Intelligent Energy Systems

Prof. Dr. Zoltán Nagy
November 15th, 2017
35th USAEE/IAEE North American Conference
Model is unknown in real life & complex problems

Reinforcement Learning

Environment

Agent

states

actions

reward

Prof. Dr. Zoltan Nagy | http://nagy.caee.utexas.edu

Samuel Beckett
Nobel Prize in Literature (1906-1989)
Intelligence = Balancing through Interaction
Can we learn to heat/cool buildings *without* knowledge of system?

J. V. Canteli, J. Kämpf, and Z. Nagy, CISBAT, 2017, **BEST PAPER AWARD**
Austin, TX
Heating

During the first 360 hours the Reinforcement Learning controller learns from the Rule-based controller. Then, it improves those sets of actions.

Learned to do the right thing & improving *without* any knowledge of building!
During the first 360 hours the Reinforcement Learning controller learns from the Rule-based controller. Then, it improves those sets of actions.
Distributed PV & Individual Loads

Hyper-local Demand-Response

Socio-technical-economic scenario development

J. V. Canteli, J. Kämpf, and Z. Nagy, CISBAT, 2017 BEST PAPER AWARD
Reinforcement Learning with Human Reward


Prof. Dr. Zoltan Nagy | http://nagy.caee.utexas.edu
Teaching Tetris

Reward Signal
Teaching Tetris

After 2 sessions!
states actions

~ 2,000 data points (15 min)
“Instead of trying to produce a programme to simulate the adult mind, why not rather try to produce one which simulates the child's?”

Alan Turing
Father of the Modern Computer
(1912-1954)
Thank You!!

@Z0ltanNagy

http://nagy.caee.utexas.edu

nagy@utexas.edu