Ruina
A mobile crash data reporting app
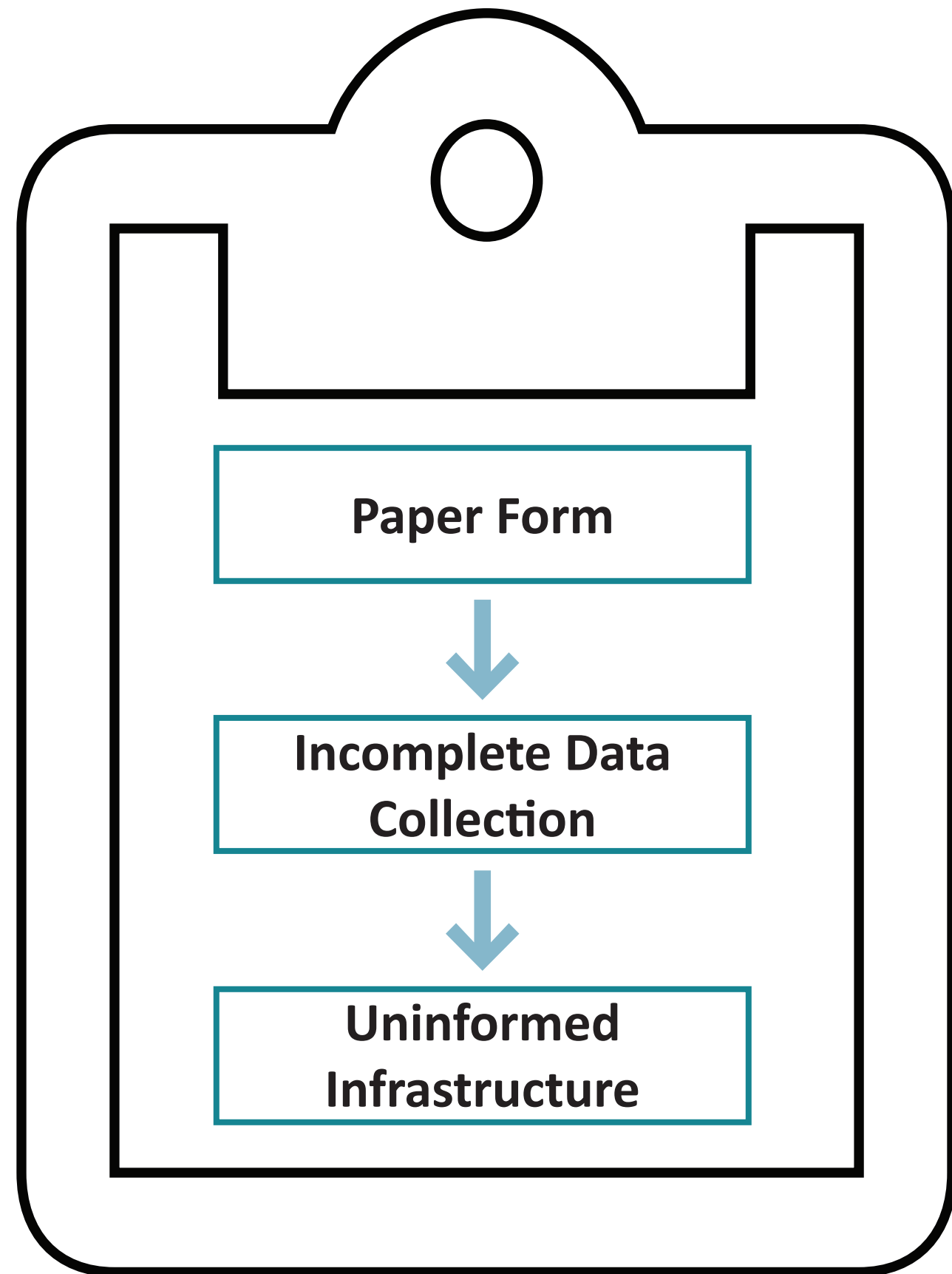
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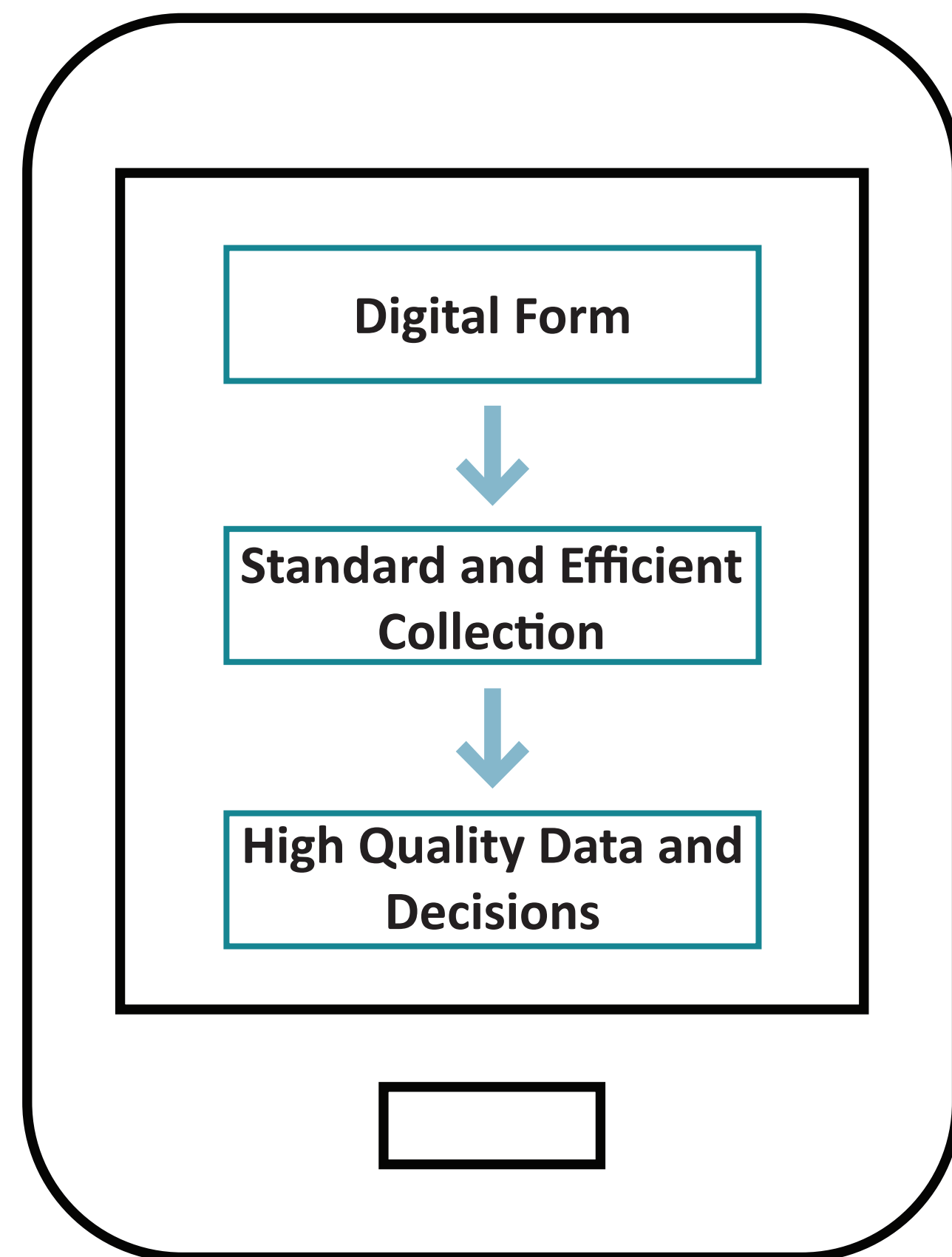U.S. Department of Transportation Volpe Center

SANTOS FAMILY FOUNDATION

Project Context

Every year, thousands of lives are lost due to traffic crashes. High-quality and thorough crash data could help inform better infrastructure decisions and reduce the frequency of crashes, especially for marginalized communities.
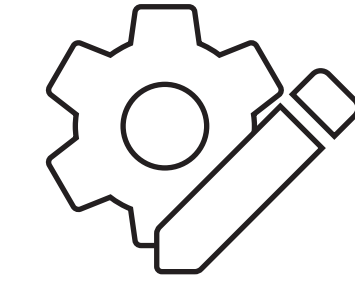
Problem

- Paper Form
  - ↓
- Incomplete Data Collection
  - ↓
- Uninformed Infrastructure

Solution

- Digital Form
  - ↓
- Standard and Efficient Collection
  - ↓
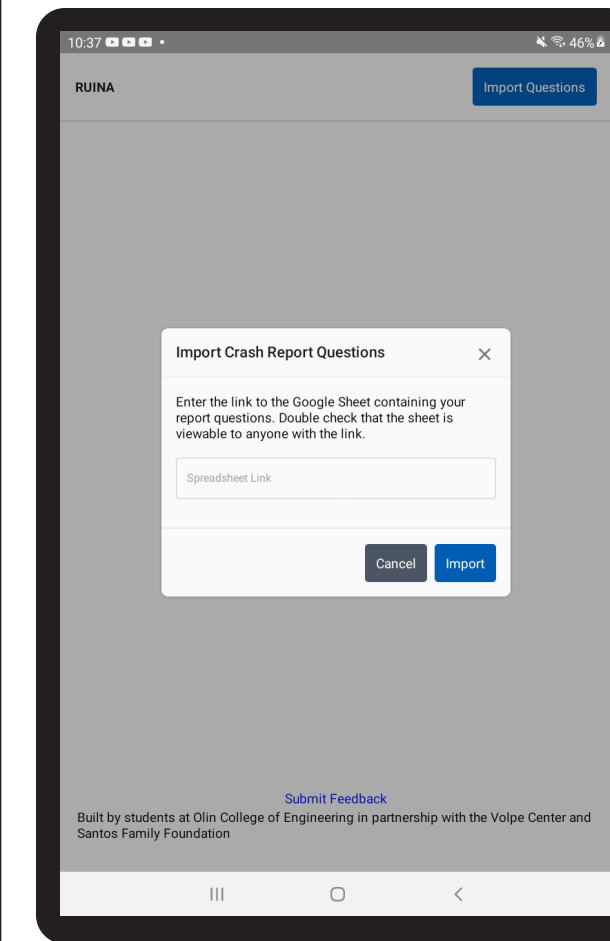- High Quality Data and Decisions

Current crash data collection systems are ineffective. Most jurisdictions only use paper forms, which makes data collection more cumbersome, result in data redundancies, and is prone to data loss and non-standardized data. As a result, there is **irregular, low quality, and low quantity data for data analysis**, which makes it difficult to understand the causes of traffic crashes and make any informed infrastructure or policy decisions. To solve these problems, we introduce **Ruina, a cross-platform application for standardized and efficient collection of crash data**. Ruina has an easy-to-use interface to make the process of collecting crash data simple and intuitive and uses standardized questions developed by experts to collect all of the most necessary information from traffic crashes. This is the 3rd year of this SCOPE project, and this year, **we focused on getting the app to a sustainable state for both future developers and future users**.

Future Work

During the year, we ran two three-week user testing sessions. From our testing sessions, we learned that **Ruina needs to be as easy-to-use as a form-fillable PDF, separate on-site and off-site questions, and provide more customization for jurisdictions in rural areas**. These insights suggest that further development on Ruina should focus on emphasizing its intelligent capabilities (like auto-fill, data validation, connection to a database), and making the user experience as intuitive as possible. While this is the final year of the SCOPE project, **Ruina will be handed off to the Volpe Center for further development**. To help future developers, we created a hand-off guide that details all of the features of the app and possible improvements. We also included proposed designs for other potential features that may be valuable to users.

Features Spotlight

App Customization

Ruina is highly customizable, making it easier for jurisdictions to adapt the app to their specific needs. The interface for question customization is a Google Sheet that is simple and accessible even for non-technical users. **Users can add, delete, or edit any questions Users enter the link to the spreadsheet into the app, which then automatically downloads the spreadsheet and processes the questions**, making the process of customizing Ruina seamless and intuitive.
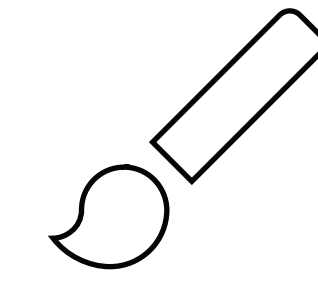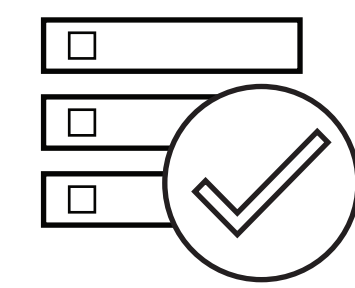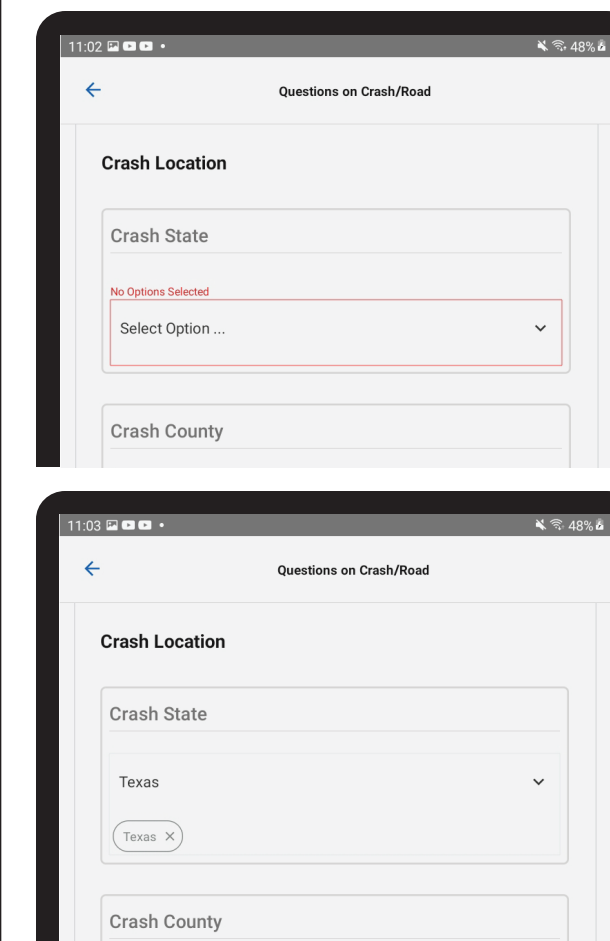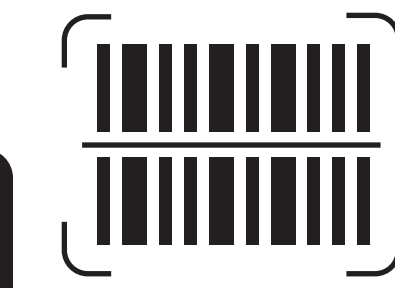
Diagram Tool

A crucial element of a crash report is a diagram of the crash, which provides more contextual visual information about the crash. **The diagram tool allows users to free-draw a diagram of the crash and capture the evolution of the crash**. Future improvements to this tool could include the stamps to make it easier to draw a diagram.
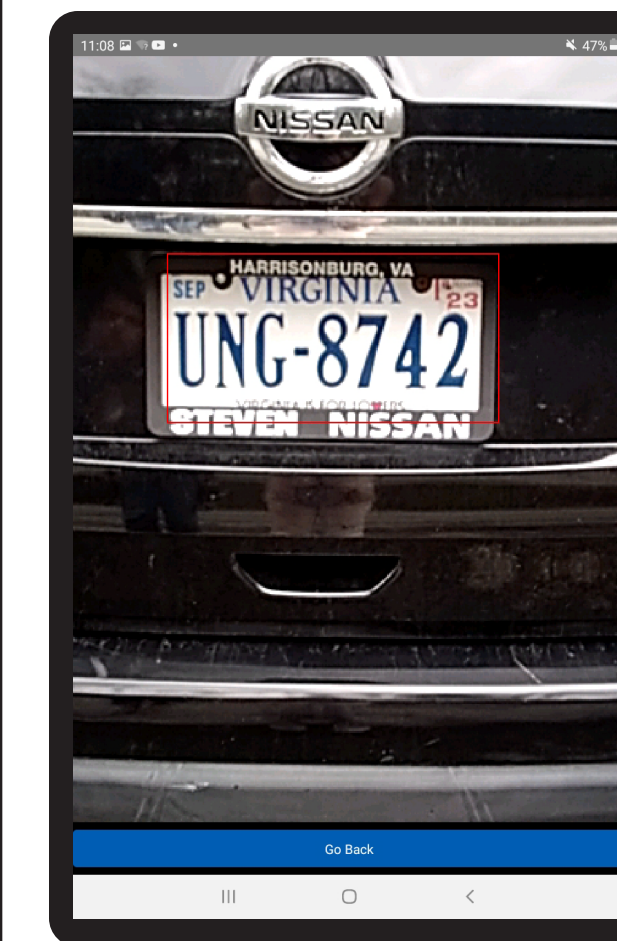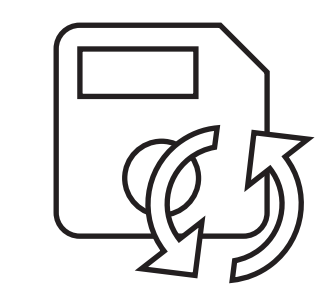
Data Checks

Ruina can automatically **check whether user input is valid**, which helps ensure high-quality crash data. This includes checking that users don't select too many or too few options if the question expects a certain number of selected options and checking that responses are of a valid length. Users can also **configure the validation type and constraint for any question using the customization spreadsheet**.
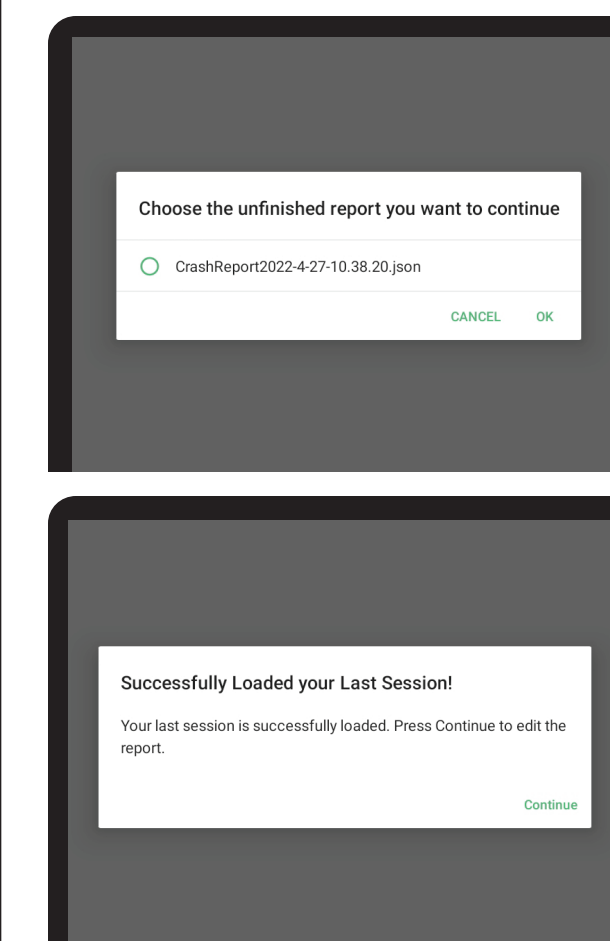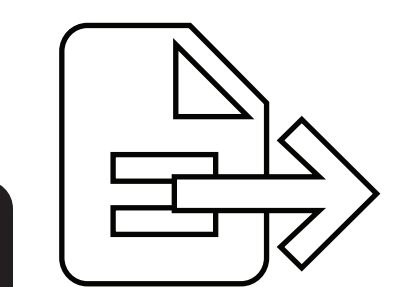
Autofill Fields

One of the incentives to use Ruina is its intelligent features, like autocomplete. The app can **auto-fill data like the license plate using OCR, driver's license data by scanning the driver's license barcode, and crash location using GPS**. These features help the user fill out the report quicker and increase the accuracy of the inputted data. Future additions include VIN scanning and vPIC querying to auto-fill vehicle information.
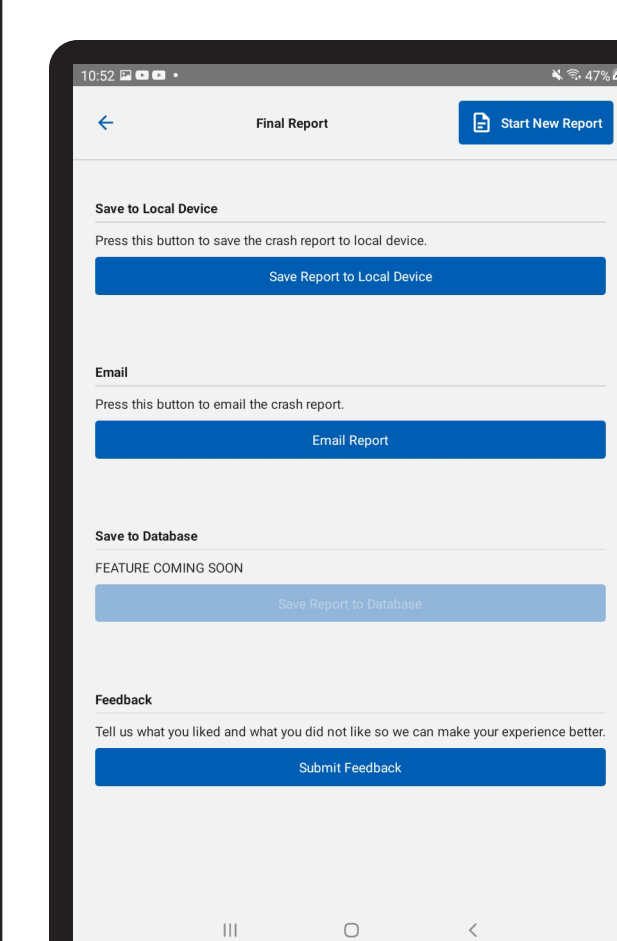
Autosave Report

Ruina periodically **automatically saves reports** to ensure that there is always a record of the current report. This is helpful in situations where users might need to start a new report before they've finished their first report. This year, we updated the auto-save feature to be able to maintain records of **multiple in-progress reports**.

Export Report

Ruina can export a report as a PDF, HTML, or Excel file. Each of the file types can be saved to the device creating the report or can be emailed to the supervisor for crash data collection. This form of exporting allows the transition from paper to digital to be smoother because it does not require a complete overhaul of the existing report system, but improves the collection and management of data.