



DataForce For Automotive

The driver experience of the future starts with high-quality data for superior sensor performance and seamless human-machine interaction. DataForce collects and labels data for computer vision, LIDAR, and voice interfaces augmented by testing services and UX research.

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01

Image, Video, and LIDAR Labeling

Most automotive companies are embedding features that makes their vehicles capable of sensing the environment and moving safely with little or no driver's input. To this end, the embedded intelligent component must:

- Capture real-time images from outside and inside the car. Images taken inside the car are used to monitor the driver's status, including the degree of drowsiness, gaze estimation, and emotions (angry, sad, happy, etc.). Images and LIDAR data outside the car focus on street boundaries, other vehicles, obstacles and pedestrians and their corresponding actions or intentions.
- Process captured images/videos to identify the current status.
- Make proper decisions based on the current status.
- Execute corresponding action items.



How We Can Help

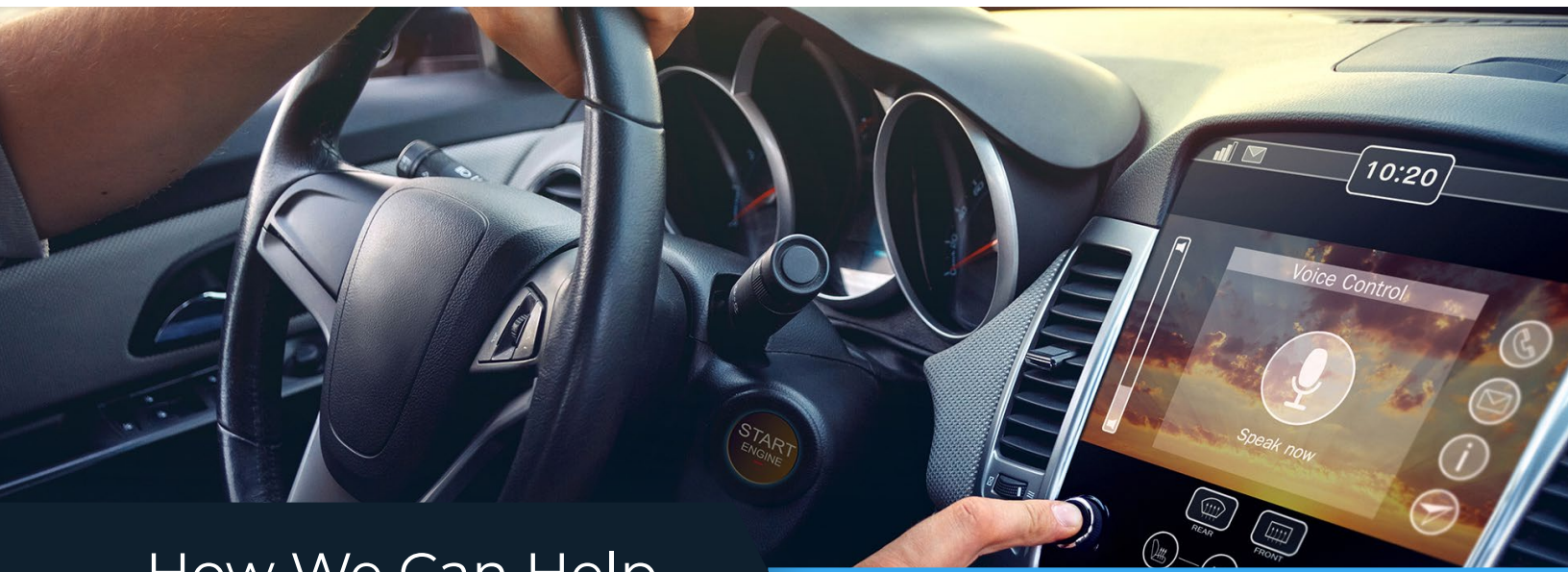
Developing such systems requires training and testing machine learning models (e.g., convolutional neural networks) with a huge amount of accurately annotated data (i.e., images and frames of videos). DataForce will help you to:

- Collect required images/videos by using our proprietary mobile app, DataForce Contribute, or custom hardware and software
- Annotate collected images/videos with required information by:
 - » Identifying image/video-level attributes such as monitoring risk and determining the proper action;
 - » Identifying objects in the scene such as other vehicles, pedestrians, obstacles, etc.;
 - » Annotating objects with object-level attributes; and
 - » Annotating the driver's face with facial landmarks, which are used to develop predictive models for monitoring

02

Localization of Virtual Assistants and Infotainment Systems

Even though there is a popular belief that English is the world's most-spoken language by total number of native speakers, that is not true. In fact, Mandarin is the first and Spanish is the second in the ranking, followed by West Germanic tongues, Hindi, Arabic, Portuguese, Bengali, and Russian. This is why voice interaction systems in cars should be available in various languages, and not only in English. Being able to speak in their native language enhances user experience and has positive impacts in terms of safety, as it does not require drivers to think too much by translating their intent into the necessary language. However, localizing these systems in all different languages is not an easy job, and it requires a whole adaptation of NLU and NLG, as well as other components of the virtual assistant.



How We Can Help

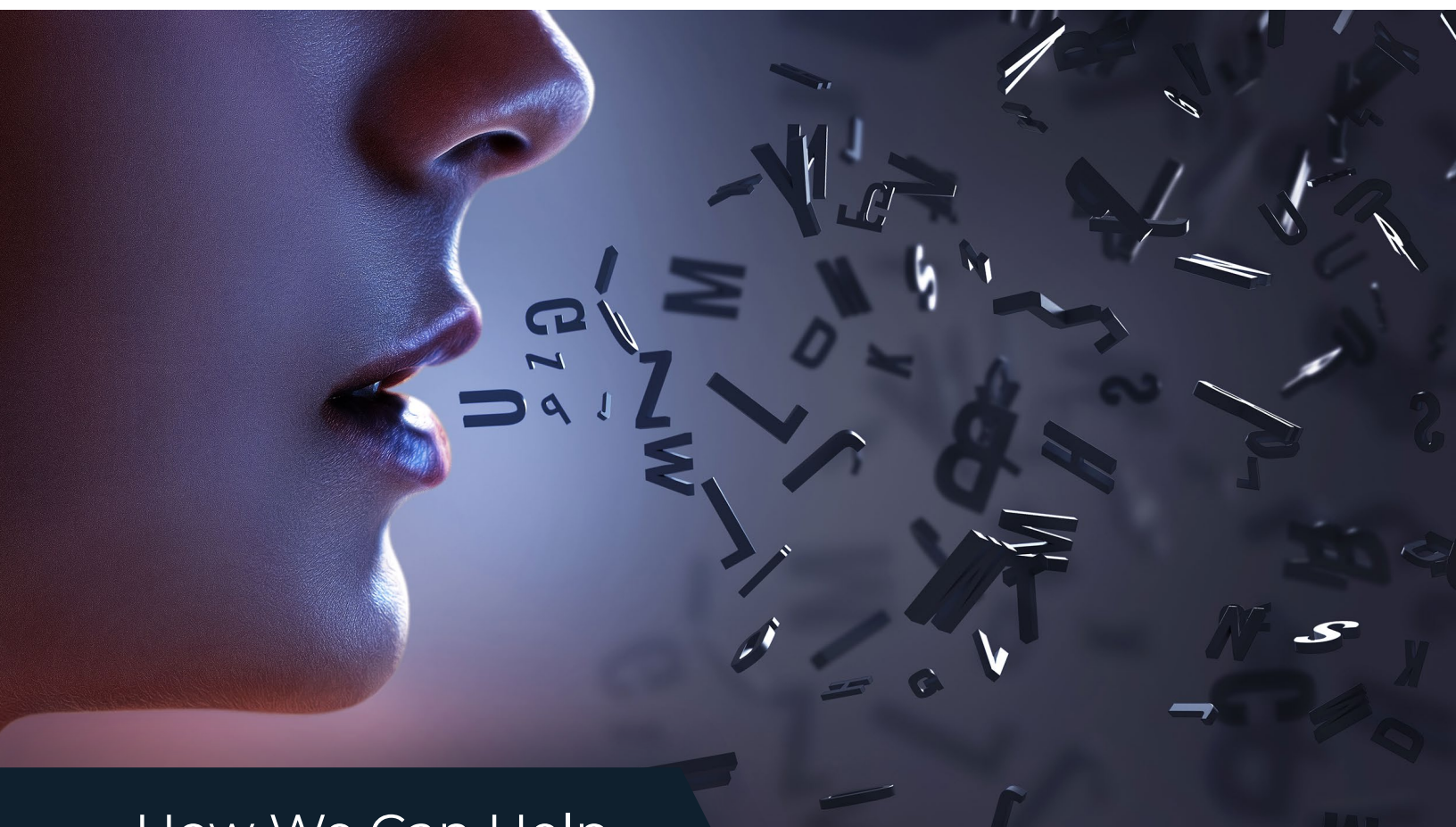
To scale up your in-car voice assistant in more languages and markets, DataForce has developed a specialized, end-to-end localization process and can support you in more than 250 languages. To teach virtual assistants various languages, we start by sourcing custom voice data to train accurate ASR models, and then we annotate training data (prompts) for state-of-the-art NLU, develop context-free grammars (CFGs), and transcreate system

responses to ensure a superior user experience. DataForce's phoneticians fine-tune your text-to-speech system for fluent, high quality responses reflecting your brand and the local culture. Finally, we test your virtual assistant and infotainment system in-lab or in-vehicle. Our end-to-end process has helped our clients' user acceptance rates increase by 30% across all implemented languages.

03

Text-to-Speech Tuning

Speech synthesis technology has recently become a must in the automotive industry, as it improves the driver's experience and increases security. Drivers are now able to read notifications, receive directions, or interact with the vehicle's features while keeping their eyes on the road. To make this interaction as natural as possible, the speech synthesizer must be perfectly tuned.



How We Can Help

DataForce can help you review text-to-speech (TTS) synthesis. To do that, we start by screening phoneticians with knowledge of the platform and experience in phonetic transcription. Then,

we review TTS synthesis output of the platform and make necessary changes, before finally delivering edited strings with necessary mark-ups to the client.

04

Speech-to-Text Transcription

Speech recognition is already seen as a commodity feature inside vehicles. Different commands related to the car infotainment system, navigation, and audio devices can be done 100% via voice. In the automotive sector, the biggest challenge to making these systems properly work is the specific acoustic environment found in cars.



How We Can Help

DataForce can help transcribe audio recordings, including user prompts, conversations, or other audible signals, enabling our clients to optimize their ASR systems and improve the accuracy of their speech-to-text systems. DataForce has developed state-of-the-art transcription, timestamping, and labeling tools, KPIs, and processes, and has thousands of

trained transcribers that cover more than 250 languages. We can also collect audio using our proprietary mobile app, DataForce Contribute, or custom hardware and software. The audio can include user prompts in different driving conditions or in a quiet environment combined with ambient noise collection.

05

Development and Optimization of Natural Language Understanding

NLU enables human-computer interaction (HCI), which makes it possible for computers to infer what you actually mean when you speak a command, rather than only capturing the words you say. This allows you to have a more natural conversation, as you aren't limited to only one way of making a specific command. You simply speak the command in your everyday language and the virtual assistant should understand it.



How We Can Help

DataForce can support the creation of an NLU model in more than 250 languages. We do this by:

1. Recruiting possible users of the product to ensure coverage of natural prompts from real life;
2. Generating data collection surveys to gather natural language prompts from participants;
3. Reviewing data with linguists who are both familiar with the product and experienced in building NLU models;
4. Developing or localizing CFGs following the structure provided by the client;
5. Reviewing the generated NLU model with senior reviewer linguists of target languages;
6. Creating test sets in the target language;
7. Testing the NLU model regularly to monitor performance throughout the development life cycle; and
8. Delivering the NLU model to the client.

06

Transcription of System Responses

In-car voice assistants simulate human interaction and the only way to make that possible is by building a unique persona. Specific tone, cultural references, politeness, and other items are to be treated carefully when adapting to other languages in order to avoid misunderstandings or uncomfortable reactions. The process of adapting both the responses and cultural content is called “transcreation,” and the chatbot localizer takes these elements into account.



How We Can Help

DataForce can help you transcreate assistant responses by:

1. Performing source text analysis to give a better understanding to translators;
2. Transcreating target texts by applying tone and intentions of source text;
3. Performing monolingual review in the target language to ensure cultural fit and legal compliance; and
4. Testing the responses as part of our user acceptance testing, linguistic testing, and user studies.

07

In-Lab or In-Vehicle Testing

Automotive original equipment manufacturers (OEMs) and suppliers are always challenged to provide in-vehicle features that are exciting to their customers. Testing these “dynamic” systems can be a difficult task, but it is a crucial step and can define whether you are releasing a successful product to the market or a total failure.



How We Can Help

DataForce offers in-lab or in-vehicle testing services for its clients. We support UI testing and IVR testing, as well as UX/UA (user experience/user acceptance) testing, focusing on the ease of use and overall experience across a range of demographics to ensure the product is well-received by all. We also offer accessibility testing

to make sure people with disabilities are kept in mind when designing the overall experience. In addition, we can automate things like functional testing and screen capturing for both linguistic testing and creating reference materials such as user guides and manuals.

08

User Studies

When in-lab and functional testing is over, it's time to evaluate user experience with real users in real environments, with a large, diverse, and targeted group of testers. What do drivers and passengers say about their experience using your new version or product while driving at different speeds or being stationary, and with the windows closed or open?



How We Can Help

We can help you design, run, and analyze user experience studies by:

1. Recruiting up to 2,000 users at a time per study and per language;
2. Creating or implementing evaluation scenarios;
3. Capturing video and audio recordings of the user's interaction with the virtual assistant or the infotainment system; and
4. Annotating and transcribing captured videos and audio for quantitative analysis and training of ML models using our specialized GlobalLink DataForce toolkit.