

CMPG 313 (Artificial Intelligence) - Practical Assignment: Training a Machine Learning Model with Teachable Machine.

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During my experimentation with the Teachable Machine, I conducted an evaluation of its proficiency in discerning road signs by training it with a dataset of images, subsequently assessing its performance with untrained images. The focal inquiry pertained to whether the machine primarily acquired knowledge based on the geometric shape of road signs or the visual content encapsulated within those shapes.

The data collection process:

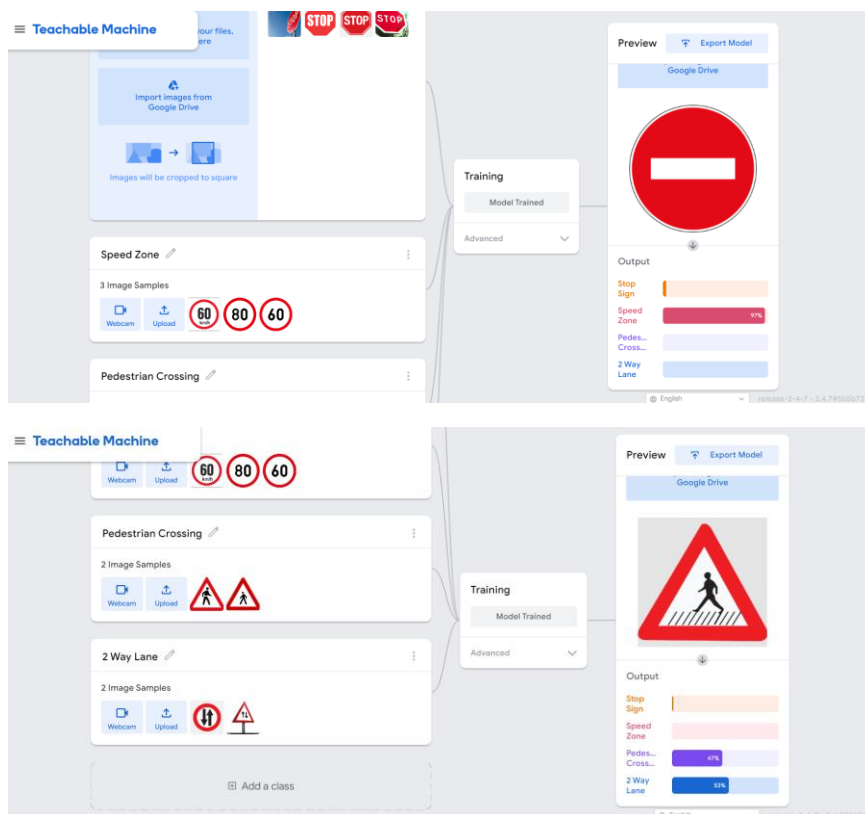
The process of data collection posed certain challenges, particularly in the context of gathering images. Downloading each image individually and categorizing them into specific classes for model training proved to be a laborious task. In contrast, a parallel experiment involving webcam facial features demonstrated a more streamlined data collection process. Leveraging a larger sample size comprising over 40 images captured through the webcam facilitated the accumulation of extensive and varied data, contributing to more robust model training.

Notably, the volume of data directly correlated with the efficacy of the model's learning. In instances where only five images per class were utilized for road signs (Stop sign, speed zone, crosswalk, and a 2-way lane), the model exhibited limitations in accurately identifying untrained images. Conversely, the webcam-based experiment, with its considerably larger dataset, yielded significantly more accurate results.

Teachable Machine experience:

My experience with Teachable Machine was seamless. The user interface proved intuitive, augmented by an array of tutorials available on the platform to accommodate users of varying proficiency levels. A standout feature was the webcam image capture functionality, which facilitated efficient data collection through the capture of image bursts.

While the overall experience was commendable, an enhancement that would streamline the data collection process would be the ability to directly drag and drop images from online sources, such as Google Images, negating the need for preliminary downloads to the desktop. This modification would not only improve user convenience but also expedite the dataset compilation process.



Learnings and Applications:

I've come to appreciate that machine learning is a versatile tool accessible to individuals across various backgrounds, owing much of its appeal to its user-friendly nature. Despite the inherent challenges in data collection, the Teachable Machine emerges as a potent resource, particularly when furnished with sizable, well-curated datasets.

The core premise behind my exploration was to harness the prevalence of cameras in contemporary vehicles, envisioning a scenario where these cameras could be employed to enhance driver awareness. Specifically, my concept revolves around leveraging machine learning to interpret visual cues from the surroundings, thereby providing timely alerts to drivers about upcoming speed zones or stop streets. This proposal operates independently of conventional navigation systems like Google Maps, tapping into the built-in cameras now commonplace in modern automobiles.

The intrinsic value of this idea lies in its potential to cater to the needs of individuals navigating unfamiliar terrains. As someone frequently traversing foreign locales, the prospect of receiving real-time information about impending speed limits or stop signs holds considerable practicality. In essence, this innovation seeks to empower drivers with pertinent information directly from their vehicle's sensors, ensuring a heightened level of situational awareness without dependence on external mapping services.

By embracing the ease-of-use characteristic of machine learning tools, coupled with the ubiquity of in-car cameras, this concept envisions a seamless integration of technology into daily driving experiences. The envisaged system would not only contribute to enhanced road safety but also cater to the convenience of drivers navigating diverse and unfamiliar road networks.

My Teachable Machine Link: <https://teachablemachine.withgoogle.com/models/jswyIHNCm/>