Research and Technical Writing for Science and Engineering

Meikang Qiu Han Qiu Yi Zeng



1,607

สำนักหอสมุด มหาวิทยาลัยเชียงใหม่

Research and Technical Writing for Science and

Meikang Qiu Han Qiu Yi Zeng

Engineering





CRC Press is an imprint of the Taylor & Francis Group, an informa business

Contents

List of	Figures		xvii
Preface			xxi
Author	Bios		xxiii
SECTIO	N I Ir	ntroduction ~	
Снарт	er 1	Overview of Research	3
1.1	WHAT	Γ IS RESEARCH?	4
	1.1.1	Definition	4
	1.1.2	Creative–Build Something New	4
	1.1.3	Systematic-General Pattern	5
	1.1.4	Increase–Acquire and Contribute	6
	1.1.5	The Stock of Knowledge	7
	1.1.6	Summary	9
1.2	THE P	ROCESS OF RESEARCH	9
	1.2.1	Intellectual Discovery	11
1.3	CLASS	SIFYING RESEARCH	12
	1.3.1	So, What is Good Research?	13
1.4	RESEA	RCH METHODS	14
1.5	OVER'	VIEW OF THE TELEHEALTH SYSTEMS	16
1.6	KEYW	ord explanation	22
1.7	SUMN	MARY	24

Снарте	ER 2 -	Research Integrity	27
2.1	WHY I	S RESEARCH INTEGRITY SO IMPORTANT?	28
2.2	BE THI	E WHISTLEBLOWER WHEN YOU SEE IT	28
2.3	FUND	AMENTAL TYPES OF RESEARCH DILEMMAS	30
2.4	FALSIF	ICATION/FABRICATION OF DATA	31
2.5	OWNE	ership of research materials and data	32
2.6	PLAGI/	ARISM	33
	2.6.1	Ignorance Is Not a Valid Excuse for Plagiarism	34
	2.6.2	Paraphrasing	35
	2.6.3	Summary of Useful Guidelines for Writing	35
2.7	AUTH	Orship/assignment of credit	35
2.8	CONF	IDENTIALITY	37
2.9		DUCTION TO CPU SCHEDULING IN OPERAT-	
	ING SY	/STEM	38
	2.9.1	CPU Scheduling: Schedulers	38
	2.9.2	CPU Scheduling: Dispatcher	40
	2.9.3	CPU Scheduling: Scheduling Criteria	41
	2.9.4	Scheduling Algorithms	42
		2.9.4.1 First Come First Serve Scheduling	43
		2.9.4.2 Shortest Job First Scheduling	44
2.10	KEYW(ord explanation	46
2.11	SUMM	IARY	47
SECTION	ı II Fi	nd Your Idea of Research	
Снарте	2R 3 ■ 1	How to Select Research Topics	51
3.1	OVER\	/IEW	52
3.2	IDENT	IFY AN AREA OF INTEREST	52
3.3	BROW	SE THE LITERATURE	54
3.4	PICK A	TOPIC AND DIVE	55
3.5	IDENT	IFY A RESEARCH QUESTION	56

	3.6		OF RESEARCH TOPICS AND KEYWORDS IN PUTER SCIENCE	58
		3.6.1	Artificial Intelligence	58
		3.6.2	Communications and Media	59
		3.6.3	Computer Science and Engineering	61
	3.7		MIC PROGRAMMING IN RESEARCH AND LEM SOLVING	63
		3.7.1	An Example for Cost Minimization	63
		3.7.2	Greedy vs. Dynamic	66
		3.7.3	Industrial and Research Applications of Dynamic Programming	68
	3.8	SUMN	MARY	69
<u> </u>		1		_,
	HAPTI	ER 4 ■	Literature Review and Formulating a Problem	71
	4.1	WHAT	IS A LITERATURE REVIEW?	72
	4.2	TYPES	OF LITERATURE REVIEWS	73
		4.2.1	Stand-Alone Literature Review Articles	73
		4.2.2	Research Proposal	73
		4.2.3	Research Report in the Workplace	74
	4.3	COM	MON STRUCTURE OF LITERATURE REVIEWS	74
	4.4	WHAT	IS THE LITERATURE?	75
	4.5	THE "I	NFORMATION CYCLE"	<i>7</i> 5
		4.5.1	Primary Sources	76
		4.5.2	Secondary Sources	77
		4.5.3	Tertiary	77
	4.6	WORK	ING BACKWARDS	77
	4.7	THE P	ublished literature	78
		4.7.1	Peer Review	78
	4.8	HOW	TO FIND THE LITERATURE	79
		4.8.1	Computer Science Research Databases	80
		4.8.2	Footnote Chasing	80
	4.9	WRITII	NG THE LITERATURE REVIEW	80

	4.10	KEY POINTS WHEN WRITING A LITERATURE REVIEW			
	4.11	ADAPTIVE RESOURCE ALLOCATION IN CLOUD			
		SYSTEN		83	
		4.11.1	Types of Cloud Computing	84	
			4.11.1.1 IaaS (Infrastructure as a Service)	85	
			4.11.1.2 PaaS (Platform as a Service)	86	
			4.11.1.3 SaaS (Software as a Service)	87	
			4.11.1.4 Cloud Computing vs. Traditional Web Hosting	88	
		4.11.2	Task Scheduling in Cloud Computing Systems	88	
			4.11.2.1 Model of Task Scheduling	88	
	4.12	KEYWC	ORD EXPLANATION	92	
	4.13	SUMM	ARY	93	
_				0.5	
CF	HAPTE	R 5 = F	How to Generate Research Ideas	95	
		DE DAT		0.0	
	5.1	BE PAT		96	
	5.2		CT HUNCHES READY TO BE STITCHED 'HER LATER	96	
	5.3		ECT YOUR HUNCHES WITH THE HUNCHES OF		
		OTHER		97	
	5.4	DIVERS	SE MINDS	97	
	5.5	MAKE S	SPACE FOR HUNCHES TO INCUBATE	98	
	5.6	ACTIVE	ELY LOOK FOR THE IDEA FITS YOU	98	
		5.6.1	Acquire the Ability to Read and Improve Your Taste	99	
		5.6.2	Recognize the Trends Associated with the Development of Research Ideas	101	
		5.6.3	Make it a Habit to Think about Research Ideas	s 105	
	5.7	CYBER	SECURITY AGAINST BUFFER OVERFLOW		
	omorei.	ATTAC		106	
		5.7.1	Buffer Overflow Exploits	108	
		5.7.2	Buffer Overflow Consequences	108	

		5.7.3	Why C/C++ are More Vulnerable to Buffer Overflows?	109
		5.7.4	Buffer Overflow Attack Examples	110
		5.7.5	_	112
	5.8	SUMM		113
SEC	CTIO	v III B	ring Your Idea to the Reality	
Сн	APTE	R 6 ■	How to Design Algorithms	117
	<i>-</i> 1	O) (ED)	453.4	
	6.1	OVER\		117
	6.2	THE I	MPORTANCE OF ALGORITHMS IN COMPUTER	118
	6.3		PEOPLE BENEFIT FROM ALGORITHMS	
	6.4		746	119
			RITHMS DESIGN TECHNIQUES	119
	6.5		FIONS FOR YOURSELF	122
	6.6		SEFUL LIST OF QUESTIONS	123
Dd "	6.7		DUCTION TO HETEROGENEOUS MEMORY TECTURE	126
		6.7.1	Introduction and Basic Concepts	127
		6.7.2	Overview of Scratchpad Memory Management	129
		6.7.3	Basics of the System Model	131
	6.8	KEYWO	ORD EXPLANATION	134
JOI,	6.9	SUMM	IARY	136
Сн	АРТЕ	R 7■1	How to Do Experiments	137
Ţir i	7.1	THE IN	MPORTANCE OF EXPERIMENTS IN COMPUTER CE	138
i.	7.2	EXPERI	MENTATION IN COMPUTER SCIENCE	138
		7.2.1	Empirical Dimensions	139
		7.2.2	Subjects and Topics	140
		7.2.3	Activities	141

7.3 FIVE PERSPECTIVES ON EXPERIMENTATION IN			
		PUTER SCIENCE	143
	7.3.1	Feasibility	143
	7.3.2	Trial	144
	7.3.3	Field	144
	7.3.4	Comparison	145
	7.3.5	Controlled	146
7.4	MACH	IINE LEARNING EXPERIMENTAL PIPELINES	146
	7.4.1	How a Machine Learning Model is Built	147
7.5		DAPTIVE GENETIC ALGORITHM FOR MEMORY CATION	149
	7.5.1	An Adaptive Genetic Solution	151
	7.5.2	Genetic Algorithm Operations	153
7.6	SUMN		157
Снарт	ER 8 =	How to Write a Paper	159
8.1		RCH YOU TOPIC	160
8.2	DRAFT	TING YOUR ESSAY	161
8.3	GENER	RAL PAPER STRUCTURE IN COMPUTER SCIENCE	163
	8.3.1	Title	163
	8.3.2	Abstract	163
	8.3.3	Main Body Structure	164
8.4		TIVELY USE TABLES AND FIGURES TO BETTER PRATE YOUR IDEAS	165
	8.4.1	Using Tables	166
	8.4.2	Using Figures	167
	8.4.3	Common Errors When Using Tables and Figures	168
8.5	REVISE	YOUR PAPER	170
8.6		P YOUR PERSONAL DEEP LEARNING ENVIRON-	
		– SELECTION OF THE HARDWARE	171
	861	CPHe	171

		Contents	xiii
	8.6.2	CPUs	172
	8.6.3	RAMs	174
	8.6.4	Motherboard	174
	8.6.5	Storage	174
	8.6.6	Power Supply Unit	174
	8.6.7	Cooling	175
	8.6.8	Case	175
	8.6.9	Final Checking List Before Your Shoping	175
8.7	SUMA	MARY	176
SECTION	N IV P	ut Your Work Out and Make Impacts	8
Снарть	ER 9	Paper Submission and Publication	179
Nonemaine disease repair province and		·	
9.1	CHOC	DSING WHERE TO SUBMIT YOUR PAPER	179
	9.1.1	Why Preferring Conferences?	182
	9.1.2	Why Preferring Journals?	183
9.2		TO SUBMIT A RESEARCH PAPER TO A JOURNAL	
0.0		ONFERENCE	184
9.3		TO WRITE REBUTTALS AND REPLIES?	186
9.4		P YOUR DEEP LEARNING ENVIRONMENT – Ware Level	189
	9.4.1	Install Graphics Drivers	191
	9.4.2	-	191
	9.4.3		192
	9.4.4	Install and Manage Deep Learning Frameworks	
9.5	SUMN	· · · · · · · · · · · · · · · · · · ·	193
Снарте	ER 10 =	Reference and Research Impact	197
10.1	INITDO	DDUCTION	100
			198
		DSE OF CITING REFERENCES	198
		NIZATION OF REFERENCES	198
10.4	CHAL	ON AND REFERENCE FORMATS	199

	10.5	AUTHO	DRS' RESPONSIBILITIES	201
	10.6	TASKS	RELATED TO REFERENCES	202
		10.6.1	Choosing References for Citation	202
		10.6.2	Inducting Citations in the Text	204
		10.6.3	Preparing the Reference List	205
	10.7		ine learning and adversarial learning – JG of MLS	206
		10.7.1	Overview on ML Models	207
		10.7.2	Overview of DNNs	208
		10.7.3	Adversarial Attacks on DNNs	208
		10.7.4	Existing Defenses for Poisoning Attacks	211
		10.7.5	Existing Defenses for Evasion Attacks	213
	10.8	SUMM	ARY	216
CI	HAPTE	R 11 ■ R	Resource, Advisor, and Time Management	219
	11.1		DUCTION	219
	11.2		AL TECHNIQUES FOR TIME MANAGEMENTS	220
	11.3		JCTIVITY AND RESEARCH WRITING	224
	11.4	CAN B	TWICE BEFORE ACCEPT A REQUEST – HOW YOU ETTER CONCENTRATE ON YOUR MAIN TIME-	
		LINE?		225
	11.5	SUMM	ARY	229
SE	CTION	V Re	cap and Conclusion	
CI	HAPTE	R 12 ■ C	Critical Remarks and Chapters Recap	233
	12.1	OVERV	IEW OF THE RECAP	233
	12.2	INTRO	DUCTION TO COMPUTER SCIENCE RESEARCH	234
	12.3	FIND Y	OUR IDEAS FOR RESEARCH	235
	12.4	BRING '	YOUR IDEAS TO THE REALITY	236
	12.5	PUT YO	OUR WORK OUT AND MAKE IMPACTS	236
	12.6	HOME	WORK AND PRACTICES	239

			Contents	xv
	12.6.1	Homework One		239
	12.6.2	Homework Two		240
	12.6.3	Homework three		241
12.7	FINAL F	PROJECT		242
12.8	POSSIB	BLE PROJECTS OR PRESENTATIONS		243
Bibliogr	aphy			245
Index				283