RET Research and Training

Introduction to Python

1. A variable can be used for any type
2. Arrays from Python lists
3. Creating arrays from scratch
4. Compare and contrast: x1rd, panda, list and numpy to determine which type of array may be best to use, and what function should be used to import data file.
**Hands On Technical Training**

- Machine learning is new and challenging for me
- I was introduced to online platform
- During the daily afternoon meetings I learned about code notebooks. This was the most exciting for me because I had not used them before.

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**Technical Exposition**

- There were 4 to 5 video presentations per week to watch.
- Guest speakers each week gave insight into what ML looks like in the real world practices.
- Topics on audio, motion, and video sensing were informing. The Arduino presentation was very enlightening.

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Research Materials

• This summer was my first experience with canvas, Colab, and scikit.
• The scikit notebooks and the practice exercises using it was an experience that left me wanting to learn more.
• The 5 weeks went so quickly. I will be continuing with my learning journey and share it with my students.

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Research Objectives

• The collection of my data is where the bulk of time was spent. I have 30 months of data saved one day at a time.
• My problem is to find how much energy is produced on average for each day during different weather condition.
• Output data is then used to predict future energy production.

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### RET Lab Experience Research Summary

#### Research Background

- There is little to no information on residential property solar energy production.
- Most solar energy information found was on commercial properties and energy stations.
- Frequently, articles on load forecasting was found.

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#### Research Proposal

- Literature review was performed for two weeks. Finding 8 references was difficult.
- The abstract portion was difficult. This is my first proposal and all my previous experiences in writing abstracts were after completion of work.

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RET Lab Experience Research Summary

Research Conclusions

• Data from Cyprus was used to begin the process of finding the algorithms to use to learn, validate and predict.
• Linear progression did not appear work well on a large array of data.
• I still have work to do. But, the ability to predict the energy production can aid in buying the proper storage facility.
• Future of solar may not be so grid dependent.

Next STEPS in Research

• Retrieve the remainder of the solar data dating back to 15 July 2018
• Use data with existing algorithms and newly developed ML algorithms
• Plan to write final report
• Plan for completing results for publication
• Engagement with SenSIP

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RET Instructional Lesson Implementation

Lesson Objectives

• The information learned will be the basis of a 12-lesson unit on exploring IoT and ML research.
• Students will explore an emerging technology of their choice.
• Students will learn the vocabulary of computer programming.
• Students will learn to write a technical paper of their findings.

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Questions & Feedback

• Optional: Is there an open-ended question you can ask the audience to help provide useful feedback?
  
  • For example: What would you recommend I be thinking about as I prepare to implement this lesson with students?

  • For example: What’s one thing you liked about the lesson and one thing you think I should still be thinking about?

Self Assessment

• What worked well in this program, what did not work so well?
  
  • Skill building gained - theory / software
  
  • Research knowledge gained
  
  • Ability to express research in abstract and presentation
  
  • etc
References


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