

Portfolio

Dean Zadok

Explorations and Lessons Learned in Building an Autonomous FormulaSAE Car from Simulations

Developing a self-driving algorithm in simulation, followed by deployment on a real car. The environment is Formula Student Driverless competition, in which a formula race car, designed and built by students, is challenged to drive through previously unseen tracks that are marked by traffic cones. The project consists of creation of simulation, usage of simulations to train and validate the software stack and the deployment of the system in real-world.

Joint work with Tom Hirshberg, Amir Biran, Dr. Kira Radinsky and Dr. Ashish Kapoor.

Paper: <https://arxiv.org/abs/1905.05940>

Video: <https://youtu.be/2wHz6Jp8IVk>



Images taken from the simulated environment (bottom) and from real tracks (top).

Publication

Published as a conference paper and won best poster award in SIMULTECH 2019. In addition, the project won the Technion computer science department's annual excellent project competition.

Media and newspapers:

[Mako \(Hebrew\)](#) [Sport5 \(Hebrew\)](#) [Technion \(Hebrew\)](#) [Nvidia \(English\)](#)

Repository

The official code repository for the simulation and for the self-driving algorithm:

<https://github.com/FSTDriverless/AirSim>

The official code repository for the implementation of the software on embedded hardware:

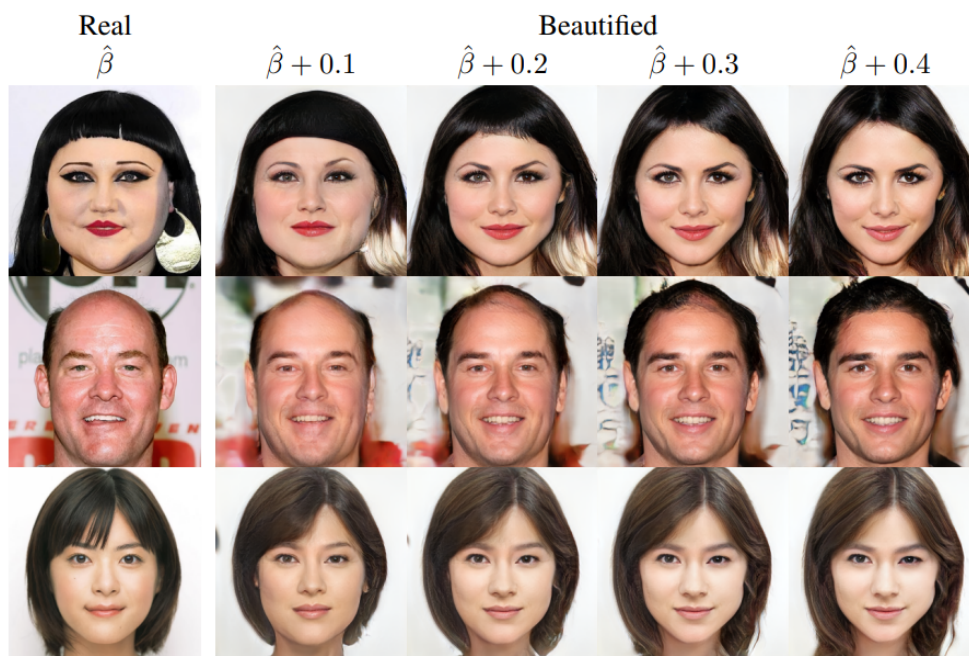
<https://github.com/FSTDriverless/FSTImplementation>

Beholder-GAN: Generation and Beautification of Facial Images with Conditioning on Their Beauty Level

Training a generative model to generate faces conditioned on a requested beauty score, and show how this trained generator can be used to "beautify" an input face image. By doing so, an unsupervised beautification model is proposed, in the sense that it relies on no ground truth target images.

Joint work with Nir Diamant, Chaim Baskin, Eli Schwartz and Prof. Alex Bronstein.

Paper: <https://arxiv.org/abs/1902.02593>



Beautification of real faces - Left column are the input real faces, and to the right are the beautified images with an increasing beauty level.

Publication

Published as a conference paper in ICIP 2019. Won the best undergraduate project award at IMVC 2019 (Israel's annual computer vision conference). Participating in the Technion Computer Science department's 2021 excellent project competition.

Repository

The official code repository for this paper:

<https://github.com/beholdergan/Beholder-GAN>

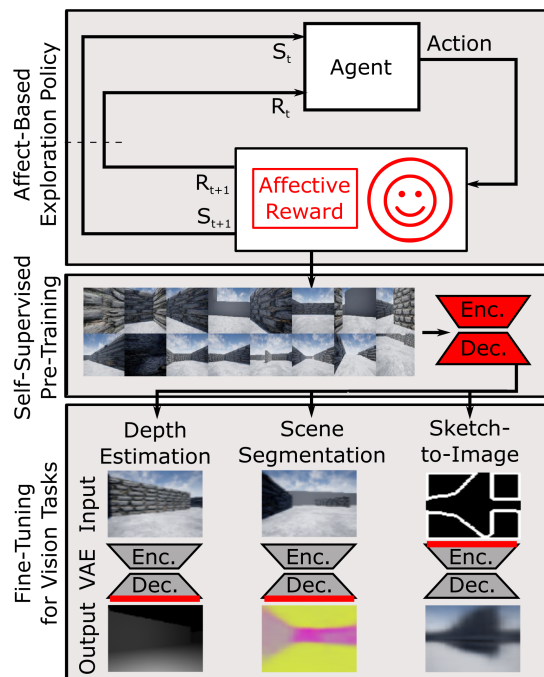
Modeling Affect-based Intrinsic Rewards for Exploration and Learning

This work is on an exploration policy achieved using a proposed reward mechanism. The reward function in this work is trained on spontaneous smile behavior that captures positive affect. We trained several downstream computer vision tasks on data collected with our policy and several baseline methods, and show that the policy based on intrinsic affective rewards successfully increases the duration of episodes, the area explored and reduces collisions.

Joint work with Dr. Daniel McDuff and Dr. Ashish Kapoor.

Paper: <https://arxiv.org/abs/1912.00403>

Video: <https://youtu.be/YNv8CEaOx8I>



We use the policy to collect data for self-supervised pre-training and then use the learned representations for multiple downstream computer vision tasks.

Publication

Published as a conference paper in ICRA 2021. Presented in the Machine Learning for Autonomous Driving workshop in NeurIPS 2020.

Repository

The official code repository for this paper:

<https://github.com/microsoft/affectbased>