Touchless Photo Estimating

John Wensink

MIS480 Capstone

Colorado State University-Global Campus

Dr. Chris den Hejer

December 6, 2020

Touchless Photo Estimating

USAA is a large financial services organization that is unique in the modern landscape in that it is entirely member-owned (USAA, 2020). I chose this organization because I am currently employed there as an auto non-injury claims adjuster, trying to educate myself into the data department of the company, specifically I want to work on a current project in the USAA innovation pipeline. The project (Google, 2020), is public information so I am not divulging any trade secrets, and have no inside information which I have learned from work. As such, my analysis of this project is speculative in nature, with the goal being to approximate the systems at work for this project, at the level of understanding of a Bachelor’s degree. Fortunately, USAA pays for my education, and I do intend to continue my studies with an MS in Cybersecurity.

We are designing a touchless photo-estimating process where the member can submit photos of their damaged vehicle, and within a short processing time have an audited and approved preliminary repair estimate and the necessary parts ordered to the member’s shop of choice. The stated goals of the business information system are threefold. Identify damaged panels by comparing user submitted images to training data in a supervised, Convolutional Neural Network (Qiu, Xu, & Cai, 2018). Second, a supervised classification algorithm using nearest neighbour or decision trees (Pyrtz, 2014) would be used to classify identified damage as most likely to need repaired or need to be replaced based on historical training data. Third, using Mitchell cloud-estimating technology (Mitchell, 2020), order parts to the member’s repair shop-of-choice. The idea is that for simple damage claims where the vehicle is still safe to drive, if this damage estimating system is able to free up our human staff appraisers to use their costly time to focus on the more complex damage claims, our organization will have to rely less on contracted staff appraisers from third party companies such as Audit Services International, Snapsheet, and CCC. This is a project in which USAA is partnering with Google and it seems a likely extension that USAA would also utilize their cloud computing infrastructure as well as their platforms, as a service. Ideally the data storage and computational resources required would be hosted 100% in Google’s cloud servers. There are three main reasons for this. Cloud scalability will allow our project to grow at a reasonable cost all along the way. Google has tremendous uptime for their cloud services as the specialized hardware put to use is always going to be modern and well maintained. Finally the aspect of supporting the massive infrastructure to make this project a success would be nearly all the responsibility of Google. Storing information in the cloud is just putting your data on someone else’s drives. Data security and redundancy are still areas where USAA will have to closely monitor the servers to ensure safeguards such as robust event logging, digital encryption of data moving and at rest, as well as a tiered authentication system and ‘need-to-know’ access. Data should be stored at a minimum of RAID5 redundancy, even if we have to pay more to have recovery systems in place (it is likely that this is a default setting with Google’s cloud storage). Data visualization will be accomplished by leveraging USAA’s existing contract with Tableau. Care must be taken to review the existing contract and determine how much (if any) additional licensing fees would be owed for using this data visualization system outside its normal purposes. Client-side, an augmented reality overlay on the user’s smartphone will show a similar model vehicle for the user to line up their shot, adjusting for brightness, contrast, and saturation. Damage estimators already ues heatmaps of damaged panels built into their cameras, a good connection would allow Google’s servers to preprocess this data and display it live for the user taking the photos for improved user experience. When all of the photos are taken and submitted, the algorithms will perform their functions and a Mitchell damage estimate and photos will be emailed to the user’s address on file. An OpenTable type reservation for damage repairs would confirm shop availability and the member would select a repair time which would allow for the appropriate amount of shipping time for parts to arrive. If the member has rental coverage, the app would prompt the member to leave and go to the Enterprise rental page.

This process is starting to rollout in a test market already. It will have to be carefully tuned and calibrated before we continue the phased rollout to other test markets. When we are comfortable with the accuracy of the BI application, we are anticipating a nationwide rollout. This tool has the potential to revolutionize the physical damage appraisal process and free up our staff appraisers to work on more complicated files, and has the potential to improve over time.

References

Google. (2019). USAA and Google Cloud work together to speed auto claims. Retrieved

November 24, 2020, from <https://cloud.google.com/blog/topics/customers/usaa-and-google-cloud-work-together-to-speed-auto-claims>

Mitchell. (2020). Mitchell Cloud Estimating. Retrieved December 07, 2020, from

<https://www.mitchell.com/products-services/collision-repair-shop-solutions/cloud-estimating>

Pyrtz. (2014). (PDF) Machine learning methods for vehicle predictive maintenance using

off-board and on-board data. Retrieved December 07, 2020, from <https://www.researchgate.net/publication/273452541_Machine_learning_methods_for_vehicle_predictive_maintenance_using_off-board_and_on-board_data>

Qiu, S., Xu, X., & Cai, B. (2018). FReLU: Flexible Rectified Linear Units for Improving

Convolutional Neural Networks. *2018 24th International Conference on Pattern Recognition (ICPR)*. Retrieved from <http://proceedings.mlr.press/v48/shang16.pdf>

USAA. (2020). USAA Company History. Retrieved December 07, 2020, from

<https://www.usaa.com/inet/wc/about_usaa_corporate_overview_history?akredirect=true>