What this talk is not ...

Sunday in the park with George ...

... but it could be ...

Adapted from “A Sunday Afternoon on the Island of La Grande Jatte” by Georges Seurat
What this talk is not ... 

Adapted from Curious George by Margret and H.A. Rey
What we're really talking about

Working with George

Dan Lopresti

Computer Science & Engineering
Lehigh University
Bethlehem, PA, USA

Troy, NY, December 19, 2008
What's the connection?

- Not a former student.
- Never employed by the same institution.
- Just a lucky bystander?
Serendipity

serendipity (sərən dəpˈɪtɪ) — n
the faculty of making fortunate discoveries by accident


1994 = ancient history!
Papers with George I


Robin Li, a student who worked with us, is now billionaire founder of Baidu.


The Rise of Baidu (That’s Chinese for Google)

Robin Li, center, signing the action before the Nasdaq opening bell in New York on Aug. 5, 2005, Baidu’s first day on Nasdaq stock exchange.

RobinLi, center, signing the action during the closing of Nasdaq trading in New York on Aug. 5, 2005, Baidu’s first day as a listed stock.

Yahoo! Dir. General Corp. Ra, George Lopresti and Man Quanuan.

Validation of Image Defect Models for Optical Character Recognition

Yan Hong Li, Daniel C. C. O'Sullivan, George Lopresti and Steven C. H. Hoi.

Abstract: In this paper, we consider the problem of evaluating character image generation models that model distortion using optical character recognition (OCR). We test a number of such models, comparing the generated images with the original. To determine the reliability of the model, we use a dataset of 1000 images, each containing a single character. We use two metrics to assess the quality of the generated images:

1. Introduction

2. Methods

3. Results

4. Discussion

5. Conclusion

Yan Hong Li received the B.S. in information science from Peking University in 1991 and the M.S. and the Ph.D. in computer science from the State University of New York at Buffalo in 1993. Since 1994, he has been a senior software engineer at GARI Software, IBM Information Services. From 1992 to 1994, he was a research assistant at the Center for Document Analysis and Recognition (CEDAR) at SUNY Buffalo. In the summer of 1993, he did an internship at Mathematical Information Technology Laboratory in Princeton, N.J. His research interests include document analysis, information retrieval, text compression, and financial information routing.

Daniel Lopresti received the B.A. degree in mathematics and engineering from Dartmouth College in 1982 and the Ph.D. degree in computer science from Princeton University in 1986. From 1986 until 1991, he was on the faculty of the Department of Computer Science at Brown University. In 1991 he joined the newly formed Mitsubishi Information Technology Laboratory as a senior scientist and leader of the Cognitive Research. His research interests include pattern matching and recognition, parallel VLSI architectures, and computational aspects of molecular biology.

George Nagy received the B.Eng. and M.Eng. degrees from McGill University and the Ph.D. degree in electrical engineering from Cornell University in 1982.

June 18, 2011 Slide 7
Papers with George II


Papers with George III


Papers with George IV


Papers with George V


- “When is a Problem Solved?,” D. Lopresti and G. Nagy, to be presented at the *Eleventh International Conference on Document Analysis and Recognition (ICDAR 2011)*, September 2011, Beijing, China.

“Defect Models are Important to Advance the State-of-the-Art of Optical Character Recognition”

April 1996
Las Vegas, NV

For:
- Henry Baird
- Bob Haralick

Against:
- Dan Lopresti
- George Nagy

Now available on video!
Decades of Influence

George Nagy graduated Physics (fencing and solving Euler’s Second) awarded the PhD at C. Rosenblatt build Tob network for speech recognition. Nagy claims credit for IBM’s reverse sabbatical at the trains from cats’ media. Department of Computer where he dabbled in 1985 he has been Prof. Troy, NY. Nagy’s credits in document analysis include Casey, “self-corrective” character recognition with years later with Henry Baird), character recognition.

* Slides available on the DAS 2010 website.

Keynote talk on datasets by George Nagy at DAS 2010 ...

Data Sets advertised in IEEE Computer

January 1972 (6 data sets)

PATTERN RECOGNITION DATA BASES AVAILABLE

April 1976 (10 data sets)
A really good bad idea?

Training Humans to Read Like Machines
(or, The Lazy Researcher's Approach to Perfect OCR)

Dan Lopresti and George Nagy (if he agrees)

- For decades, document analysis researchers have labored with tremendous effort and unbridled enthusiasm in desperate attempts to raise accuracy rates for optical character recognition to 100%.

- Success has proved to be elusive for all but the cleanest of documents typeset using standard fonts, i.e., boring cases that present absolutely no challenge and that even a moderately-talented trained monkey could handle with one paw tied behind its back.
A really bad good idea?

- Tired of seeing the field perpetuate this exercise in futility, in this work we propose a novel, radical, earth-shaking, ground-breaking, revolutionary, radical idea.
- We posit that if it is too hard to solve the problem, it is always possible to change the problem and thereby make it easier to solve.
- Our thesis is that if we train humans to read like machines - to make all of the same mistakes that our current computer algorithms make when processing a typical page image - we will instantly achieve 100% OCR accuracy with no additional research effort required.
Support to back up our claims

- We are quite certain this is feasible because humans are typically very smart and infinitely adaptable - making mistakes comes naturally to our species.
Proof? We don’t need no proof.

- Instead, we shall conduct a brief but revealing demonstration using this classic tome:
The task: read like a machine

2.1

Man-Made

Bitmap -> Correct result

Man-Made
Han-Hade
Man-Made
Han-Made

OCR outputs
The task: read like a machine

What would a machine output for this bitmap?
(A) Unnamed Mineral
(B) I think that I shall never see ...
(C) Unnamed Mineral  Correct answer
The task: read like a machine

What would a machine output for this bitmap?

(B) Holt (1984).  
(C) ... a poem as lovely as a tree,

Correct answer: (B) Holt (1984).
The task: read like a machine

McGovern

What would a machine output for this bitmap?

(A) A penny saved is a penny earned.
(B) McGovern
(C) McGovem  Correct answer
The task: read like a machine

What would a machine output for this bitmap?
(A) Imaging Experts
(B) A stitch in time saves nine.
(C) Iiiij~in~ L\1)(4~  Correct answer
The task: read like a machine

Great Lakes

What would a machine output for this bitmap?

(A) May you live in interesting times.
(B) Grear Lakes
(C) Great Lakes

Correct answer
The task: read like a machine

What would a machine output for this bitmap?
(A) 4.300 residents
(B) 4,300 residents
(C) A miss is as good as a mile.

Correct answer: (A) 4.300 residents
The task: read like a machine

I have learned

What would a machine output for this bitmap?

(A) I have learned  Correct answer
(B) I have learned
(C) What, me worry?
The task: read like a machine

just like them

What would a machine output for this bitmap?
(A) just like them
(B) justlike them  Correct answer
(C) A rolling stone gathers no moss.
The task: read like a machine

Do you think you could learn to make the same mistakes a machine would make?

(A) Yes, I already make those same mistakes.
(B) Yes, I’m smarter than a dumb machine.
(C) Yes, anything you say, just stop talking!

Voilà!

Perfect OCR!!!
(or “Perfect OCR!!!”)
A final Haiku

Farewell RPI
George Nagy is retired
He is all ours now

Congratulations and best wishes, George and Jill, for a long, healthy, enjoyable, fulfilling retirement!