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Doctor of Philosophy (Software Engineering)

Advanced Informatics School
Universiti Teknologi Malaysia

OCTOBER 2017

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This nation, turning 100 years old, had no Odyssey, no St. George slaying the dragon, no Prometheus. The emerging American genius for making a lot of money was a poor substitute for King Arthur and his knights (although the Horatio Alger myth of rags to riches was good for a lot of mileage). Without a mythology and set of ancient heroes to call its own, America had to manufacture its heroes. So the mythmaking machinery of nineteenth-century American media created a suitable heroic archetype in the cowboys of the Wild West. The image was of the undaunted cattle drivers living a life of reckless individualism, braving the elements, staving off brutal Indian attacks. Or of heroic lawmen dueling with six-guns in the streets at high noon. This artificial Wild West became America's Iliad.

ACKNOWLEDGEMENT

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ABSTRACT

Imagine trying to live in a world dominated by dihydrogen oxide, a compound that has no taste or smell and is so viable in its properties that it is generally benign but at other times swiftly lethal. Depending on its state, it can scald you or freeze you. In the presence of certain organic molecules it can form carbonic acids so nasty that they can strip the leaves from trees and eat the faces off statuary. In bulk, when agitated, it can strike with a fury that no human edifice could withstand. Even for those who have learned to live with it, it is often murderous substance. We call it water.

ABSTRAK

This nation, turning 100 years old, had no *Odyssey*, no St. George slaying the dragon, no Prometheus. The emerging American genius for making a lot of money was a poor substitute for King Arthur and his knights (although the Horatio Alger myth of rags to riches was good for a lot of mileage). Without a mythology and set of ancient heroes to call its own, America had to manufacture its heroes. So the mythmaking machinery of nineteenth-century American media created a suitable heroic archetype in the cowboys of the Wild West. The image was of the undaunted cattle drivers living a life of reckless individualism, braving the elements, staving off brutal Indian attacks. Or of heroic lawmen dueling with six-guns in the streets at high noon. This artificial Wild West became America's *Iliad*.

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LIST OF ABBREVIATIONS

- RTFM – Read The Fine Manual
YMMV – Your Mileage May Vary

LIST OF SYMBOLS

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CHAPTER 1

INTRODUCTION

1.1 Introduction

You probably should RTFM (Read The Fine Manual) before taking any actions. Donald Knuth has spent the past several years working on a system allowing him to control many aspects of the design of his forthcoming books—from the typesetting and layout down to the very shapes of the letters! Seldom has an author had anything remotely like this power to control the final appearance of his or her work. Knuth's \TeX typesetting system has become well-known and is available in many countries around the world. By contrast, his METAFONT system for designing families of typefaces has not become as well known or as available.

In his article “The Concept of a Meta-Font”, Knuth sets forth for the first time the underlying philosophy of METAFONT, as well as some of its products. Not only is the concept exciting and clearly well executed, but in my opinion the article is charmingly written as well. However, despite my overall enthusiasm for Knuth's idea and article, there are some points in it that I feel might be taken wrongly by many readers, and since they are points that touch close to my deepest interests in artificial intelligence and esthetic theory, I felt compelled to make some comments to clarify certain important issues raised by “The Concept of a Meta-Font”.

1.2 Problem Statement

(Chang et al., 2008) We thrive in information–thick worlds because of our marvelous and everyday capacity to select, edit, single out, structure, highlight, group, pair, merge, harmonize, synthesize, focus, organize, condense, reduce, boil down, choose, categorize, catalog, classify, list, abstract, scan, look into, idealize, isolate, discriminate, distinguish, screen, pigeonhole, pick over, sort, integrate, blend, inspect, filter, lump, skip, smooth, chunk, average, approximate, cluster, aggregate, outline, summarize, itemize, review, dip into, flip through, browse, glance into, leaf through, skim, refine, enumerate, glean, synopsise, winnow the wheat from the chaff and separate the sheep from the goats.

1.3 Project Research Aim

(Han et al., 2011) The Earth, as a habitat for animal life, is in old age and has a fatal illness. Several, in fact. It would be happening whether humans had ever evolved or not. But our presence is like the effect of an old-age patient who smokes many packs of cigarettes per day — and we humans are the cigarettes.

1.4 Objectives

Imagine trying to live in a world dominated by dihydrogen oxide, a compound that has no taste or smell and is so viable in its properties that it is generally benign but at other times swiftly lethal. Depending on its state, it can scald you or freeze you. In the presence of certain organic molecules it can form carbonic acids so nasty that they can strip the leaves from trees and eat the faces off statuary. In bulk, when agitated, it can strike with a fury that no human edifice could withstand. Even for those who have learned to live with it, it is often murderous substance. We call it water.

1.5 Research Scope

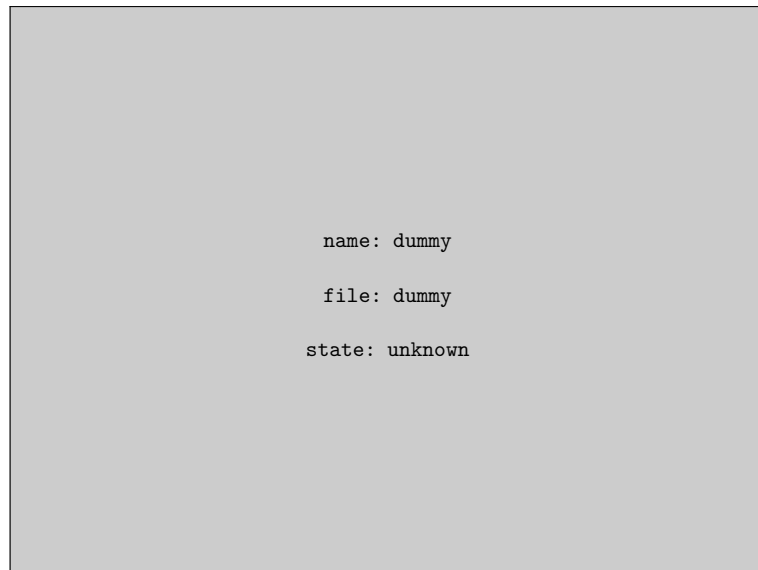
This nation, turning 100 years old, had no *Odyssey*, no St. George slaying the dragon, no Prometheus. The emerging American genius for making a lot of money was a poor substitute for King Arthur and his knights (although the Horatio Alger myth of rags to riches was good for a lot of mileage). Without a mythology and set of ancient heroes to call its own, America had to manufacture its heroes. So the mythmaking machinery of nineteenth-century American media created a suitable heroic archetype in the cowboys of the Wild West. The image was of the undaunted cattle drivers living a life of reckless individualism, braving the elements, staving off brutal Indian attacks. Or of heroic lawmen dueling with six-guns in the streets at high noon. This artificial Wild West became America's Iliad.

1.6 Research Contribution

I used a similar illustration in one of my Royal Institution Christmas Lectures in 1991. I said I had reason to believe that among my audience was a psychic, clairvoyant individual, capable of influencing events purely by power of thought. I would try to flush this individual out. "Let's first establish," I said, "whether the psychic is in the left half or the right half of the lecture hall." I invited everybody to stand up while my assistant tossed a coin. Everybody on the left of the hall was asked to 'will' the coin to come down heads. Everybody on the right had to will it to be tails. Obviously one side had to lose, and they were asked to sit down. Then those that remained were divided into two, with half 'willing' heads and the other half tails. Again the losers sat down. And so on by successive halvings until, inevitably, after seven or eight tosses, one individual was left standing. "A big round of applause for our psychic." He must be psychic, mustn't he, because he successfully influenced the coin eight times in a row?

1.7 Report Organization

If [in 2600] you stacked all the new books being published next to each other, you would have to move at ninety miles an hour just to keep up with the end of the line.



CHAPTER 2

LITERATURE REVIEW

2.1 First section

Donald Knuth has spent the past several years working on a system allowing him to control many aspects of the design of his forthcoming books—from the typesetting and layout down to the very shapes of the letters! Seldom has an author had anything remotely like this power to control the final appearance of his or her work. Knuth's \TeX typesetting system has become well-known and is available in many countries around the world. By contrast, his METAFONT system for designing families of typefaces has not become as well known or as available.

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We thrive in information–thick worlds because of our marvelous and everyday capacity to select, edit, single out, structure, highlight, group, pair, merge, harmonize, synthesize, focus, organize, condense, reduce, boil down, choose, categorize, catalog, classify, list, abstract, scan, look into, idealize, isolate, discriminate, distinguish, screen, pigeonhole, pick over, sort, integrate, blend, inspect, filter, lump, skip, smooth, chunk, average, approximate, cluster, aggregate, outline, summarize, itemize, review, dip into, flip through, browse, glance into, leaf through, skim, refine, enumerate, glean, synthesize, winnow the wheat from the chaff and separate the sheep from the goats.

2.1.1.1 First subsubsection

The Earth, as a habitat for animal life, is in old age and has a fatal illness. Several, in fact. It would be happening whether humans had ever evolved or not. But our presence is like the effect of an old-age patient who smokes many packs of cigarettes per day — and we humans are the cigarettes.

2.1.1.2 Second subsubsection

Imagine trying to live in a world dominated by dihydrogen oxide, a compound that has no taste or smell and is so viable in its properties that it is generally benign but at other times swiftly lethal. Depending on its state, it can scald you or freeze you. In the presence of certain organic molecules it can form carbonic acids so nasty that they can strip the leaves from trees and eat the faces off statuary. In bulk, when agitated, it can strike with a fury that no human edifice could withstand. Even for those who have learned to live with it, it is often murderous substance. We call it water.

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If [in 2600] you stacked all the new books being published next to each other, you would have to move at ninety miles an hour just to keep up with the end of the line. Of course, by 2600 new artistic and scientific work will come in electronic forms, rather than as physical books and paper. Nevertheless, if the exponential growth continued, there would be ten papers a second in my kind of theoretical physics, and no time to read them.

CHAPTER 3

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CHAPTER 4

4.1 _____

4.1.1 _____

[REDACTED]

4.1.1.1 [REDACTED]

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4.1.1.2 [REDACTED]

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4.2 [REDACTED]

[REDACTED]

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4.2.1 [REDACTED]

1. **Introduction:** The purpose of this report is to analyze the financial performance of the company over the last quarter, focusing on revenue growth, profit margins, and operational efficiency.

2. **Executive Summary:** The company has achieved a 15% increase in revenue compared to the previous quarter, driven by strong performance in the North American market. However, profit margins have slightly declined due to increased operational costs.

3. **Financial Performance:**

- Revenue:** Total revenue for the quarter was \$1,250,000, representing a 15% increase from the previous quarter's \$1,080,000.
- Profit:** Net profit for the quarter was \$300,000, a decrease from the previous quarter's \$320,000.
- Operating Expenses:** Operating expenses increased by 8% to \$950,000, primarily due to higher marketing and R&D costs.

4. **Market Analysis:** The North American market continues to show strong growth potential, with a projected 10% increase in demand for our core products. The European market remains stable but faces increased competition.

5. **Conclusion:** While revenue growth is positive, the decline in profit margins indicates a need for cost optimization. The company should focus on improving operational efficiency and exploring new market opportunities to sustain long-term growth.

Table 4.1

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APPENDIX A

SAMPLE APPENDIX

APPENDIX B

ANOTHER APPENDIX

APPENDIX C

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