



SKETCH RECOGNITION LAB

TEXAS A&M UNIVERSITY

This blog hosts weekly news about the Texas A&M University Sketch Recognition Lab. SRL is directed by Dr. Tracy Hammond, an associate professor in the Computer Science and Engineering Department. More information about the lab can be found at <http://srl.tamu.edu>

Thursday, July 9, 2015

SRL Graduate Students Also Awarded 5 Times in Medicine, Education, and CS at 2015 TAMU Student Research Week!

The 2015 Student Research Week (SRW) at Texas A&M University began on March 24 and ended with an awards ceremony on March 27. Many students of the Sketch Recognition Lab, directed by Dr. Tracy Hammond, participated. SRL students won 10 awards; 5 awards went to undergraduates (see prior post) and 5 went to graduate researchers. This post describes the graduate awards.

The following is a list of Sketch Recognition Lab Awards at TAMU Student Research Week 2015. Bolded are those from graduate students.

1. 2015 Sigma Xi Interdisciplinary Award. TAMU Student Research Week, SRW 2015. gRec: A Gesture Recognition Interface for CourseSketch. Gutierrez, A.**
2. 2015 1st Place Undergraduate Oral (Subject Area: Math, Statistics, Computer Science) TAMU Student Research Week, SRW 2015. Wood, H.**, Vangavolu, H.**, Newman J.** Frontier
3. 2015 1st Place Undergraduate Poster (Subject Area: Math, Statistics, Computer Science) TAMU Student Research Week, SRW 2015. gRec: A Gesture Recognition Interface for CourseSketch. Gutierrez, A.**
4. 2015 1st Place Undergraduate Oral (Subject Area: Health, Nutrition, Kinesiology, Physiology) TAMU Student Research Week, SRW 2015. Bowersox, M.**Brown, W.**, Sauers, C.**, Shoot Responsibly
5. 2015 2nd Place Undergraduate Poster (Subject Area: History, Literature, Fine Arts, Communication, Languages, Philosophy) TAMU Student Research Week, SRW 2015. KidGab: A Social Media Tutorial. Zhang, H.**, Privett, J.**, Tian, F.**, Mulholland, T.**, Carrasco, M.**, Cestafe, E.**
6. **2015 1st Place Graduate Poster (Subject Area: Math, Statistics, Computer Science) TAMU Student Research Week, SRW 2015 Poster Competition. Approximate Sketch Matching and Retrieval. Ray, J.***
7. **2015 2nd Place Graduate Poster (Subject Area: Math, Statistics, Computer Science) TAMU Student Research Week, SRW 2015. Optimizing Corner Finder. Garg, A.*, Ray, J.*, Polsley, S.***
8. **2015 2nd Place Graduate Oral (Subject Area: Math, Statistics, Computer Science) TAMU Student Research Week, SRW 2015. SmartStrokes: Evaluating Sketches from Neuropsychological Tests. Lara-Garduno, R.***
9. **2015 2nd Place Graduate Poster (Subject Area: Medicine, Biomedical, Neuroscience) TAMU Student Research Week, SRW 2015. Modeling Radiologists' Visual Search Patterns during Mammographic Screening. Alamudun, F.***
10. **2015 2nd Place Graduate Oral (Subject Area: Psychology, Sociology, Anthropology, Business, Education, Political Science, Economics) TAMU Student Research Week, SRW 2015. CourseSketch. Turner, D.***

Folami Alamundun won 2nd Place for Poster in Medicine, Biomedical Engineering, and Neuroscience.

Alamundun's poster, Modeling Radiologists' Visual Search, visually presented his research pertaining to gaze data and radiologists looking at mammograms. Medical procedures are emotional enough for the patient and provider without the worry of human error and honest mistakes that may happen.

Using eye tracking devices strapped onto radiologists' heads, Alamundun recorded where radiologists looked during a screening. His goal was to analyze and identify common habits of radiologists which could then be used to develop diagnostic tools, decision support, and better training methods.

Contributors

- Pauli
- Stephanie Valentine
- Tracy Hammond
- Hannah Conrad
- David Turner
- Catoyin
- manoj

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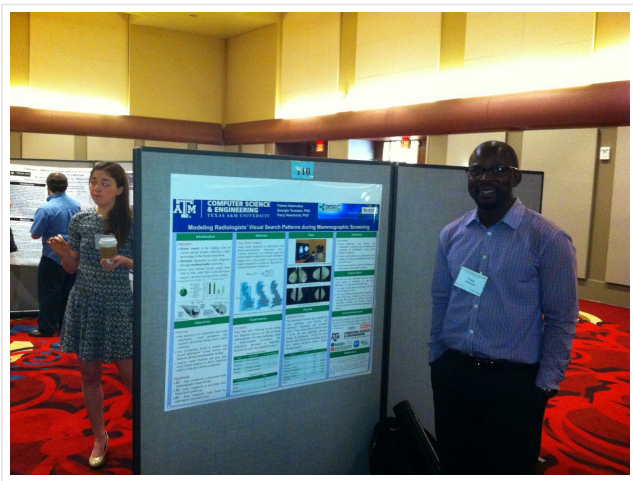
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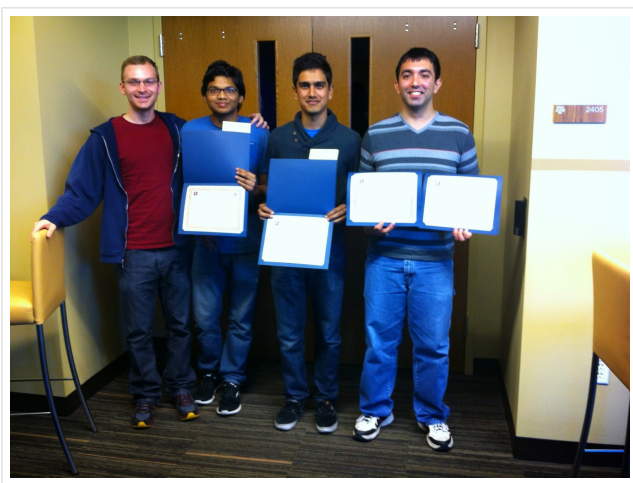
(Folami Alamundun standing with his poster)

"In this experience, in particular, one of the judges I talked to was in health sciences," Alamundun stated about what he took away from SRW. "She asked a very certain question that I just never thought about, so I had very interesting feedback. She gave me her contact information and she introduced me to someone who is working with similar ideas, but in a different domain. You get a chance to create a local network and collaborate with others who have similar interests to you."

Winning 1st Place for Poster in Math, Statistics, and Computer Science was Jaideep Ray, the second member of SRL who was awarded.

In his poster, titled Approximate Sketch Matching and Retrieval, Ray researched and created an algorithm-based program that could automatically recognize what a hand-drawn sketch is of. The program acts in a similar fashion to trying to find books or articles on certain topics via an online database.

For example, if a person drew a pig, there are certain parts of the animal's anatomy that almost everyone draws – the iconic curly tail and a snout. Using basic geometric shapes, the algorithm relates the parts of the picture to the whole image. So, once an image is input into the system, it searches for 'key terms' to identify what the user has drawn.



(Jaideep Ray [second from the left] holding his award with Seth Polsley, Harish Vangavolu, and Abram Gutierrez)

The third SRL member is Anurag Garg, who was awarded with 2nd Place for Poster in Math, Statistics, and Computer Science.

His poster, Optimizing Corner Finder, aimed at improving the performance of the ShortStraw algorithm introduced by Wolin et. Al in 2008. One issue that occurs in sketch recognition is finding corners in free-line drawings. ShortStraw takes the points of a stroke, recognizes them, and then uses the distance between the points to predict whether the points are from straight lines or corners. This makes coding and programming much easier.

Through analysis of Wolin's corner finder algorithm, Garg found that there was gap between the run-times of individual segmenters and ShortStraw. After tests and further evaluation of the process, Garg's research resulted in an improved algorithm using 'parallelization techniques'.

Fourthly, David Turner was awarded 2nd Place for Oral Presentation in Psychology, Sociology, Anthropology, Business, Education, Political Science, and Economics.

CourseSketch, as described by Turner, is an online learning experience and system that allows for the submission of handwritten homework and a unique course management functionality.

"CourseSketch is a system to make education smarter," Turner stated. "Our mission is to deliver an intuitive, as well as interactive, learning experience that simplifies instructor and student interactions."

There were three driving motivations behind the creation of CourseSketch. Firstly, Turner was unsatisfied with the current state of education in regard to the long feedback loop between the learning of material and the evaluation and response given to students based on completed work. Secondly, while there are current web-based education platforms, such as eCampus, the online tools are limited in function, efficiency, and practicality. Finally, while its predecessor, Mechanix, aided in the resolution of the first two motivators, it was limited by which domains it could support.

Currently, CourseSketch has been used in an introduction to logic course and a mathematics course at Texas A&M University.

When asked about where he wants to see CourseSketch implemented in the future, Turner responded with a quick "Everywhere!"

"I believe this can improve how education is done," he continued his answer. "Improving how people learn and integrating technology to make education 'smarter.'"

The fifth member of SRL to be awarded for his research was Raniero Lara Garduno, who won 2nd Place for Oral Presentation in Math, Statistics, and Computer Science.

His project, Smart Strokes, is a digitalization of traditional, sketch-based neuropsychology tests. By digitalizing the tests, Smart Strokes allows for a more thorough evaluations – including information that could not normally be gathered by pen-and-paper tests, such as the age of the patient.

Since the previous post published about Smart Strokes, Lara Garduno has been working on interface changes and improvements requested by his neuropsychologist consultant, Dr. Nancy Leslie.

"For instance, I changed the way patient IDs are generated, from a random 16-digit number to a format that is used by neuropsychologists in the field," he commented. "This is the kind of feedback that is very valuable for us as the developers of software intended for other fields, as these details are the difference between a novelty application and one that is actively used by the intended field."

Looking toward the future, Lara Garduno wishes to develop a way to define what it means to be 'unhealthy' as it can be seen in sketches. That can then be integrated into the program, allowing it to identify problems right after the patient has taken the test. This would speed up the process of medical staff being able to identify problem areas for patients and make a diagnosis.

"We are also vastly interested in deriving information about humans, not just patients, through these tests," Lara Garduno added when talking about the motivation behind Smart Strokes. "We believe we still haven't discovered just how much these tests can reveal about us as humans, and digitizing the tests and performing modern sketch recognition on the sketches gives us far more powerful tools to take that particular type of research to the next level."

Congratulations to everyone who won awards at SRW! Thank you to everyone who participated!

Posted by [Hannah Conrad](#) at 5:44 PM



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