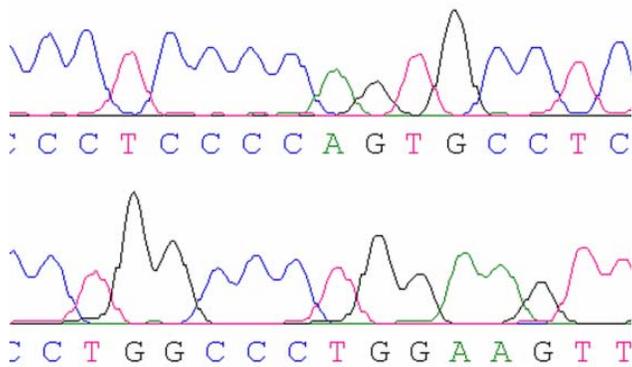


Genotype Pattern Recognition and Classification



DESCRIPTION

The field of molecular genetics has enjoyed a period of rapid improvement in data collection technologies as well as a decrease in data storage costs; however the ability to interpret such data to inform patient care has not kept pace. An entire genome can be sequenced in less than a day for around \$1,000, however manual interpretation by experienced scientists can cost hundreds of thousands of dollars for a single genome and is extremely time consuming, prohibiting high-throughput genotyping. Several approaches have attempted to automate genotyping, however reduction

of background chemical and electrical noise tend to reduce the viability of the true "signal" patterns. Various techniques have been proposed to avoid this problem; however these typically involve looking at more specific markers and therefore limit the scope of complexity and usefulness.

City of Hope has developed a technique that reduces noise and simplifies the data without sacrificing important features of the pattern. By using a transformation (ex. Fourier transform) the nucleic acid sequence data can be converted into a set of frequencies. The coefficients of these frequencies comprise a much smaller volume of data which can be efficiently mined using various pattern recognition techniques (ex. artificial neural network, classification tree/rule induction algorithm) to categorize and identify genotypes. This sequencing method has potential to significantly reduce the cost of analysis associated with genome sequencing. Driven by personalized medicine and a growing interest in personal genomics, demand for bioinformatics technology continues to increase. \$2.4 billion was spent on bioinformatics in 2011 with a predicted 25% compound annual growth rate over the next several years.

KEY ASPECTS

- Method for accurate automated genotyping
- Uses mathematical transformations to reduce noise and reduce the volume of data without sacrificing information for pattern recognition
- Applications in personalized medicine and personal genomics services

INTELLECTUAL PROPERTY

Title	US Patent Number	Issued
Genotype Pattern Recognition and Classification	6,950,755	9/27/2005

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