KARAN THUKRAL - 20460691

ENGINEERING LOGBOOK

SYDE 461

Contents

Week 1: Sept. 11 - 17

- Discussion with team members to clarify the idea and discuss the potential interest
- Discussions with Lyrical Security[1] regarding the data access policy along with NDA and IP agreements.
- Discussion around potential supervisor

[1] http://lyricalsecurity.com/

Week 2: Sept. 18 - 24

- Team met with and signed Alex Wong as our supervisor
- Back and forth with Lyrical Security about details of NDA and IP agreement
- Finished team and advisor contracts
- Talked with Alex Wong regarding the details of the NDA

Sept 23: Speed Dating Round 1

Team 7: Snow Removal

- No good fully automated way
- Risk of injury while removing snow
- Need more affordable options
- Has a good mix of skills in the team members to pull it off

Team 10: International Shipping

- Using US + Mexico border as example
- lost of illicit goods being shipped
- Not sure how to tackle it yet
- Looking into modelling the physical steps in shipping and then find ways to improve it.
- One idea is a tamper proof seal

Team 5: Heat Exhaustion

- Early detection of heat exhaustions
- #2 cause of death for athletes in US

- Health damage or death can happen from heat exhaustion
- Need to measure a good approximation of internal body temp to be able to detect it
- Prof Stashuk as advisor. Good choice

Team 1: Real Time Wait Time

- How busy is the restaurant I want to go to?
- How long will be the wait time?
- One challenge is to take into consideration crowds inside and outside the location
- Potential for ML

Team 2: Women's Health

- Uncomfortable topic to talk about
- Lot of stigma
- Chat bot to make this conversation easier
- Source info and knowledge from doctors
- Need to scrape existing forums etc to train the NLP model. This will be challenging
- Should not use conversations to train the model since can lead to mis-training and ruin the purpose - example Microsoft bot

Team 4: Pressure Ulcers

- Why does it happen?
- How do you prevent it?
- How do you take proactive action towards it?

Team 8: Understand Products

- Understand existing info about products by using forums, social media reviews etc
- structure this unstructured data somehow - NLP problem

Feedback for Us

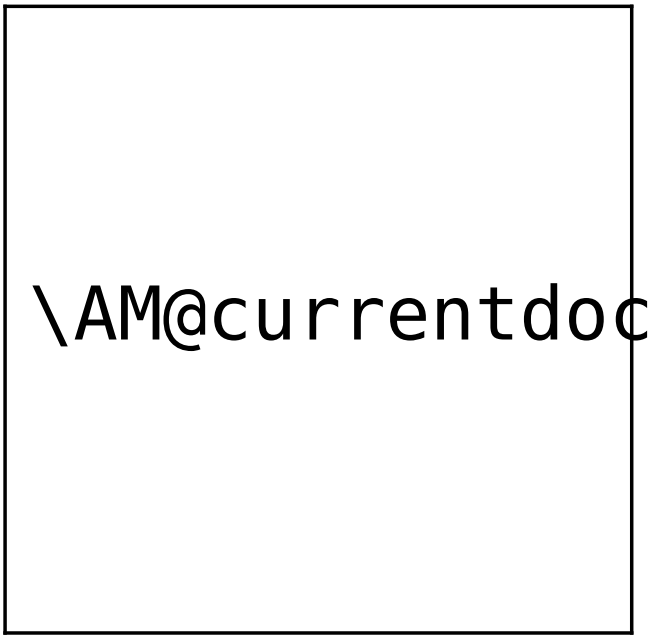
- Try and narrow the scope
- Cannot process each packet in realtime without adding overhead
- Have very clear ways of testing and validating it
- Look at Cloudflare. Potentially have a contact there through someone in class

Tensorflow Example

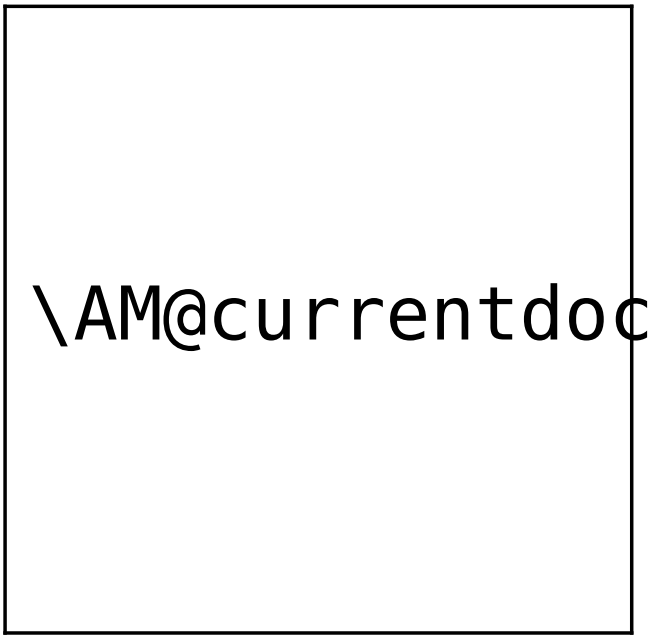
- Started work on a tensorflow example to learn details about neural nets

Week 3: Sept. 15 - Oct. 1

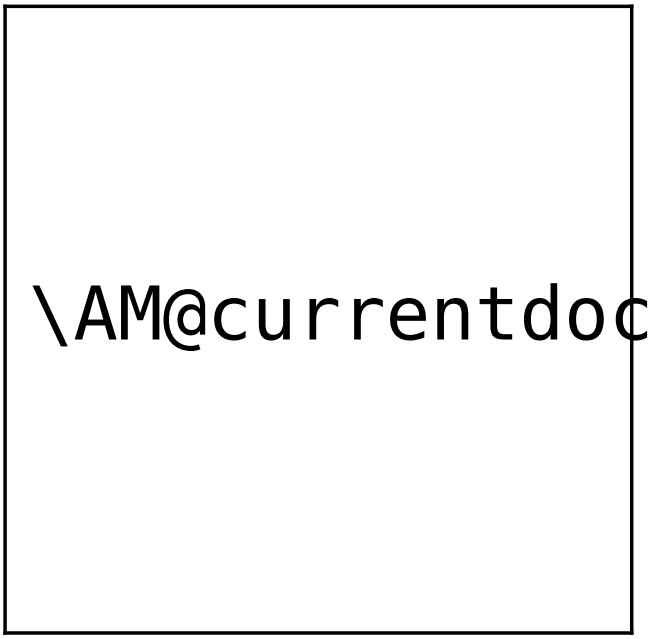
Tensorflow Example Continued



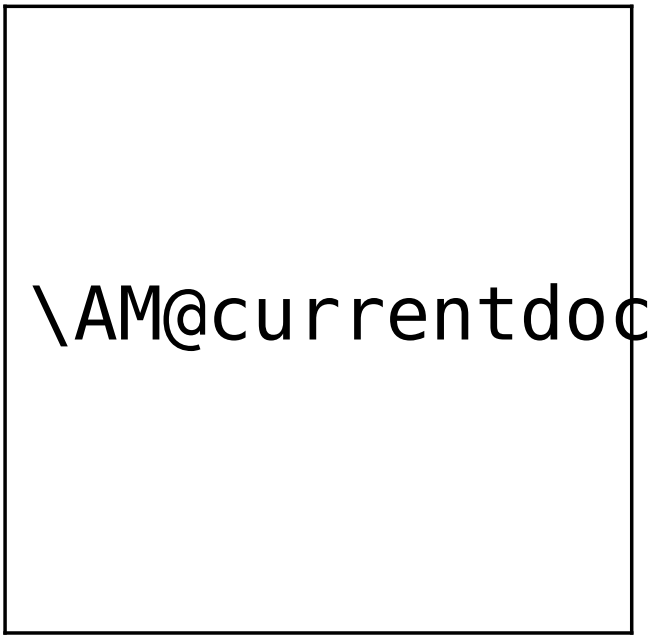
.png



.png



.png



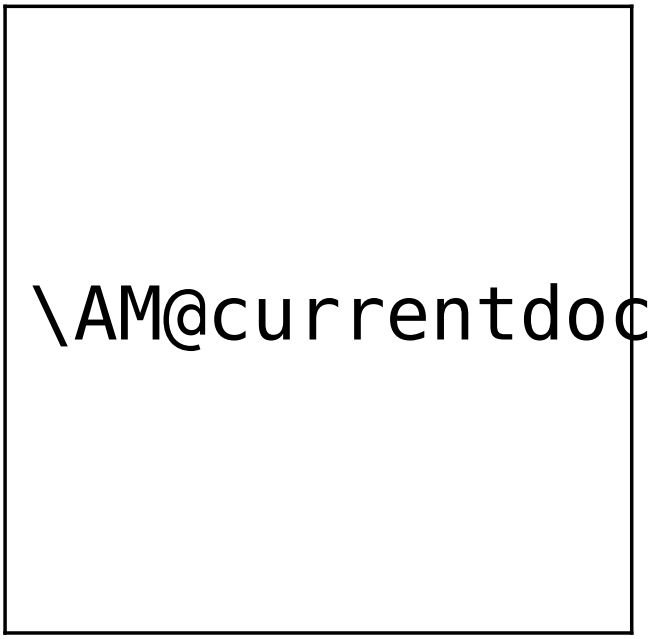
.png

Back Propagation

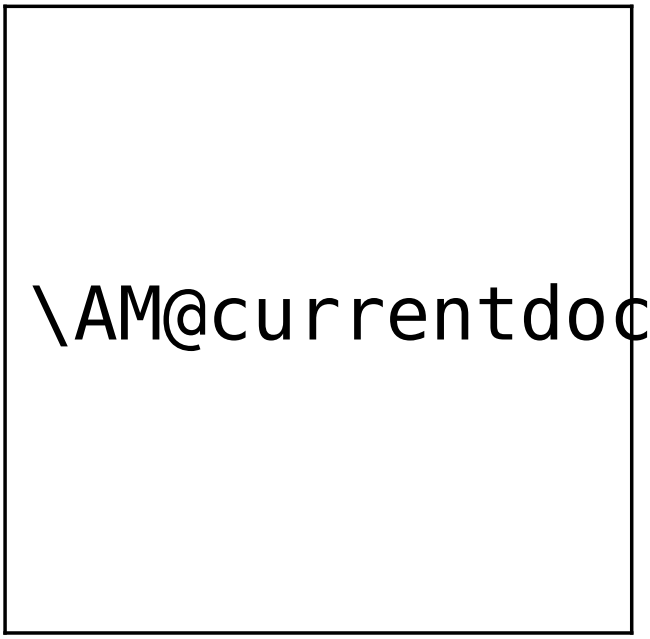
- Reverse mode differentiation
- Regular chain rule gives you the derviative of the output with respect to one input/node
- Doing that for all nodes is intractable
- To extend this to find $\frac{\partial output}{\partial}$ with respect to all nodes and inputs in the neural net/graph you start using the chain rule from the other end (output) and go till the input layer. This is essential for neural networks. [2]

[2] Christopher Olah. Calculus on computational graphs: Backpropagation. https://colah.github.io/posts/2015-08-Backprop/, August 15, 2015

Multiple Instance Learning Paper



.png



.png

Bibliography

Christopher Olah. Calculus on computational graphs: Backpropagation. https://colah.github.io/posts/2015-08-Backprop/, August 15, 2015.