# Computer Science Research at UHD

CS Faculty

Cognitive Intelligence

- The vast implications of using EEG data to analyze brain states include designing brain-computer interfaces (BCI) where users' brain activities, and using brain state models in healthcare related activities.

- Applications of EEG data include:
  1. Brain-Computer Interface (BCI)
  2. EEG-based Person Identification
  3. Brain State Modeling
  4. EEG-Based Emotion Detection
  5. Healthcare
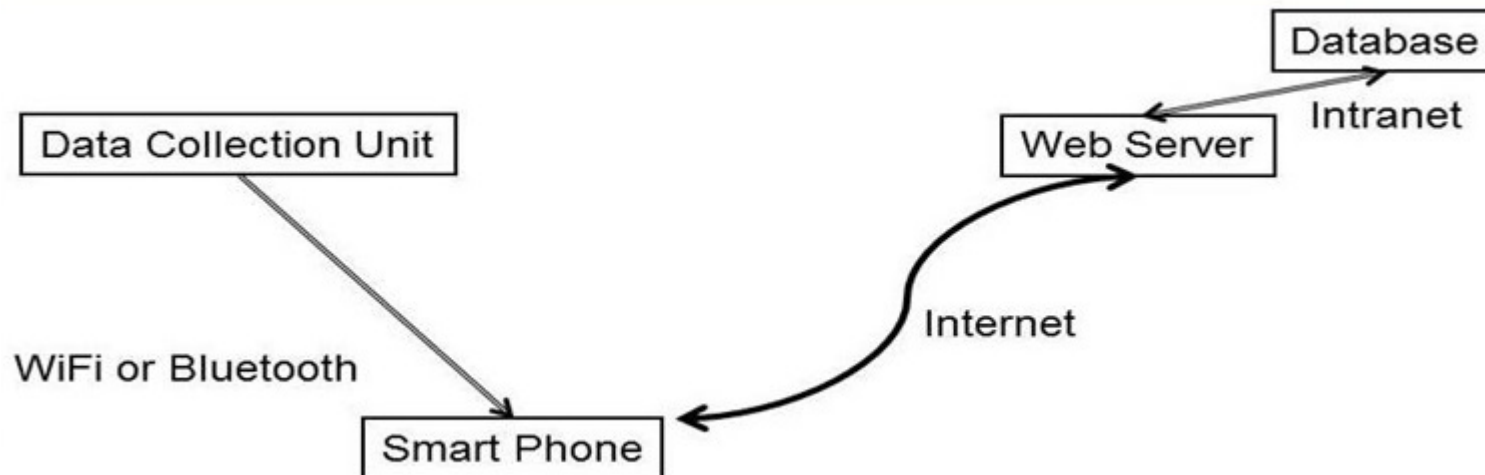
Dr. Hong Lin
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linH@uhd.edu

Current Research Projects (Dr. Lin)

1. Machine learning algorithms for EEG data classification

2. Mobile applications

3. Microprocessor programming for real-time EEG data processing

4. EEG sensor design
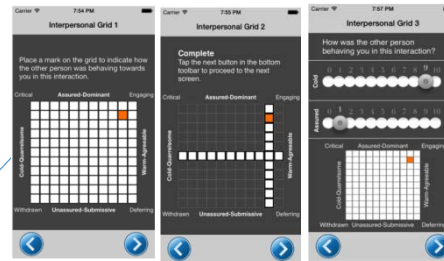
5. Database system design

6. Web design

Looking for Undergraduate Research Students? : **Yes**

Human Centered Computing (HCC)

We compute every aspect of human life including physical activity, behavior, and cognition. HCC is an interdisciplinary area. It encompasses computer science, psychology, data analytics, and applied mathematics.
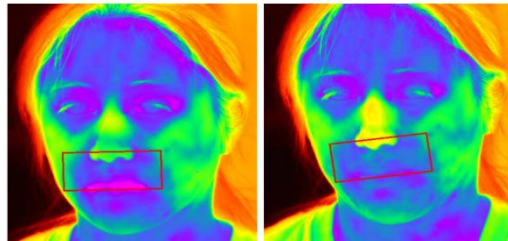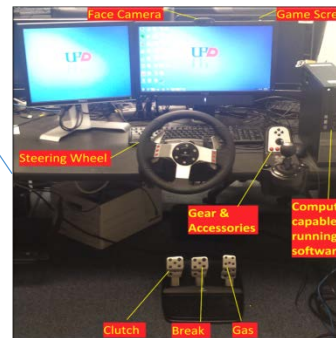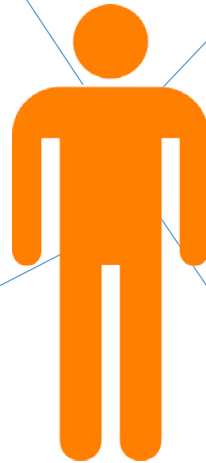

Lie Detection

Mobile Designs for 2D Psychometrics

Mobile Accelerometer for Estimate Surface Incline

Driving Simulator for Monotonous/Stressful Driving

Dr. Dvijesh Shastri
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Current Research Projects (Dr. Shastri)

1. Study the impact of brief meditation on cognitive performance

2. Driver stress analysis via physiological responses

3. Analysis of monotonous driving via physiological responses

4. Workout coupling: Study the influence of one's workout on the other

5. Physical activity modeling

Looking for Undergraduate Research Students? : **Yes**

Computational Genomics

We broadly work on problems associated with computational algorithms to analyze high throughput molecular data. Specifically, we are working on three main projects:

<u>DNA/RNA Sequencing Data analysis</u>
Accurate algorithms to analyze RNA-Seq and ChIP-Seq data to identify novel molecular markers involved in heart development and their application in cardiac reprogramming.

<u>Cancer gene networks</u>
Scalable methods to identify conserved modules across multiple cancer types to built a diagnostic system which is invariant across different types of cancer.

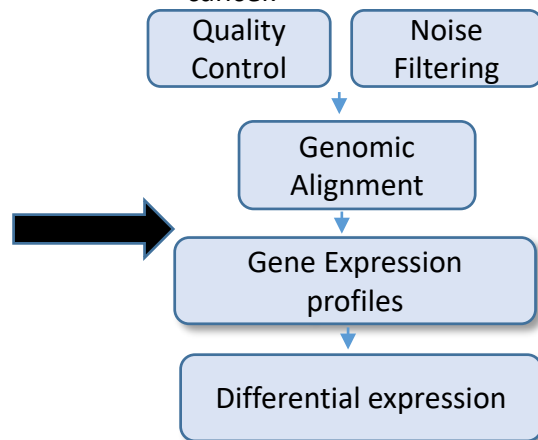<u>RNA-protein interactions</u>
Machine learning based algorithms to predict RNA-protein interaction for diagnosis and therapeutics in cancer and heart diseases.
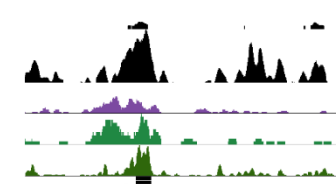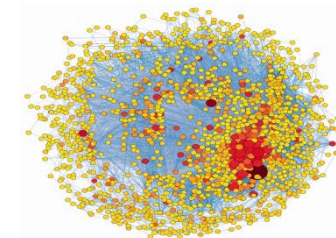
Dr. Benjamin Soibam
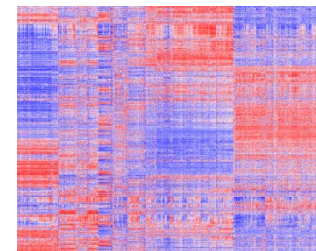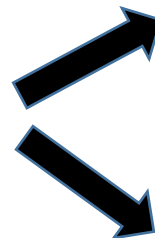Office: N714
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Quality Control

Noise Filtering

Genomic Alignment

Gene Expression profiles

Differential expression

Data Generation

Bioinformatics

Discovering molecular markers
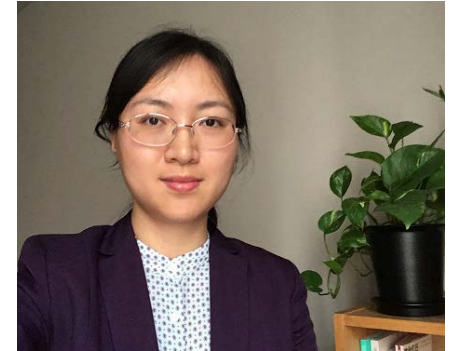
Current Research Projects (Dr. Soibam)

1. Distributed network alignment algorithms to detect conserved modules in multiple cancers.

2. Machine learning methods to discover new biomarkers in diseases.

3. High Performance Computing for large scale, multiplatform molecular data.

4. Computational modeling for embryonic stem-cell fate control.

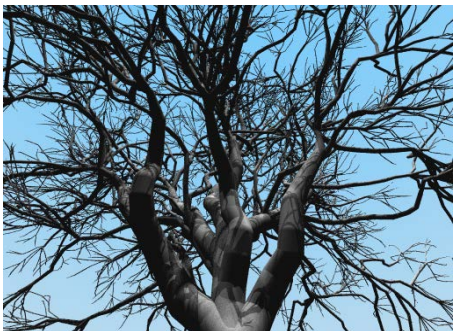Looking for Undergraduate Research Students? : **Yes**

Computer Aesthetics and Virtual Worlds

Computer generated virtual worlds are widely needed in many applications such as video games and 3D movies. We design algorithms in order to automatically synthesize the virtual scenes. We are also interested in research topics related to computer aesthetics such as computer simulated sketches and hair style synthesis for cartoon characters.

Dr. Ling Xu
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Current Research Projects (Dr. Xu)

1. Procedural 3D Modeling

2. Computer Generated Aesthetic Forms

3. Gaming Investigation

4. Artistic Image Processing

Looking for Undergraduate Research Students? : **Yes**

Data Privacy

Today, vast amounts of location data are collected by various service providers. These location data owners have a good idea of where their users are most of the time. Other businesses also want to use this information for location analytics, such as finding the optimal location for a new branch. However, location data owners cannot share their data with other businesses, mainly due to privacy and legal concerns. Privacy-preserving solutions can be developed in which location-based queries can be answered by data owners without sharing their data with other businesses and without accessing sensitive information such as the customer list of the businesses that send the query.

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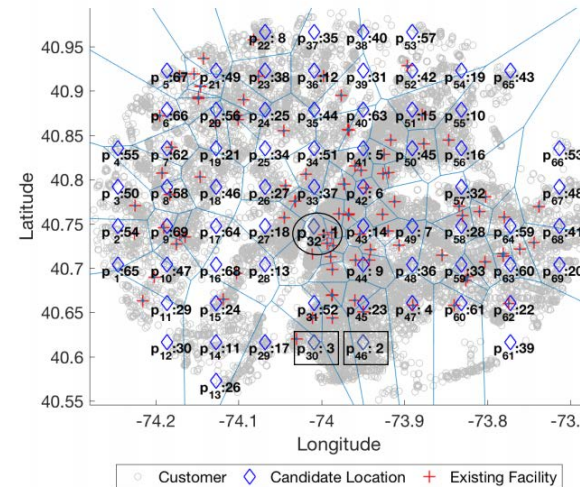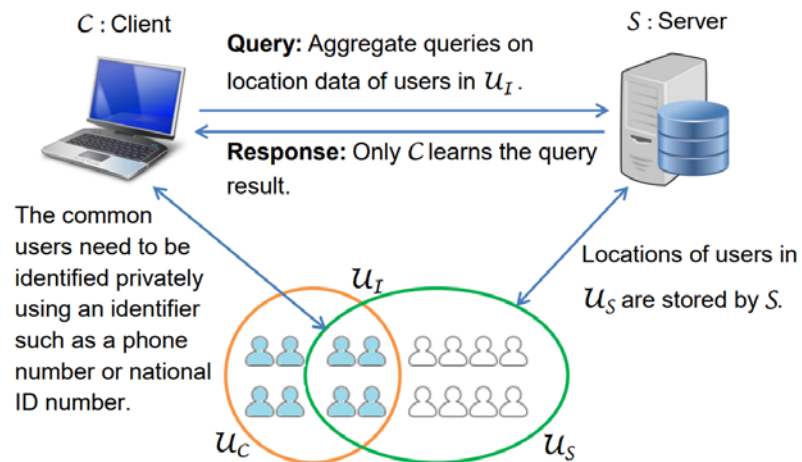
Current Research Projects (Dr. Yilmaz)

1. Data Privacy

2. Machine Learning

Looking for Undergraduate Research Students? : **Yes**

Network Security

With more and more Internet traffic carrying sensitive data, network security is increasingly causing major concerns. Researchers design and develop new algorithms that are immune or are less vulnerable to certain attacks. They are required to perform simulations, and collect and analyze a large amount of data in order to validate the effectiveness of the algorithms.
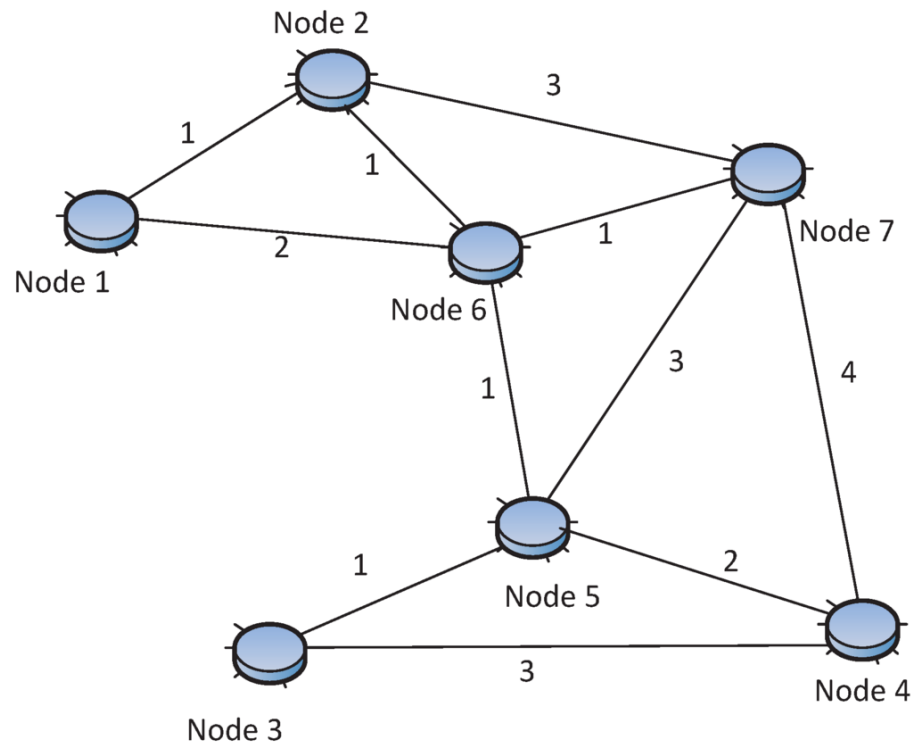
Dr. Shengli Yuan
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yuans@uhd.edu

Current Research Projects (Dr. Yuan)

1. Network security

2. Network reliability

3. Algorithm analysis and optimization

4. Optical network and wireless network protocols

Looking for Undergraduate Research Students? : **Yes**

Intelligent Sensor Systems

Sensors are like human's skin. Intelligent algorithms are like human's brain. Intelligent sensor systems can detect the surrounding environment and make intelligent decisions. We design embedded systems, data mining algorithms and communication modules for intelligent sensor systems.

Virtual Reality technology is a realistic and immersive simulation of a three-dimensional environment. We create interactive software and hardware, experienced or controlled by signals of the body. We design virtual reality environments to provide the immersive experience for intelligent sensor systems.
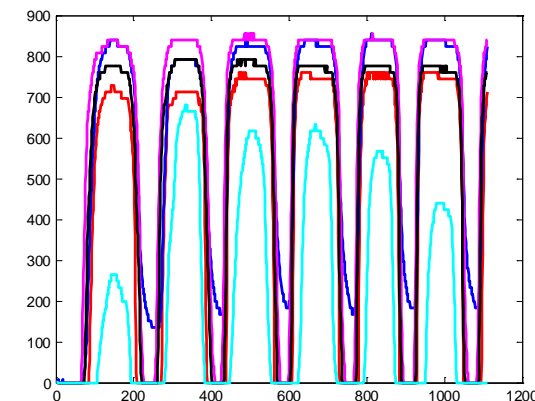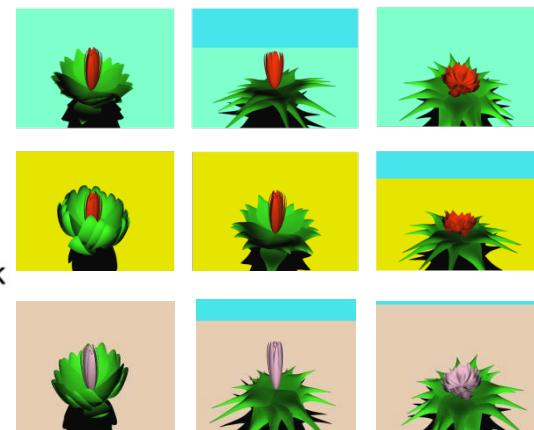
Dr. Ting Zhang
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Current Research Projects (Dr. Zhang)

1. Designing a low-cost smart glove

2. Data analytics for smart glove systems

3. Designing a pressure sensor based shoe system

4. Data analytics for intelligent shoe systems

5. Virtual reality scene design for biofeedback

Looking for Undergraduate Research Students? : **Yes**