Aesthetic Creation and Operator Inversion

Dr. Richard Schubert[1], Berlin-3D-Art.de / Factory

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Many artistic processes include the transformation of a given object into a kind of image. The artist may work e.g. on an object in the real world and create an artwork out of it, amplifying, exaggerating, distorting some aspects, neglecting, minimizing or smoothing others. One kind of art where this interpretation particularly well applies is photography. A real world object or scene is transformed into a flat two-dimensional image. The artistic expression resides on the one hand in choosing the object/scene and on the other in selecting the appropriate parameters, as exposure, aperture, position and orientation of the camera ... . Over many years the author worked with a process for taking 3D multi-view images of small objects by means of a flatbed scanner he invented and had patented (DE9819992) many years ago and which turned out to be a specific tool for creating aesthetic 3D images[2] besides its specific application in biological research[3]. By its specificity the procedure does not have many parameters for adjustment. So, the creative process consists mainly in looking for appropriate objects and arranging them in a particular way.

In a somewhat more abstract manner this 3D-scanning process can be represented by the scanning **operator S**, which transforms the real **3D Object O_{3D}** into a **3D multi-view image I_{mv}.**

S: O_{3D} => I_{mv}

When the intention of the artist is to create aesthetic 3D multi-view images ($I_{mv,ast}$) the process would be to look for objects ($O_{3D, [ast]}$) that give aesthetic images through the operator S, these 3D objects are, however, not necessarily aesthetic by themselves, but they may be. In this sense the aesthetic process can partly be interpreted as the inversion of the imaging operator S. The artist knows the result he/she wants (aesthetic images) and his/her expert knowledge could thus be interpreted as the knowledge of the inversion of that operator: S^{-1}. It is well known in science and technology that the inversion of operators is often much more complicated than the forward calculation, a phenomenon being the basis of current day cryptography for example. For the calculation of the electron density profiles in tokamaks from the microwave raw data, a case where the back calculation (inversion of operator) is also much more complicated than the forward calculation, the author invented e.g. a numerical iteration to get good approximate values[4].

The aim of the workshop contribution is to discuss this interpretation of the creative process on the example of some aesthetic 3D images from the author's collection, the "Gummy Bears" being the most prominent of them. In a somewhat broader sense it could e.g. be discussed whether the possible creation of music or paintings by artificial intelligence could also be interpreted in the framework of a theory relating to operator inversion.