Collective Stress Psychology

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Abstract

The environment is a crucial factor, which influences how individuals act regardless of the current subject of study or contextual factors. Group interactions can for example cause increase anxiety, as for humans speaking in public, but this effect can also extend to other animals, for example audience effects in fishes. The social context is a critical component of an organism's environment, and one which may be aversive (for instance audience effects) or appetitive (for instance social buffering) depending on individual, species, or context. Measurement and quantization of stress events means that an effect of social stress is measured in the context of social interactions with other individuals The stress can naturally be measured in a rise in heart and breath rate, which are one of the quantities which gives a chance to quantify the aforementioned stress effects.

1 Objectives

The goal of this project is to develop a universal off-the-shelf package for non-programmers to easily track and analyze repetitive patterns in natural environments.
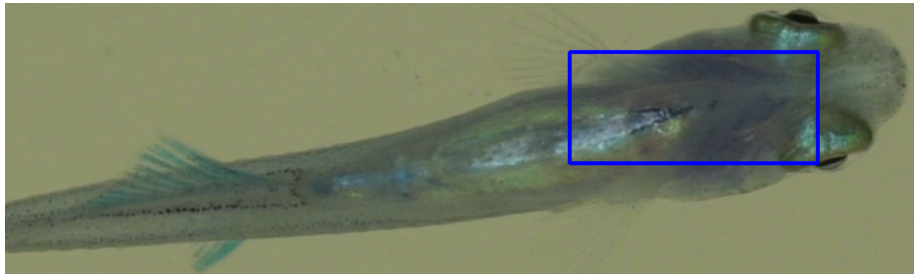

Figure 1: **Tracking of a fish.** A user would select the bounding box around the object of interest and the tool would automatically track the object over time. The entire operation would be done almost exclusively visually.

Most tools focus exclusively only on tracking or behavioral analysis and do not provide an easy-to-use answer to quickly and easily track the object and then analyze the behavioral patterns at the same time. Our goal is to develop a set of tools which provide efficient and easy to use answers for visual tracking and anomaly detection which would require minimal user interaction for individual analyses. The package would provide almost immediate insight into the studied object by providing a projection of the tracked object into a latent space of the auto-encoder and eventually detecting the repetitive patterns like heart and breath rates, see Figure 2 for an example.
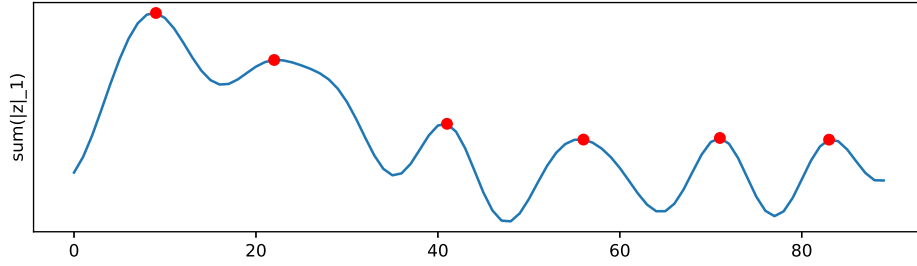

Figure 2: **A visualisation of the latent code of the tracked object over time**. A minimal auto-encoder would train the tracked object appearance. The transformation of the latent space into 2D graph can provide us important clues about for example breath rates of the fish.

Furthermore, we will validate the proposed approach on the real data from by Alex Jordan and provide results to prove the practicality of the proposed tool.

The range of use of the proposed tool is from easy to use individual tracking to the analysis of pose and state of an individual by providing a projection of the object into the intuitive visualization.

2 Funding Scope

We ask for 5000 EUR which would cover costs of development and testing. There are no hardware needs since most of the material is already recorded and the computational part is, due to relatively short video materials, possible to be processed on a standard computer.