***A6-to-One Program Intern Research Training-Project-Based Learning**

Preparation for Research Experience Training (*IP and Copyright reserved by AARD)

Python & Machine Learning

Instructor: Dr. Mikhail Shalaginov, MIT (email: mys@mit.edu)
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Zoom: https://us06web.zoom.us/j/5513212474?pwd=cTBXWUhzdnBFbm0yeXFENUNVVzA5QT09

This course is designed for students to gain and hone the skills of coding in python and learn the basics of engineering artificial neural networks.

Intended learning outcomes:
By the end of the course the students will be able to:

- comprehend and compose basic programs in python
- perform elements of data processing
- select a suitable type of network for the problem at hand
- engineer and train available and custom-built neural nets

12 Sessions: June 20th -Jul 15th (Jul 4th no class);
Office Hours T/Th 10am-12pm, then individual supervision for research by zoom meeting.
More RAs and advisors will step in to support your project since Jul 5th.

Fundamentals of python language	**Day/Week Day**	**Time**	**Every Day Individual Work**
Simple inputs and operations	June 20/M	7pm-9pm	Developing topic
Functions, branches & loops	June 22/W	7pm-9pm	Developing topic
Objects and classes	June 24/F*	9am-11am	Developing topic
Data processing	June 27/M	9am-11am	Developing topic
Elements of neural networks			
Deep Learning: capabilities and limitations	June 29/W	9am-11am	Developing topic
Anatomy of neural nets	July 1/F*	9am-11am	Developing topic
Digit classifier	July 5/T	9am-11am	Individual Research
Image recognition	July 6/W	9am-11am	Individual Research
Natural language processing	July 8/F*	9am-11am	Research Plan Presentation
Recurrent nets	July 11/M	9am-11am	Research Plan Presentation
Generative models	July 13/W	9am-11am	Research Plan Presentation
Advanced AI models - GANs	July 15/F*	9am-11am	Research Progress Presentation

References:

- Dane Hillard, 'Practices of the Python Pro', Manning Publications, 2020.
- Sylvain Gugger and Jeremy HowardDeep, "Learning for Coders with fastai and PyTorch: AI Applications Without a PhD", 2020.

July 8th-Aug 12th, we have regular Friday lunch meetings at MIT E70, and online review students progress for those who cannot come onsite. Individual supervision is available as needs M-Fridays.

Jul 29: Friday, Future World Leadership Training at MIT E70 onsite/Online video record will be available.

Aug 12: Final Project Presentations; Aug 13-27th: Writing Project Paper Draft (IEEE Template).