## Computational Medical Diagnosis

John Foley

10 April 2014

## Abstract

Computers are increasingly being used in the medical industry. They are used to provide structure and efficiency to record management and patient organization to both hospitals and medical labs, but the intelligence and efficiency of computers is also advanced enough to be able to analyse massive quantities of information and produce intelligent, reasonable conclusions. Of course in the context of diagnosis and medication, the data can consist of human medical records and genetic sequencing of genetic material and conclusions be diagnoses and care planning. Analysis of this information is currently conducted by one or more highly trained doctors or medical experts. The cost of these trained professionals is relatively high compared to the time it takes to perform the analysis per patient. Using computers, with advanced algorithm and high level cognitive science research, we are able to replicate the team of specialists and come to the same results in significantly less time and hard work, freeing those professionals to be able to perform harder problems.

## 1 Introduction

- 2 Computer Aided Medical Tools
- 2.1 Improved Imaging Analysis
- 3 Genetic Problem Solving
- 3.1 Quicker, Efficient Analysis
- 3.2 Solving Problems
- 4 Doctor Oversight
- 4.1 Linguistic Expression
- 4.2 Diagnostic Correctness

## References

- [1] G. O. Barnett. History of the development of medical information systems at the laboratory of computer science at massachusetts general hospital. In *Proceedings of ACM Conference on History of Medical Informatics*, HMI '87, pages 43–49, New York, NY, USA, 1987. ACM.
- [2] Wilson McCoy, Jeff B. Pelz, Cecilia Ovesdotter Alm, Pengcheng Shi, Cara Calvelli, and Anne Haake. Linking uncertainty in physicians' narratives to diagnostic correctness. In *Proceedings of the Workshop on Extra-Propositional Aspects of Meaning in Computational Linguistics*, ExProM '12, pages 19–27, Stroudsburg, PA, USA, 2012. Association for Computational Linguistics.
- [3] Lipo Wang, Feng Chu, and Wei Xie. Accurate cancer classification using expressions of very few genes. *IEEE/ACM Trans. Comput. Biol. Bioinformatics*, 4(1):40–53, January 2007.
- [4] Kathryn Womack, Wilson McCoy, Cecilia Ovesdotter Alm, Cara Calvelli, Jeff B. Pelz, Pengcheng Shi, and Anne Haake. Disfluencies as extra-propositional indicators of cognitive processing. In *Proceedings of the Workshop on Extra-Propositional Aspects of Meaning in Computational Linguistics*, ExProM '12, pages 1–9, Stroudsburg, PA, USA, 2012. Association for Computational Linguistics.

[5] F. Zhang, A. Bilas, A. Dhanantwari, K. N. Plataniotis, R. Abiprojo, and S. Stergiopoulos. Parallelization and performance of 3d ultrasound imaging beamforming algorithms on modern clusters. In *Proceedings of the 16th International Conference on Supercomputing*, ICS '02, pages 294–304, New York, NY, USA, 2002. ACM.