

Poster presentation

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## Theoretical derivation of EMOTION-II model for happy and unhappy emotions

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The second of a series of emotional models called "Emotional Model of The Theoretical Interpretation Of Neuro-processing" (EMOTION-II) is derived theoretically to address the emergency of happy and unhappy emotions based on first principles without any *a priori* assumptions about what these emotions are and what they are used for. The model is derived based on the necessary principles essential for the formation of an internal model of the external world by an autonomous system. In the real world, discrepancy between the internal model and external world often occurs. A self-derived measure to indicate the expectancy error of the model is emerged as a result of the internal self-consistency check when comparing the internal model prediction with the representation of the real world. In this EMOTION-II model, the congruency measure between the subjective and objective realities represents the happy emotion labeled by humans, and the discrepancy measure between these two realities represents the unhappy emotion. This model also derived the mechanisms for the emergency of innate target goal state for achieving true happiness based on the absolute difference in forming the expectancy of the ideal goal state based on the indicators provided by the self-derived discrepancy error signals between the internal and external models. The model also establishes the objective criteria in which an organism (or an autonomous robot) may have intrinsic emotions without using any artificial or subjective definitions of emotions either as an introspective label constructed by humans or as an add-on property introduced into a robot. This theoretical model provides the foundation for the emergency of natural emotions in a self-correcting autonomous system to reduce the expect-

ancy errors of the internal model for precise prediction of its interaction with the external world [1].

### References

1. Tam D: **EMOTION-II Model: A Theoretical Framework for Happy Emotion as a Self-Assessment Measure Indicating the Degree-of-Fit (Congruency) between the Expectancy in Subjective and Objective Realities in Autonomous Control Systems.** *The Open Cybernetics & Systemics Journal* 2007, 1:47-60 [<http://dx.doi.org/10.1186/1471-2202-9-S1-P80>].