Huong's Research Portfolio

Huong Nguyen

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Huong Nguyen

Website: huong.tech

Education

Leesville Road High *Summa Cum Laude and NC Scholar*, 2017-2021

Research Areas

- Design and visualize data: computational human behaviors, interactive visualization

- Machine learning and information: basic data compression, neural network

Grants and Awards

Awards and Honors

2021 Microsoft Data Compression Conference International, invited author

2020 Rising Scientist Award, exceptional promise in neuroscience and research

2020 Crown Education Challenge STEM Semifinalist

2020 Design Thinking for Teens, 1st place

Publications

Articles in Peer-Reviewed Journals

Nguyen, Huong., Renee Liang, Carina Chiu Human-Centric Video Processing for Reducing Net Latency in Video Streaming *The*

Informaticists, in press.
https://compression.stanford.edu/summer-internships-high-school-students

Nguyen, Huong., Vy Nguyen The Effects of Social Media on Altruism *The Science Squad*, in press. https://issuu.com/thescisquad

Roshan Prabhakar, Shubham Chandak, Carina Chiu, Renee Liang, Huong Nguyen, Kedar Tatwawadi, Tsachy Weissman Reducing latency and bandwidth for video streaming using keypoint extraction and digital puppetry. *Data Compression Conference 2020,* arXiv preprint: https://arxiv.org/abs/2011.03800

Book Chapters

Nguyen, Huong. "Being Invisible" *What is Important To Me?*, Creative Communications, print. Spring 2017

Conference Presentations

Nguyen, Huong., Renee Liang, Carina Chiu. Keypoint-Centric Video Compression for Reducing Net Latency in Video Streaming STEM to SHTEM Program Presentation Conference. Stanford, CA. August 7, 2020.

Nguyen, Huong. Rising Scientist Awards On the Shoulders of Giants Symposium. Hunter CUNY College, Child Mind Institute, NY. October 6, 2020.

Selected Media Coverage

Stanford Electrical Engineering. STEM to SHTEM 2020 Program yields multidisciplinary research, with wealth of insights. Sep 2020.
https://ee.stanford.edu/news/research-news/09-28-2020/stem-shtem-2020-program-yields-multidisciplinary-research-wealth

Updated February 23, 2021

Abstract 1

Keypoint-Centric Video Processing for Reducing Net Latency in Video Streaming

Renee Liang, Huong Nguyen, Carina Chiu
June 20, 2020

Abstract

COVID-19 has made video communications an important mode of information exchange. Consequently, research advancement in this field will contribute to eventual societal normalcy by promoting virtual collaboration while maintaining social-distancing. Currently, there exist problems with the streaming process. Our group focuses on the topic of latencies related to live video conferencing. Specifically, the purpose of our research is to reduce latency in video streams by exploring different configurations of the streaming pipeline and different types of video encoding schema. This research presents an opportunity to examine existing industry-level video communication tools, as well as the technical workings behind image segmentation as it relates to the condensation of a video stream. By extracting key points from the image as they relate to the reconstruction of an animation client-end, we are able to achieve a drastic condensation of transmitted data. Under test conditions it has been proven that this mode of video encoding representation can function at a much lower network bandwidth than the conventional model. Our results, as well as a demo, can be found here: https://github.com/roshanprabhakar/pose-animator/tree/master.

Reducing latency and bandwidth for video streaming using keypoint extraction and digital puppetry

Roshan Prabhakar, Shubham Chandak, Carina Chiu, Renee Liang, Huong Nguyen, Kedar Tatwawadi, Tsachy Weissman

Nov 7 2020

Abstract

COVID-19 has made video communication one of the most important modes of information exchange. While extensive research has been conducted on the optimization of the video streaming pipeline, in particular the development of novel video codecs, further improvement in the video quality and latency is required, especially under poor network conditions. This paper proposes an alternative to the conventional codec through the implementation of a keypoint-centric encoder relying on the transmission of keypoint information from within a video feed. The decoder uses the streamed keypoints to generate a reconstruction preserving the semantic features in the input feed. Focusing on video calling applications, we detect and transmit the body pose and face mesh information through the network, which are displayed at the receiver in the form of animated puppets. Using efficient pose and face mesh detection in conjunction with skeleton-based animation, we demonstrate a prototype requiring lower than 35 kbps bandwidth, an order of magnitude reduction over typical video calling systems. The added computational latency due to the mesh extraction and animation is below 120ms on a standard laptop, showcasing the potential of this framework for real-time applications. The code for this work is available at
https://github.com/shubhamchandak94/digital-puppetry/.

The Effects of Social Media on Altruism

Huong Nguyen, Vy Nguyen
May 11, 2019

Abstract

Altruistic behaviors varied on a spectrum, and commonly characterized as showing generous tendencies, kindness, or helpfulness not for any personal intentions or done based on the intrinsic motivation for better goods. This notion of supporting each other unconditionally is prevalent, as demonstrated that humans are interdepent on each other. This innate trait has been passed down through the survival process. Our research shows that the media hatred received is correlated to the altruism presence in adolescents. The Bystander Effect also occurs when participants just like or swipe through these negative posts because they do not feel the need to take action. According to them, the responsibility for action is shared among all people that see the posts. If the number of bystanders outweighs the hate, people are more encouraged to write hate speech on social media. Adding to, the concept of group polarization, which indicates that people of shared opinions will support each others ideas, also stimulate antisocial opinions. This empirical research integrated social exchange theory and the various theoretical modesl of incentives to analyze several important factors affecting prosocial behaviors in virtual communities.

Identifying Breast Cancer Through Novel Machine Learning Image Processing and Statistical Analysis

Huong Nguyen, Vy Nguyen

August 29, 2020

Abstract

With breast cancer being the most common occurrence, attaining approximately two million new cases respectively, efforts in classifying and identifying this form will help minimize time and error, and hence would be imperative for treatment and prevention during a pandemic. In this approach, we aim to produce an increasing constructive accuracy with high precision by coupling machine learning algorithms and statistical model analysis objectives in mammographic images and optimal modeling methods on breast tissue data, which are all provided by University of California, Irvine Center for Machine Learning and Intelligent Systems. In doing so, our purpose is to capture and analyze key features, such as six classifications along with the maximum spectrum of each repeatedly, that might refine and limit the data for precise accuracy; consequently, accuracy is subjectively prone to be limited by tumor size, lymph nodes, and related categories. We will also look at how cancer diagnoses are impacted by COVID-19, specifically the impact of the healthcare framework on the implications of mental health and postponed routine cancer screenings, to further analyze other underlying factors on the survival outcomes. The projected accuracy was estimated to be 82% for this automated method.