

# Al Amin Hosain

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## Education

- George Mason University Fairfax, VA, USA  
Ph.D. in Computer Science (3.84/4.00, Expected Graduation - July 2021) 2015 — present
- Chittagong University of Engineering and Technology Chittagong, Bangladesh  
B.S. in Computer Science and Engineering (3.73/4.00) 2008 — 2012

## Research Area

Machine Learning, Data Mining, Deep Learning based Video Understanding

## Research Experiences

- Pose guided American Sign Language (ASL) video recognition
  - ◇ Developed pose guided 3d pooling mechanism in 3d ConvNet (I3D)
  - ◇ Proposed model outperformed state of the art methods for isolated sign video recognition by 10%
  - ◇ Developed Graph Neural Network (GNN) based models using hand pose to capture subtle distinction in hand shapes
  - ◇ Publication :  
**Al Amin Hosain**, Panneer Selvam Santhalingam, Parth Pathak, Huzefa Rangwala and Jana Kosecka. "Hand Pose Guided 3D Pooling for Word-level Sign Language Recognition". IEEE Winter Conference on Applications of Computer Vision (WACV), 2021
- Hand shape learning from sign videos
  - ◇ Developed semi-supervised hand shape learning using ConvNet (CNN)
  - ◇ Built Recurrent Neural Network (RNN) based models using hand and pose features
  - ◇ Publication :  
**Al Amin Hosain**, Panneer Selvam Santhalingam, Parth Pathak, Huzefa Rangwala and Jana Kosecka. "FineHand: Learning Hand Shapes for American Sign Language Recognition". 15th IEEE Conference of Face and Gesture Recognition (FG), 2020
- Sign video modeling using multiple modalities
  - ◇ Built 3d pose data acquisition system using depth sensors
  - ◇ Developed multi-modal American Sign Language (ASL) model using video and pose data

- ◇ Used attention based mechanism in the learning process to select better modality source
- ◇ Utilized hand shape representation from other sources to boost sign recognition performance
- ◇ Publication :  
**Al Amin Hosain**, Panneer Selvam Santhalingam, Parth Pathak, Jana Kosecka and Huzefa Rangwala. "American Sign Language Recognition using Body Pose and Deep Hand-Shape Features". (IEEE DSAA, 2020)  
**Al Amin Hosain**, Panneer Selvam Santhalingam, Parth Pathak, Jana Kosecka and Huzefa Rangwala. "Sign Language Recognition Analysis using Multimodal Data". IEEE DSAA, 2019 (**Best Research Paper Award**)

## Programming Skills

- Programming Languages : Python, C, C++, Java
- Deep Learning : PyTorch, Tensorflow, Keras
- ML & Big Data : Scikit-Learn, OpenCV, Matlab, Hadoop, Spark
- Pose/Object Detection : Openpose, Densepose, Detectron, Aphapose, Object Detection API (TF)

## Professional Experiences

- **Samsung Research, Bangladesh** Dec, 2012 — Jul, 2015
  - ◇ SIMD Optimization of image/signal processing routines using Advanced Vector Extensions (Intel AVX) intrinsics
  - ◇ Automated Test tool development for Chat ON messenger
  - ◇ Worked with relational databases in the form generation team
  - ◇ Instant Messenger (IM) development (Chat ON)
  - ◇ Issue solving, feature enhancement and version control and release in symbian OS
- **Graduate Assistant : GMU, CS** Aug, 2015 — present
  - ◇ Conducting lab classes for programming courses (C, Python, Software Engineering)
  - ◇ Conducting research on American Sign Language (ASL) recognition from video using deep learning based methods

## Relevant Courses

Pattern Recognition (A), Theory of Computation (A), MapReduce and Spark (A+), Data Mining (A), Graph Algorithm (A-), Software Testing (A-), Artificial Intelligence (A-), Machine Learning (Andrew Ng, Coursera) (99.6%)