EMOTIONAL INTELLIGENCE AND THE SOUL: LIMITATIONS TO STRONG AI. *ETHAN WIDEN*, FAULKNER UNIVERSITY.

Limitations in the reach of programming beyond strict logic as well as weaknesses in the current tests used to determine human-level intelligence erect significant barriers to the creation of an artificial human being. For instance, the Turing Test is no longer sufficient because it does not produce a result that indicates a complete lack of intelligence when AI fails it. The test is also lacking because it does not indicate whether AI is fully capable of multifaceted, multifield intelligence. Additionally, the Chinese Room Argument by Searle refashions the question about the fundamental differences between syntax and semantics in such a way that the essential tool of computer science, the digital computer, may be insufficient to build strong AI. The flexible, dynamic nature of human emotion poses another and perhaps greater barrier to machine learning due to the binary nature of digital computations. If AI is intended to solve major human problems like poverty and homelessness, while considering the moral implications of its actions, it must understand itself and maintain an emotional connection with the people it will influence. The emotional capacity of a human and the semantic issues that arise from symbol manipulation detail a need for computer science to retool the way the discipline conceptualizes human cognition.

The next stone to tread on a path toward strong AI taking all these issues into consideration is to narrowly inquire into specific aspects of a human being's mind, body, and soul.

ENGINEERING AND COMPUTER SCIENCE POSTER ABSTRACTS

EOM OF GRAPHENE FOR THE DEVELOPMENT OF A TUNABLE FILTER. *JOHN WISE*, DYLAN MCKELVEY AND RAVI GOLLAPOLLI, UNIVERSITY OF NORTH ALABAMA.

Graphene Oxide consists of a hexagonal ring-based carbon network that has both sp2-hybridized carbon atoms and sp3-hybridized carbon atoms bearing hydroxyl and epoxide functional groups on both sides of the mono-atomic sheet. These groups provide a unique ability to tune the electronic and optical properties of graphene, which finds applications in the development of modulators, color filters, etc. Our study is concerned with both the theoretical understanding and experimental verification of the application of DC or AC signal across a graphene-based cavity to develop an electrically controlled tunable filter. The purpose of the numerical study will help the experiment which will evaluate for the optical modulation characteristics of a mono-atomic layer of graphene on a limited-band collimated light. Numerical results related to this effect and study will be presented.

IMPLEMENTING BELIEF PROPAGATION ON A GPU USING THE MERCATOR FRAMEWORK. *EDGAR FLORES*, SAMFORD UNIVERSITY. JEREMY BUHLER,STEPHEN COLE AND THERON HOWE, WASHINGTON UNIVERSITY IN ST. LOUIS.

This research lays a ground work to apply an irregular application of Loopy Belief Propagation (LBP) on general graphs to be processed on an NVIDA GPU using MERCATOR by first implementing a regular application of LBP on a CPU to solve for stereo vision, and finally, porting the regular application of LBP to an NVIDIA GPU using the MERCATOR framework. MERCATOR is a data streaming framework designed to make GPU programming more feasible, and handle the irregularities of streaming applications for GPU computations.

UNCERTAINTIES IN FITTING FORCE-DISTANCE CURVES FROM ATOMIC FORCE MICROSCOPY. *STEPHEN MORGAN*, UNIVERSITY OF ALABAMA IN HUNTSVILLE. JEFFREY WEIMER, UNIVERSITY OF ALABAMA HUNTSVILLE.

The goal of this project was to reverse-engineer the causes of uncertainty in parameters determined by curve fitting models to experimental data. Atomic force microscopy (AFM) is a powerful tool to measure interaction forces between macroscopic objects that have dimensions on the scale of microns. Data are collected as a function of separation distance and are curve-fit to theoretical or empirical equations. The Hamaker constant A is an unknown fitting parameters characteristic of materials in the objects. The fitting results for A are subject to uncertainty (error) due to noise on the measured raw data. We modeled force-distance curves as might be generated by AFM between a colloidal-size sphere and flat plate with added noise using Monte Carlo simulations. We also varied sphere radius and number of fitted data points. We quantified levels of uncertainty in the various input parameters. The noisy data obtained by

simulations were curve fit with non-linear regression methods to the original model equations (without noise). Trends in the relative uncertainty of A were then analyzed in relation to the uncertainties on the input parameters. Our outcome demonstrates how A is sensitive to uncertainties in the AFM system used to obtain the raw data.