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Research Topic

Optimization of Kidney donor matching

Research Problem

How speed up the process of kidney donor matching using optimization aided with computer science techniques?

Problem Statement

Given an extended list of potential donors, construct a list of matching donors and recipient.

A potential donor is a person that is willing to donate a healthy kidney.

A matching a recipient is a person that is interested in receiving a kidney and has a sponsor (potential donor) who is willing to donate a kidney, not necessarily compatible, but is willing to exchange it for one that will be compatible with the recipient.

Problem Statement

Optimization problems are hard, especially when you look for optimal solutions on a case by case. However with the aid of Algorithms, Combinatorics and Optimization Dr. Blum is approach problems kidney donor exchange gathering pool of potential donor with recipient with minimal relocation and exchanges.

Computer Science Perspective

Computer science comes in to play as a tool to facilitate a very complex, time consuming task. The problem is well understood but the current procedure is not practical in terms of resources and effort. With novel applications of graph and game theory, an attempt is made to make this problem manageable and practical.

Disciplines actively involved

- Medicine
- Operation Research

Description of Disciplines Involved

For the kidney problem, medical doctors are involved at all times. Medical doctors dictate the premises and constraints of the algorithms to be implemented. While operational research dictate the techniques to employed for resolving the problem.

Stakeholders

Transplant candidates: They are the ones who benefit the most of the matching.

Doctors: They can focus their resources in the actual transplant as opposed of going over massive amount of data (mostly reviewing)

Insurance companies: Since a flow of the algorithm can potentially cause death or expensive procedures, insurance companies must be involved at all times.

Ethical groups: Since this technique has the potential of speeding up the match making this can spun an organ market by cash strap participant willing to “donate” an organ.

References

General Information about the researcher

<http://www.cs.cmu.edu/~avrim/>

General Information about Algorithms, Combinatorics and Optimization

<http://www.cs.cmu.edu/~ACO/>

Info about the traffic problem

<http://www.cs.cmu.edu/afs/cs.cmu.edu/project/aco/www/fac.html#AB>

Info About the Kidney Donation/Exchange problem

<http://news.cs.cmu.edu/Releases/demo/292.html>

By: Guillermo Marinero

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