

The Role of Sketch Recognition in Engineering Education: Applications and Challenges

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Abstract

Sketch recognition is the automatic understanding of hand-drawn diagrams sketched through electronic mediums such as Tablet PCs or Smart Boards. In design, recognition algorithms and tools have been used to automatically generate computer-aided design (CAD) models from hand-drawn, conceptual sketches. However, sketch recognition also lends itself to the field of education, especially in engineering domains. Hand-sketched diagrams aid in student learning and promote the creative process. Although having students draw diagrams to demonstrate knowledge of a concept is important, diagramming is typically omitted from the examination process as sketched diagrams take a significant time to grade. Because sketch recognition aims to automatically understand these hand-drawn diagrams, we are able to create tools that allow diagrams to be drawn and assessed in order to give immediate feedback to student and professor alike. In this talk, we will present our ongoing research and demonstrate some of the tools we have developed in the field of sketch recognition. In particular, we will discuss domains where sketch recognition can be used to aid in the educational process. Such domains include finite state machines and UML diagrams for computer science, circuit diagrams for electrical engineering, truss solving and recognition for civil engineering, physics simulations for mechanical engineering, and many others. We will also discuss some of the obstacles and challenges facing sketch recognition researchers, and give some insight into the future role and direction of sketch recognition in engineering education.