Learning About Creativity from an Artificial Artist

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INTRODUCTION

Despite many philosophical debates and academic treatises, there is still no concrete definition of creativity. Yet society continually attributes creativity to individuals and attempts to foster it. Some feel that creativity, by its very nature, cannot be reproduced in a computer program. Why is this the case? What are the attributes of creativity that cannot be replicated in a program? We don't attempt to dispute the claims that creativity cannot be simulated, but we do argue that by trying to do so, we can learn much about what it means to be creative while advancing the capabilities of artificial intelligence.

We outline an original computer system designed to produce images that are not only perceived by humans as creative products, but that are also produced through arguably creative processes. Additionally, the system will be able to communicate the intention behind its works, thus demonstrating a level of awareness that we feel is an important part of creativity. We hope that this system will be useable in a variety of research related to both human and artificial creativity. Since all good virtual artists need a catchy name, we call ours DARCI (Digital ARtist Communicating Intention).

PROCESS AND PRODUCT

DARCI will create artefacts by rendering images, in a manner that reflects an accompanying series of descriptive words, using Non-Photorealistic Rendering (NPR) filters. This is analogous to an artist painting an existing subject using a particular style and set of materials. We will evaluate the creativity of DARCI's creation process based on three conditions outlined by Simon Colton: *skill*, *appreciation*, and *imagination* [1]. We will also evaluate the creativity of these artefacts, independent of the creation process, using a list of 18 criteria outlined by Graeme Ritchie [2].

DARCI will learn associations between image features and myriad descriptive words through human interaction. This interaction will consist of user labeled images in conjunction with user requests for artefacts. Learning how to select and apply the filters used to create these artefacts will be a separate learning task dependent upon DARCI's evaluation of her own work—*appreciation*. Her value attribution will be based on an aesthetic measure of her work, a score of originality (according to what she has both seen and produced), and an evaluation of how accurately the artefact reflects the accompanying description. Because the processes of learning both associations and rendering techniques are interrelated, unpredictable behavior will likely emerge despite human involvement—*imagination*. Conveniently, this same human involvement will help ensure meaningful artefacts are produced—*skill*.

Whether or not DARCI is in fact creative, she may appear creative if able to communicate the intention behind each artefact she creates. The descriptions that drive DARCI's creation process essentially represent this intent. At first these descriptions will be provided by users; thus, they will more accurately characterize the intention of the user. Once DARCI has developed to a certain point however, she will provide the descriptions that accompany an image. DARCI will then be communicating her own intention.

ABOUT THE AUTHOR

David recently received a Master's Degree from Brigham Young University. His thesis was titled *Improving Liquid State Machines Through Iterative Refinement of the Reservoir*. It explores a fairly new neural networks model, the Liquid State Machine. Prior to his Master's Degree, he received Bachelor Degrees in Computer Science and Zoology.

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