

THE WORLD IS BECOMING A MESS.
SO WHAT SHOULD WE DO ABOUT IT?

Donald V Steward
steward@problematics.com

The world is becoming increasingly chaotic because the increases in our technologies have made the world highly interconnected. The consequences of our actions are less predictable and more momentous. So tolerance for failure is shrinking. But our abilities to deal with complex problems have not increased commensurately. This can lead to our demise.

What we seem to be doing when we are unable to solve problems is to use oversimplifications and myths. Congressional gridlock and the use of threat and blame rather than negotiations is just a symptom of things to come. So what can we do?

We are generally good at collecting the dots to define complex problems. But we are atrocious at doing the logic to connect the dots so we can understand what they mean and thus be able to solve these complex problems. We could not solve these problems before, but we can now with the help of a computer program, the Explainer, that will do the logic for us. So why don't we use it to solve the serious social problems we are facing today?

It is generally believed today that anyone's opinion is as good as anyone else's. So when we can solve problems using information, relations, and logic, people accept it as just another offhand opinion. Logic and the scientific method seem to be in disrepute these days. Although scientists have been looking at and analyzing the evidence for global warming for many years and have come to general agreement, many people only consider the scientists' conclusion as just another opinion. If the scientists' conclusion is correct, and it undoubtedly is, we are facing a disaster with no attempt being made today to plan to do anything about it. People find that the short term is important, but the long term can simply be ignored. So the deficit is a short-term problem that needs to be considered now. But there is no need to worry about the future. It can just be canceled.

The Explainer helps people with various knowledges to collaborate to describe a situation from which a particular behavior can arise. And then it will find an explanation for that behavior within the scope of its knowledge.

Many types of problems can be stated and resolved in this form. The knowledge takes the form of a collection of cause-and-effect statements. The behavior is an effect. The explanation is a function of assumptions. Facts are included as a type of assumption.

Think about how a physician diagnoses a patient's symptoms. He first thinks of all the possible causes that would explain those symptoms. Then he looks at each of the proposed explanations and asks what other symptoms would also occur if that were the explanation. He makes observations or calls for tests to determine whether those other predicted symptoms also occur. If not, he rules out that

explanation. A good explanation must account for the patient's symptoms, but not predict other symptoms that the patient does not have. The Explainer works in much the same way, but it uses a computer program to extend these capabilities to handle problems that are much larger and more complex.

The Explainer uses cause-and-effect statements as the knowledge of the situation from which that behavior can arise. It uses logical abduction to find all the plausible explanations within the scope of that knowledge, and uses logical deduction to determine what behaviors each of these explanations would predict.

Let us propose that a panel of doctors whose role is to keep up with the latest medical literature maintains an up-to-date cause-and-effect medical knowledge base. Physicians could subscribe to this knowledge base so that their diagnoses are based on the latest literature, even though they have not had the time to read all the latest literature themselves. If the physician can show that he used this up to date knowledge base, it would support his case in a malpractice suit. And of course, it would improve the practice of medicine.

The Explainer works together with people through several steps. The knowledge is in the form of a collection of cause-and-effect statements. The first step is the collection of the knowledge either developed anew by the collaboration of various knowledgeable people with perhaps different perspectives, or use knowledge previously developed by others, possibly after making modifications. Over time, a library of cause-and-effect knowledges would be developed covering many different topics.

In the second step, someone chooses a behavior to be explained. Then the Explainer, by a logical process called abduction, finds all the plausible explanations that lay within the scope of that knowledge. In the third step, the explainer looks at each of these plausible explanations and uses the logical processes called deduction to find all the behaviors that that explanation would predict. The user must consider whether each predicted behavior actually occurs and chose an explanation that predicts the behavior to be explained, but does not also predict behaviors that do not occur.

The explanations to be offered by the Explainer are only as good as the cause-and-effect knowledge that has been used. So it is necessary for the Explainer to be able to provide a scenario showing the step-by-step processes it used to come to its conclusions. This scenario should be critiqued so that any deficiencies in the cause-and-effect knowledge can be found and resolved. Through this process, the knowledge will be constantly improved.

Many types of problems can be described as finding the explanations for given behaviors. It can be used for medical diagnosis, as explained above. And it can be used to find faults in other types of systems such as mechanical systems or production processes.

The Explainer can be used to explain what might have happened in the past such as developing an explanation for what occurred leading up to the commission of a crime in order to identify who

committed the crime. Or it can be used for developing explanations for historical events occurred, or understanding how a past civilization lived as revealed by archaeological evidence.

As well as explaining behaviors, it can also find the actions that would produce a desired behavior by finding the assumptions that would explain that behavior, and then turning those assumptions into actions to produce that behavior. This approach can be used to make plans where the cause-and-effect statements are plausible steps that can be used in the plan. It can also be used to design something by using cause-and-effect statements to describe each of the likely complements, and then ask the Explainer to use this knowledge about the components to explain the requirement specifications for the design.

It is great fun to think of all the things that the Explainer might be able to do. One particularly interesting idea that has yet to be investigated is the notion of using the Explainer to produce a Brainer. A Brainer would use the Explainer and its sensors to look for combinations of events in its environment that might be cause-and-effects. It would consider as cause-and-effects events that occur within a reasonable time-period and always in the same order. It would add these to its knowledge base as provisional cause-and-effect statements. Using actuators and its cause-and-effect knowledge, the Brainer could conduct experiments on its environment to determine whether its provisional cause-and-effect statements are likely to be valid. It could also conduct experiments to improve its knowledge, or to learn how to realize its needs.

I have developed a preliminary Explainer program with which I have been able to find the likely causes of and possible solutions for such complex problems as the economic crisis and widening wealth gap. Once one can find the causes of a situation, then it is more likely that one may be able to find how that situation could be changed.

Let's look further at the economic crisis and widening wealth gap problem. In solving this problem, I was quite amazed to see how complex it was. Ordinarily I would assume that people could deal with perhaps five simultaneous interrelated aspects of a problem at a time and perhaps at most two levels of logic. But I found that understanding and proposing solutions to this problem required dealing with over 30 different interrelated aspects and nearly 20 levels of logical reasoning. This is beyond people's capabilities if not aided by a computer. And prior to now, we did not have a computer program that could do this. It is easy to understand now why we have been so miserable at solving many of our vital social problems.

If my cause-and-effect statements describing the economic situation are reasonably correct, it traces the causes of the economic crisis and widening wealth gap back to two probable causes. Both causes may be occurring. And knowing the causes, we may be able to see solutions.

The first probable cause found by the Explainer is the hiding of information in economic transactions. When a lender can hide from the borrower what the borrower needs to know in order to understand his own self-interests, the lender can take advantage of the borrower. This happened in the

case of negotiating subprime mortgages. It happened again when these bad subprime mortgages were bundled with other mortgages and the bundles were sold to unwitting investors as investments that were highly rated by the rating agencies. This should not be a surprise as the rating agencies earn their money by serving the lenders.

This suggests that we look at Adam Smith's conclusions in his book *The Wealth of Nations* published in 1776. His work has become the foundation of the capitalist system. He stated that if each person were to act in his own self-interests, this would result in an efficient allocation of resources and each member of the economy would benefit to the extent of his contributions to the economy. But the assumption that is frequently overlooked is that each party to a financial transaction must first have the knowledge he needs to understand his own self-interests.

The second probable cause found by the Explainer may be automation. When tasks can be automated, jobs can be lost and the money that would otherwise be paid to the employees can be invested in new businesses. But it appears that in fact as of this date, this money has not been invested, but held out of the market. When investments cannot be made to create new businesses, and existing businesses cannot expand or borrow to develop their inventory, these businesses do not contribute to the economy and do not create jobs.

For this problem, I developed the cause-and-effect statements from my own knowledge. A much better understanding of the causes of the problem may be gained when people who are more knowledgeable than I collaborate in producing better cause-and-effect statements. But even my attempt suggests some causes to consider.

I have been developing the Explainer method and the preliminary Explainer computer program over a period of the last 20 years. But when I try to show people the conclusions that are reached using the Explainer, people consider it to be no better than anyone else's opinion. They will not look at how the conclusions were developed and why they might be better than just someone's offhand opinion.

The explainer could be used to develop a social network that people could use to discuss the complex problems of today and propose solutions to those who have the capability of implementing them. In many cases, this may be the government. Or it might be groups of people working together for a common purpose.

Recently we have seen many demonstrations by people who are complaining about a situation that they wish to see changed. The demonstrations may express their frustrations. But the demonstrators may have no idea what caused the situation and how to change it. Without understanding the cause of the situation and how it might be changed, the demonstrators may just be letting off steam while doing nothing to help change the situation. In the meanwhile, those who profit from the economic crisis and widening wealth gap at our expense will continue to profit and we will continue to be taken advantage of.

My current program can find explanations for behaviors provided there are no circuits in the cause-and-effects. I have developed the method for handling cause-and-effect circuits, but have not yet implemented it into the program. But in the meanwhile, I have been able to solve problems containing circuits by supplementing the program with some hand manipulations. The economic crisis and widening wealth problem contains many cause-and-effect circuits. Circuits can be very important to understanding and solving complex problems. One breakthrough in the Explainer method is to be able to handle circuits. I am unaware of any other techniques such as rule-based expert systems or anything else that can handle circuits.

I very much want some help to complete the program and see that it is implemented as a social network whereby people can discuss complex problems of the day and propose solutions to those who might be capable of implementing their solutions.

Such a social network could produce income for the developer by selling the time during which the Explainer is being used. There would also be a market in buying and selling knowledge bases that some people develop that other people could use to solve their own problems.

At the rate at which the world is becoming more chaotic and dysfunctional, time is of the essence.