COURSE SYLLABUS
DFSC 6312 Multimedia Forensics
3 Credit Hours, Fall 2017

Instructor:

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Office Hours:

8-9 and 10-11AM, MWF; other time may be available by appointment.

Course description:

This course is an introduction to multimedia security and forensics. It covers the following topics:

1. Programming fundamentals for multimedia processing and machine intelligence
2. Introduction to data mining and machine intelligence techniques for digital forensics and information assurance;
3. Introduction to image processing, image compression, audio/video compression, and multimedia formats;
4. Image/audio/video steganography and steganalysis
5. Image/audio/video forgery detection
6. Computer vision and video surveillance
7. Biometrics and security
8. Common multimedia forensics techniques

Course objectives:

This course addresses the computer science program's primary goal of providing a strong technical foundation and concepts in multimedia forensics and intelligent computational analysis techniques. In particular this course is concerned with

a) Gaining factual knowledge related to multimedia digital evidence, steganography, steganalysis, forgery detection, biometrics and intelligent computing;
b) Learning fundamental principles in multimedia forensics including source identification and authentication, steganography, steganalysis, forgery detection and biometrics;
c) Learning fundamental principles of image/video/audio compressions;
d) Development of specific skills and competencies in data mining, machine learning, and the applications to multimedia forensics;
e) Development of problem solving skills and growing up research capability.

Prerequisite:

1) One of high-level programming skills is requested, either Matlab/Python/Java/C/C++/C# or other high-level language programming language may be used for group or individual project;
2) Development environment: The students should obtain the usage of these programming languages/packages;
3) Graduate-oriented;
4) Senior undergraduates should have instructor's permission.

References (optional):

Book and Web Resources**:**

1. **OpenCV,** http://opencv.org/
2. **OpenCV document,** http://docs.opencv.org/
3. **OpenCV with Python By Example** by Prateek Joshi, ISBN 13: 9781785283932
4. **Learning OpenCV 3 Computer Vision with Python**, by Joe Minichino, Joseph Howse, ISBN 13: 9781785289774
5. **OpenCV with Python Blueprints**, by Michael Beyeler, ISBN 13: 9781785282690

6. **Digital Image Processing, 3/E,** by Gonzalez & Woods, Prentice Hall, ISBN-10: 013168728X ;
7. **Practical Image and Video Processing Using MATLAB**, by Oge Marques, John Wiley & Sons, Inc., 2011, ISBN: 978-0-470-04815-3
8. **Image Processing and Acquisition using Python**, ISBN-13: 978-1466583757 ISBN-10: 1466583754, Chapman and Hall/CRC; 1 edition (February 19, 2014).
9. **Steganography in Digital Media: Principles, Algorithms, and Applications,** by Jessica Fridrich, Cambridge University Press, ISBN-10: 9780521190190, copyright: 2010;
10. **Data Mining: Practical Machine Learning Tools and Techniques,** Third Edition, by Witten, Frank and Hall, ISBN-10:0123748569, Morgan Kaufmann, 2011.
11. **A Programmer's Guide to Data Mining**, http://guidetodatamining.com/
12. **PRTools: The Matlab Toolbox for Pattern Recognition.** http://www.prtools.org/
13. **Statistical Pattern Recognition Toolbox**, http://cmp.felk.cvut.cz/cmp/software/stprtool/
14. http://www.nist.gov/itl/csd/biometrics/
15. http://www.biometrics.gov/referenceroom/introduction.aspx

Journal and Conferences:

1. **IEEE Transactions on Information Forensics and Security (**Journal**);**
2. **Multimedia Tools and Applications** (journal)
3. **Pattern Recognition** (journal)
4. **ACM Workshop on Information Hiding and Multimedia Security** (Conference);
5. **SPIE Multimedia Forensics** (Conference);
6. **ACM Multimedia** (Conference)
7. **IEEE Multimedia Expo** (Conference)
8. **IEEE International Workshop on Information Forensics and Security** (Conference)
9. **IEEE International Conference on Computer Vision and Pattern Recognition (CVPR,** Conference**)**

Assignments:

In addition to some assignment on general multimedia computing and processing, students will be given some assignments including a comprehensive survey in multimedia security and forensics, as well as some significant papers in multimedia forensics to realize the methods/algorithms presented in the paper. Students will also be requested to know how to use data mining and machine learning methods.

Projects:

Group or individual projects will be assigned, and students' work is requested to write ACM/IEEE format paper to submit to international conferences or journals for potential publishing. The instructor will provide some source code and help for student's implementation and project upon request. Each group (individual) is requested to present their project in class.
Extra credits (up to 50%) may be earned by the group(s) or individuals who made excellent jobs.

Grading criteria:

Assignments	50%
Research Project	50%
Total	**100%**

Extra credits may be given to the students who made excellent job in group project (up to 50%).
Course letter grades will be assigned according to the following:

Total	**Grade**
>= 90%	A
80% <= TOTAL < 90%	B
70% <= TOTAL < 80%	C
60% <= TOTAL < 70%	D
TOTAL < 60%	F

Class participation:

In accordance with University Policy (http://www.shsu.edu/students/guide/polpro /attendance.html), regular attendance is required and your attendance will be seriously monitored. So, don't forget to give your signature on the roster. You are responsible for all material covered in classes and labs, regardless of whether you attended or not. It is your responsibility to obtain class materials from fellow classmates if you miss a class.

Rules of conduct:

Students will refrain from behavior in the classroom that intentionally or unintentionally disrupts the learning process and, thus, impedes the mission of the university. Please turn off or mute your cellular phone and/or pager before class begins. Students are prohibited from eating in class, using tobacco products, making offensive remarks, reading newspapers, sleeping, talking among each other at inappropriate times, wearing inappropriate clothing, or engaging in any other form of distraction. Inappropriate behavior in the classroom shall result in a, minimally, a directive to leave class or being reported to the Dean of Students for disciplinary action in accordance with university policy.

Academic dishonesty:

All students are expected to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain complete honesty and integrity in the academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. The university and its official representatives may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including, but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion and the abuse of resource materials.

No cheating on an examination or assignments is allowed. A score of zero will be given to the student if such a case occurred.

STUDENTS WITH DISABILITIES POLICY:

It is the policy of Sam Houston State University that individuals otherwise qualified shall not be excluded, solely by reason of their disability, from participation in any academic program of the university. Further, they shall not be denied the benefits of these programs nor shall they be subjected to discrimination. Students with disabilities that might affect their academic performance should register with the Office of Services for Students with Disabilities located in the Lee Drain Annex (telephone 936-294-3512, TDD 936-294-3786, and e-mail disability@shsu.edu). They should then make arrangements with their individual instructors so that appropriate strategies can be considered and helpful procedures can be developed to ensure that participation and achievement opportunities are not impaired.

SHSU adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with disabilities. If you have a disability that may affect adversely your work in this class, then I encourage you to register with the SHSU Services for Students with Disabilities and to talk with me about how I can best help you. All disclosures of disabilities will be kept strictly confidential. NOTE: No accommodation can be made until you register with the Services for Students with Disabilities. For a complete listing of the university policy, see:

http://www.shsu.edu/dept/academic-affairs/documents/aps/students/811006.pdf

Other administrative matters:

Religious Holidays: An institution of higher education shall excuse a student from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. A student whose absence is excused under this subsection may not be penalized for that absence and shall be allowed to take an examination or complete an assignment from which the student is excused within a reasonable time after the absence.