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| Literatures  - Areas of research:  -> Deep Learning  -> Neural Networks  -> Emotion Recognition  -> Computer-Human Interaction  -> Brain-Computer Interfaces (BCI)  -> Papers related to Computer-Human Interaction and papers about architectures of Neural Networks using multimodal signals  -> Readings:  1 -> Recognition of emotions using multimodal physiological signals and an ensemble deep learning model.  2 -> Physiologically Attentive User Interface for Robot Teleoperation, Real Time Emotional State Estimation and Interface Modification Using Physiology Facial Expressions and Eye Movement  3 -> Amplifying Human Cognition: Bridging the Cognitive Gap between Human and Machine | Observations & Arguments  1  -> Neural Network using Stacked Autoencoders and a Fusion Layer  -> Pros: Good performance compared with best existing emotion classifiers  -> Cons: Subject-specific, needs large sizes of samples, bad performance for extremely Imbalanced data  2  -> User Interface that adapts to the emotional state of the subject  -> Architecture with three layers:  - Emotional State Estimator using SVMs  - Layer for the application of the changes  - Communication to other GUI  -> Pros: Accuracy over 80% for all the conditions tested  -> Cons: Performance can be Improved using Deep Learning Techniques  3  -> Presents the idea that the connection between Human-Machine should be upgraded  -> Machines should be able to get data related to the emotional state of the user and adapt accordingly  -> Pros: Optimization of the cognitive resources  -> Challenges: Complete reformation of traditional software design thinking, find a way to synchronize and process together the data from all the sources, the choice of the best classifier | RQ / Hypotheses  -> Which type of classifier should be used?  -> Best architecture for the classifier?  -> How to obtain the most relevant features from the input signals | | Contributions  -> The research will provide the Machine Learning part of the project that It is inserted in  -> Used upon completion in a medical environment in real cases of rehabilitation processes | Sample / Context  Did not understand well this. Is it the the way I am get samples to train and test my model? |
| Methodology / Design / Methods  -> Obtain the data to use in the training/testing of the classifier that is going to be developed  -> Create the classifier that is the most fitted to handle the type of data used  -> The classifier needs to have good performance measures | |
| Theory & Concepts  -> Deep Learning Techniques; Neural Network Architectures  -> Processing of Electroencephalogram signals | | | |
| Problem / Phenomenon  -> The problem Is the necessity to rehabilitate people that have suffered from limp motion restrictions, due to various medical conditions. The condition that Is the focus on this work Is strokes.  -> The patient rehabilitation takes a lot of resources, both material and human. It would be Important to find a way to decrease the resources needed to execute the rehabilitation task. The cut in the resources results in a cost reduction, as well as lowering the workload of medical staff. | | | Assumptions / Paradigm  -> Research for upper limb motion rehabilitation  -> Using Brain-Computer Interface (BCI) and Hand Tracking sensors  -> Integrated Virtual Reality environment for the rehabilitation  -> Use of Machine Learning for the analysis of the data obtained from the sensors | | |