GPS Paper

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In the 1961 paper *GPS, A Program that Simulates Human Thought*, authors A. Newell and P. Simon introduce the their General Problem Solver, or GPS, attempts to solve problems in the way that humans would solve them. The program organizes information about a task into three types of goals:

- Transform A into B
- Find the difference D between A and B
- Apply an operator Q to A

A GPS program achieves it's end goal by applying many subgoals. This is a recursive process. By finding working down the tree of subgoals one can expect to eventually reach an end goal if the problem is solvable.

Remarks

Overall this was an interesting paper. I found their formalism for problem solving a unique idea that seems widely applicable. One thing that I found helpful is the comparison they made between the inner workings of GPS and how the engineering student solved the problem in section 6. This helped give a clear indication that the student and the program were operating under similar principles.

The authors of this paper seem to lean heavily into the philosophical implications of their program. While this in and of itself is not a bad thing, I believe the authors here pushed this a little bit too far. The authors claim that their program can help give insight into how humans think, often mentioning Behaviorism or the Gestald movement in psychology. I'm not going to claim that I know anything about these two ideas, but I will say that one program *appearing* to mimic a human thought process on one very specific and very well formalized problem should not "finally reveal with great clarity that the free behavior of a reasonably intelligent human can be understood as the product of a complex but finite and determinate set of laws." This claim seems to me a little lofty. While this technique is interesting and exciting, I would be sceptical that it could be used to solve some less than well defined problems that are all over psychology.

Overall, while I feel mixed about weather I liked or disliked this paper, I can still find many inspirations with it. One thing that I have been researching a little bit on my own has been theorem proving software like the Lean programming language. While I haven't looked much into their inner workings, I would assume they use an advanced version of GPS. GPS's principles seem so widely applicable to many problems that I'm actually surprised I haven't learned about it before this course. I'm excited to learn about how this technique has shaped with time.