMENT

Professor T Z Mthembu

Vice-Chancellor and Principal

PhD (Wits); MSc (Vanderbilt); BSc Hons (UFH)

Professor M N Sibiya

Deputy Vice-Chancellor:  
Teaching and Learning

D Tech (DUT); M Tech (TN); BCur Hons (UniZulu)

Vacant

Deputy Vice-Chancellor:  
People and Operations

Professor S Moyo

Deputy Vice-Chancellor:  
Research, Innovation and Engagement

PhD (UND); M TEM (UniMelb); MSc (UND)

Dr M J Nkonoane

Registrar

PhD (CUT); MEd (VISTA); B Paed (UniZulu)

Professor O O Olugbara

Executive Dean:  
Accounting and Informatics

PhD (UniZulu); MSc (Unilorin)

Professor S Singh

Executive Dean:  
Applied Sciences

PhD (UDW)

Professor R Kruger

Executive Dean:  
Arts and Design

PhD (UP); NHD (TUT)

Professor B Twala

Executive Dean:  
Engineering and the Built Environment

PhD (OU); MSc (Southampton); BA (UNESWA)

Professor G G Mchunu

Executive Dean:  
Health Sciences

PhD (UKZN)

Professor F G Netswera

Executive Dean:  
Management Sciences

DPhil (SU); PGDip (Buckinghamshire Chilterns);  
NDP (TSA); BA Hons (UWC); BA (UniVEN)

Mrs N F Dhumazi

Chief Financial Officer

MCom (UP); PGD Auditing (UniSA); BCom (UnMenda)

Dr Q P T Mtshali

Chief Information Officer

PhD (NSU); BSc (SUNY)

Mr S Nyangintsimbi Dr J

Chief Risk Officer

MPhil (UP); MBL (UniSA); B Com (WSU)

M Molete

Director: Midlands Campuses

PhD (PSU); MBA (UCT); MSc (HU); BSc Hons (Wits)

Dr D Mohale

Director: Special Projects

DLitt et Phil (UniSA); MMPP (Wits); BA (Cum Laude) (CUT)

Dr V L Mthethwa

Senior Director:  
Human Resources

PhD (UKZN)

## HEADS OF DEPARTMENTS

### FACULTY OF ACCOUNTING AND INFORMATICS

Management Accounting	Dr OM Olarewaju	PhD (UKZN); MSc Accounting (OAU)
Finance and Information Management	Dr S Parbanath	PhD (UKZN); BSc Hons (UniSA)
Auditing & Taxation	Dr L Jali	DBA (UKZN); B.Com (UniZulu); JSTC (Adams College)
Financial Accounting	Dr A Bhana	PhD (DUT)
Information Technology	Dr J Wing	PhD (DUT)
Information Systems	Dr N Naicker	PhD (UKZN, MSc (UniSA); HED (SCE)
Information and Corporate Management	Dr KS Ngwane	PhD (UKZN) B Tech (DUT)



# Faculty of Accounting and Informatics

## Degree of Doctor of Philosophy in INFORMATION TECHNOLOGY

ANGULA Nikodemus

### Title of Thesis

A comprehensive standards-based framework for enabling semantic interoperability of disease surveillance data for Namibia through adopting health standards.

### Summary

The Ministry of Health and Social Services (MoHSS) in Namibia runs silo health information systems (HIS) in the 14 regions of the country, and these silo systems were donated by non-governmental organisations. In addition to a regional District Health Information System (DHIS- 2) for each region, there is the main DHIS-2 at the MoHSS. The health information systems (HIS) that include the main DHIS-2 at the MoHSS and silo systems in the regions work in isolation currently. Hence this study aimed at finding a framework to enable semantic interoperability of disease surveillance data in these HIS. In the Namibian health domain, there is no known protocol that governs or aggregates disease surveillance data from remote heterogeneous HIS. Therefore, the study developed an interlink protocol that can aggregate disease surveillance data from remote HIS. To test the Interlink protocol, a number of use case scenarios were used. The scenarios include integrating crowd-sourced disease surveillance data through the communities' mobile phones, integrating disease surveillance data collected through community health workers' (CWH) visits, and also integrating disease surveillance data collected from community members during hospital visits. In each case, the interlink protocol is paired to an HL7 standard to facilitate communication of the disease surveillance data from the source to the integrated HIS. A software system was developed for proof of concept.

**Supervisor** Prof N Dlodlo  
**Co-Supervisor** Dr QPT Mtshali

OYEWOLE Stanley Ade

### Title of Thesis

Image content-based user preference elicitation for personalised mobile recommendation of shopping items

### Summary

Personalised recommendation of shopping items is an exciting snug suggestion for customers. It is required to meet the customer preferences and improve the sales of merchants. Most previous works in content-based recommendation heavily relied on an orthodox 2-dimensional "user by item" data structure that has been extensively used in different application domains. However, this structure is highly limited in delivering personalised recommendations to mobile customers because of the inherent "problem of concept drift" that can degrade the performance of a recommendation system. This research

introduces an image content-based preference elicitation model based on supervised machine learning, a novel 4-dimensional colour image and Eigen-colour features to deliver personalised shopping item recommendations to mobile customers. The introduced model leverages the extraction of multiple aspects of item dynamic features to characterise customer preferences. This will help mobile customers and nomads to pervasively discover the most relevant shopping items of interest and reduce the barriers to swiftly purchasing. Experimental results of testing an implementation of the proposed recommendation algorithm have shown an impressive accuracy of 92.2% on the popular PI100 e-commerce shopping items corpus. Three enthralling research articles have been published from the work reported in this thesis.

**Supervisor** Prof OO Olugbara

SO FOWORA Mayowa Abiola

### Title of Thesis

Examining the impact of the Ethnoscience teaching philosophy on academic performance in introductory computer programming

### Summary

The mastery of the core technologies of the Fourth Industrial Revolution (4IR) seems to require a set of skills that are reputed to be difficult to learn. This also includes general STEM (Science, Technology, Engineering and Mathematics) related know-how where computer programming is considered by many as the new linking glue of the 4IR despite its reputation of being difficult to learn and to master. 4IR is credited with a wide range of advantages, such as improved production, communication and participation, but it also comes with several disadvantages, such as the widening of the digital divide and higher levels of unemployment, especially for unskilled people. In fact, computer programming and other STEM related skills are crucial for the optimization of the benefits of the 4IR and for the minimization of its disadvantages. This is why this study is examining the impact of a different type of teaching approach known as the ethnoscience teaching approach, a STEM teaching philosophy, on students' academic performance in introductory computer programming. The results of this study indicate that the ethnoscience teaching approach significantly improves students' academic performance in introductory computer programming compared to the conventional teaching approach. They also indicate that students' prior language and computing subject choices affect their performance in conventional but not in culturally sensitive introductory computer programming. Other subsequent studies can also be conducted with more programming concepts and with different samples, so as to confirm the intrinsic value of culturally sensitive computing education.

**Supervisor** Prof SDE Obono

ZVAREVASHE Kudakwashe

### **Title of Thesis**

Recognition of speech emotion in call centre conversations in a multilingual environment

### **Summary**

The automation of multilingual speech emotion recognition in customer call centres is an extremely hard assignment because human languages and accents vary significantly across different cultures. The intrinsic problem that many existing automatic speech emotion recognition models were not able to efficiently recognise certain categories of human speech emotions with a high level of accuracy was investigated in this thesis. The author proposed an elegant methodology to circumvent this problem based on a fascinating acoustic feature extraction technique, and a novel ensemble learning algorithm. The proposed machine learning framework extracts highly discriminating speech emotion feature representations from multiple sources that were subsequently agglutinated to form a set of spectral and prosodic acoustic features. A novel ensemble learning algorithm was developed to learn the acoustic features for recognising multilingual vocal utterances in call centre conversations. A series of experiments was conducted on numerous public databases using a variety of modern ensemble learning algorithms. The presented analysis which reported the performance of the proposed ensemble learning algorithm provided scientific evidence that the utilisation of the novel features increased the generalization ability of the proposed algorithm. Five fascinating research articles have been published from the work reported in this thesis.

**Supervisor** Prof OO Olugbara

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(Full Research)

### **Title of Dissertation**

Towards a framework for improved organisational performance at the Department of Transport, eThekweni region

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**Co-Supervisor** Prof OO Olugbara

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MAJOZI	Nompilo
MANZINI	Nkosiphendule Sphelele
MAYISA	Andile
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NDLOVU	Amanda
NDLOVU	Malibongwe Msizi
NDOKWENI	Nhlakanipho
NGCAMU	Snenhlanhla
NGCOBO	Lusanda Anele
NGUBANE	Gugu
NKOSI	Nomfundo Sthokozile
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