


Chapter 3 - Study of developer challenges using ML

- Manually analyzed posts in  stackoverflow
- Ranked the posts based on reputation and like/dislike ratio
- Categorized the issues based on various factors:
 - Library (Caffe, Tensorflow, Keras)
 - Stage in the ML Pipeline
 - Lifetime of the issue
- Answered research questions like:
 - Problematic Libraries
 - Difficult stages, and many more...

Chapter 4 – Deep learning bug characteristics




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- Analyzed bug related posts  stackoverflow
- Studied various bug characteristics:
 - Which type of bug occurs a lot (data flow/ initialization/ logic etc.)
 - What are the root causes? (API Change, Absence of type checks)
 - Impact of bugs? (Performance, crash etc.)
 - Patterns....

Chapter 5 – Repairing deep neural networks



- Analyzed bug fixes in  **GitHub**
- Answered various bug fix related questions:
 - Which type of fix patterns are common
 - Relation between bug fix pattern and bug types
 - Does fixing a bug introduce a new bug?

Chapter 6 - Amimla: Misuse detection for Machine learning Libraries



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Combines various sources/techniques to detect misuses motivated by study

Detected misuses with 70% precision and 80% recall