

How does computer science fit in the traditional view of science?

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Computer science has gone from being the study of the phenomena surrounding the computer to being the study of information processes and learning systems. The term computer science is like saying biology is microscope science or that astronomy is telescope science. Computation is the principle; the computer is simply the tool [1]. The term computer science is in need of a major update. How should we define it?

If we consider the interplay of science, engineering and mathematics [2] in which science provides usage context for mathematics and fundamental mechanism to engineering, computer science does fulfil these criteria. There is an argument that computer science is not a natural science, the reason being that it studies something artificial and can therefore only be an artificial science. This argument states that computer scientist study computers. Although computer scientist study information processes which can occur artificially; economist see economic systems as large complex information systems [2]. Physicists and biologists declare that information processes occur naturally in their fields [3]. Which would make computer science a natural science. It is not enough to say that computer science study natural phenomena. To decide we need to define what constitutes a science. This however is not completely clear. There are criteria for a natural science such as there should exist an organized body of knowledge, the use of a scientific method and Karl Poppers falsification theory; a tolerance to the falsification of a hypothesis. Computer science does fulfil these criteria. To understand information processes, computer scientists must observe phenomena, formulate explanations, and test them. This is the scientific method [4]. Science is continuously pushing the limits of what is possible in computing, and in some areas is leading computational advances. Scientific computing platforms and infrastructures are making possible new kinds of experiments that would have been impossible to conduct only 10 years ago, changing the way scientists do science [3]. This poses the question if computer science needs to be a science on its own

or if it should be an overlay on top of the interplay. Looking at the engineering and mathematics parts in the interplay computer science plays these roles as well. Computer science has shifted to become something embedded into every fibre of science and engineering. With this shift Stephen Emmott suggests distinguishing computer science from computing [3].

The same way the advancement of biology, chemistry, physics and astronomy have made it clear how they are increasingly intertwined so has computation with the natural sciences. The question no longer seems to be if computer science is a science it is rather what perspective we should be looking at computation from. How we should organize all the embedded aspects of computer science in mathematics, science and engineering. Perhaps computation is a science and programming, modelling and testing is engineering. Creating a new language for discussing computing with a framework and principles so that computation can be called a science in its own right.

References

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