

# System and Service Design

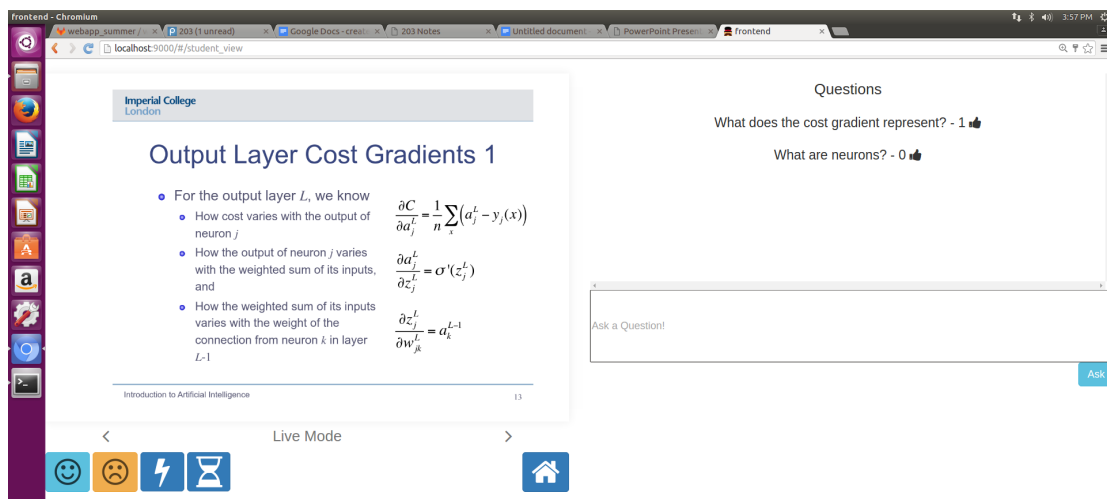
Group 21: Kam Chiu, Ho Law, Jiranart  
Vacheesuthum, Vasin Wongrassamee

While there are plenty of forums, question asking platforms and feedback system for students to use (such as piazza and SOLE), there are very few applications that does it live. Our web application, LiveLe, allows the lecturer to gauge the current understanding of the class and answer questions quickly while the students can ask questions without interrupting the lecture

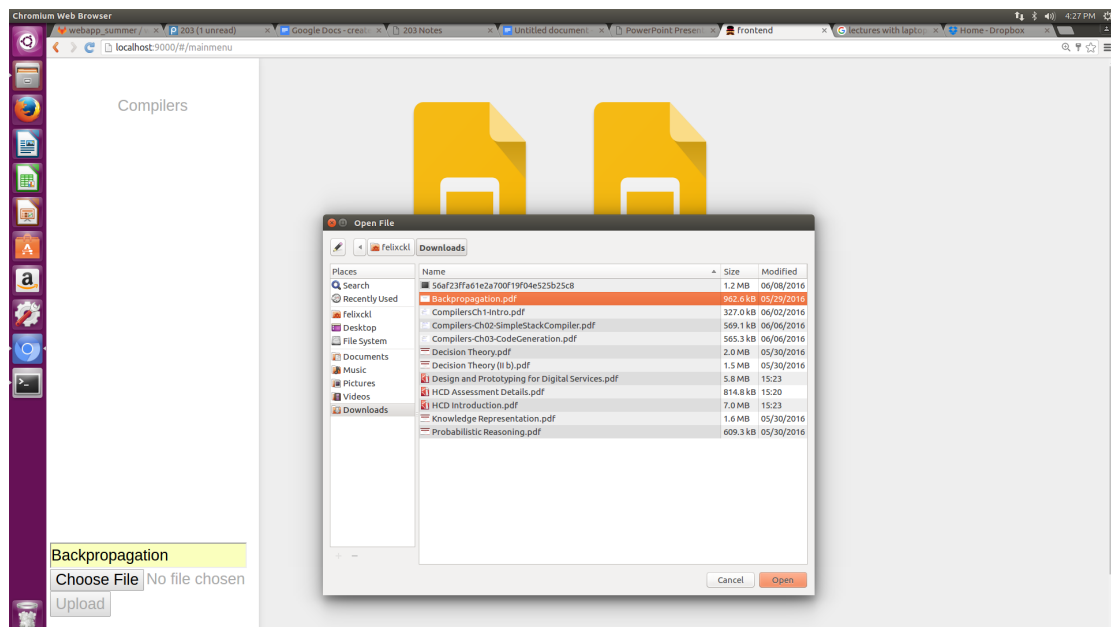


*LiveLe integrates with the whole lecture system very well since lecturer can use it just like any other platform and students always have either a laptop or phone with them*

LiveLe fits perfectly into the lecture system because every notifications and questions from the students are discrete as the lecturer can view them when he want without stopping the lecture. An example of this is when our group did our 20 minutes presentation on this project, we actually use LiveLe (this project itself) to present. The markers were each given a tablet/laptop and it allowed us to address their questions they had about our application rather quickly.



*The student can ask/upvote questions, tell the lecturer if they are going too fast and follow the lecture slides live on their own laptop*



Lecturer can upload slides for their courses before starting the lecture

Imperial College London

## Hidden Layer Cost Gradients 2

- Similarly, for hidden layer  $L-2$  (if there is one) we get

$$\frac{\partial C}{\partial w_{jk}^{L-2}} = \frac{\partial z_j^{L-2}}{\partial w_{jk}^{L-2}} \cdot \frac{\partial a_j^{L-2}}{\partial z_j^{L-2}} \cdot \sum_{i1} \left( \frac{\partial z_{i1}^{L-1}}{\partial a_j^{L-2}} \cdot \frac{\partial a_{i1}^{L-1}}{\partial z_{i1}^{L-1}} \cdot \sum_{i2} \left( \frac{\partial z_{i2}^L}{\partial a_{i1}^{L-1}} \cdot \frac{\partial a_{i2}^L}{\partial z_{i2}^L} \cdot \frac{\partial C}{\partial a_{i2}^L} \right) \right)$$

- Differentiating, we get

$$\frac{\partial C}{\partial w_{jk}^{L-2}} = a_k^{L-3} \sigma'(z_j^{L-2}) \sum_{i1} \left( w_{i1j}^{L-1} \sigma'(z_{i1}^{L-1}) \sum_{i2} \left( w_{i2i1}^L \sigma'(z_{i2}^L) \frac{\partial C}{\partial a_{i2}^L} \right) \right)$$

Introduction to Artificial Intelligence 16

Lecturer can then use LiveLe just like opening a PDF file. They can navigate to the slides they want using all the same controls as they would if they open the PDF itself. This removes the need for the lecturer to adapt to a new platform.