

# Reporting Motor Vehicle Accidents with a GNSS based application

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# Overview

- Background
- Current Method & Associated Problems
- Other Methods
- My Application - Demonstration
- A-GPS Accuracy
- Summary

# Background

## Problem:

- Current accident reporting systems used in N.B. are hand written and outdated

## Objective:

- Prove the accuracy of GNSS vs. conventional method
- Build a phone APP to demonstrate the ease of locating and digital reporting

## Research:

- Research the current methods used in N.B.
- Research other digital methods used worldwide

# Current Method/System

- Hand Written

New Brunswick  
DEPARTMENT OF TRANSPORTATION

REPORT OF MOTOR VEHICLE ACCIDENT  
PLEASE PRESS FIRMLY - YOU ARE MAKING 3 COPIES

ACCIDENT CASE NO. 872182

REPORT TYPE: ORIGINAL ACCIDENT

REPORTER'S NAME: [Handwritten]

REPORTER'S ADDRESS: [Handwritten]

REPORTER'S PHONE: [Handwritten]

REPORTER'S OCCUPATION: [Handwritten]

REPORTER'S SIGNATURE: [Handwritten]

DATE OF ACCIDENT: [Handwritten]

TIME OF ACCIDENT: [Handwritten]

LOCATION OF ACCIDENT: [Handwritten]

ROAD SURFACE CONDITION: [Handwritten]

WEATHER: [Handwritten]

ROADWAY ALIGNMENT: [Handwritten]

TRAFFIC CONTROL FACILITIES: [Handwritten]

VEHICLE IDENTIFICATION: [Handwritten]

TOWED UNIT: [Handwritten]

POSITION IN OR ON VEHICLE: [Handwritten]

SECTION FROM VEHICLE: [Handwritten]

SAFETY EQUIPMENT USED: [Handwritten]

OFFICIAL'S NAME AND ADDRESS: [Handwritten]

NAME AND ADDRESS: [Handwritten]

40-3100 (11-30) MOTOR VEHICLE DIVISION - PART 1

New Brunswick  
DEPARTMENT OF TRANSPORTATION

REPORT OF MOTOR VEHICLE ACCIDENT  
PLEASE PRESS FIRMLY - YOU ARE MAKING 4 COPIES

ACCIDENT CASE NO. [Handwritten]

REPORT TYPE: ORIGINAL ACCIDENT

REPORTER'S NAME: [Handwritten]

REPORTER'S ADDRESS: [Handwritten]

REPORTER'S PHONE: [Handwritten]

REPORTER'S OCCUPATION: [Handwritten]

REPORTER'S SIGNATURE: [Handwritten]

DATE OF ACCIDENT: [Handwritten]

TIME OF ACCIDENT: [Handwritten]

LOCATION OF ACCIDENT: [Handwritten]

ROAD SURFACE CONDITION: [Handwritten]

WEATHER: [Handwritten]

ROADWAY ALIGNMENT: [Handwritten]

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TOWED UNIT: [Handwritten]

POSITION IN OR ON VEHICLE: [Handwritten]

SECTION FROM VEHICLE: [Handwritten]

SAFETY EQUIPMENT USED: [Handwritten]

OFFICIAL'S NAME AND ADDRESS: [Handwritten]

NAME AND ADDRESS: [Handwritten]

40-3100 (11-30)

# Problem 1: Accuracy

- There is no set standard or tolerance in recording the location of an accident
- NB Motor Vehicle Act (130-139)

LOCATION	COUNTY	CODE	STREET, ROAD, HIGHWAY NAME			CIVIC NUMBER	ROUTE	SECTION
	1. IN 2. NEAR		LOCATION CODE					
	CITY, TOWN, VILLAGE		1. URBAN STREET 2. PRIVATE PROPERTY (URBAN) 3. ALLEY	4. SERVICE ROAD 5. PROVINCIAL HIGHWAY (URBAN) 6. PROVINCIAL HIGHWAY (RURAL)	7. UNNUMBERED RURAL ROAD 8. RURAL SUBDIVISION STREET 9. PRIVATE PROPERTY (RURAL)			
	N.B. D.O.T. USE ONLY		LOCATION DETAILS			NEAREST BRIDGE OR INTERSECTING ROADWAY		NUMBER
SITE CODE		1. METRES 2. KILOMETRES 3. AT	1. NORTH 2. SOUTH 3. EAST 4. WEST	OF	NAME			
ROUTE	SECTION	AT INTERSECTION WITH (IF APPLICABLE)						
KM		1. PROVINCIAL HIGHWAY 2. RURAL STREET / ROAD 3. URBAN STREET	4. COMMERCIAL APPROACH 5. PRIVATE APPROACH 6. ALLEY		7. RAILROAD			

# New Brunswick Road Network

- Referencing accidents in rural areas



# 2006 NB Accident Data

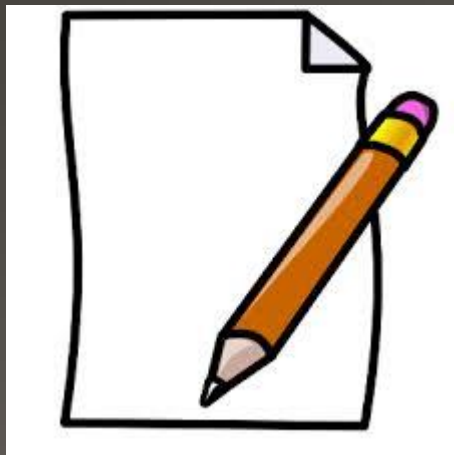
- All the data is sanitized
- 14610 accidents
- 54 fields of information for each accident
- Inconsistency's in format, abbreviations, measurement units
- Creates problems when managing data in a GIS

# Problem 2: Blunders

Error Type	Example
Street Spelling	LANDSDOWNE LANSDOWN LANSDOWNE
Street Type	SHERRARD AVE SHERRARD ST
Day of the month format	03 3
Accident Time	700 7
Coding	Code 2 (km), quantity: 800 (Code 1 for metres should have been selected)

# Problem 3: Transcribing

- Getting the data into the GIS
- It's redundant
- Another source of error



Motor Vehicle Accident Report



Transcribing.



Data Base

# Other Methods

## Hand held GPS

- Coordinates are transcribed to the report
- Source of error



## MDT integrated with GPS and GIS maps

- GPS on the car
- GIS maps are stored on the MDT



# Demo



# MIT App Inventor 2

- Designer Interface

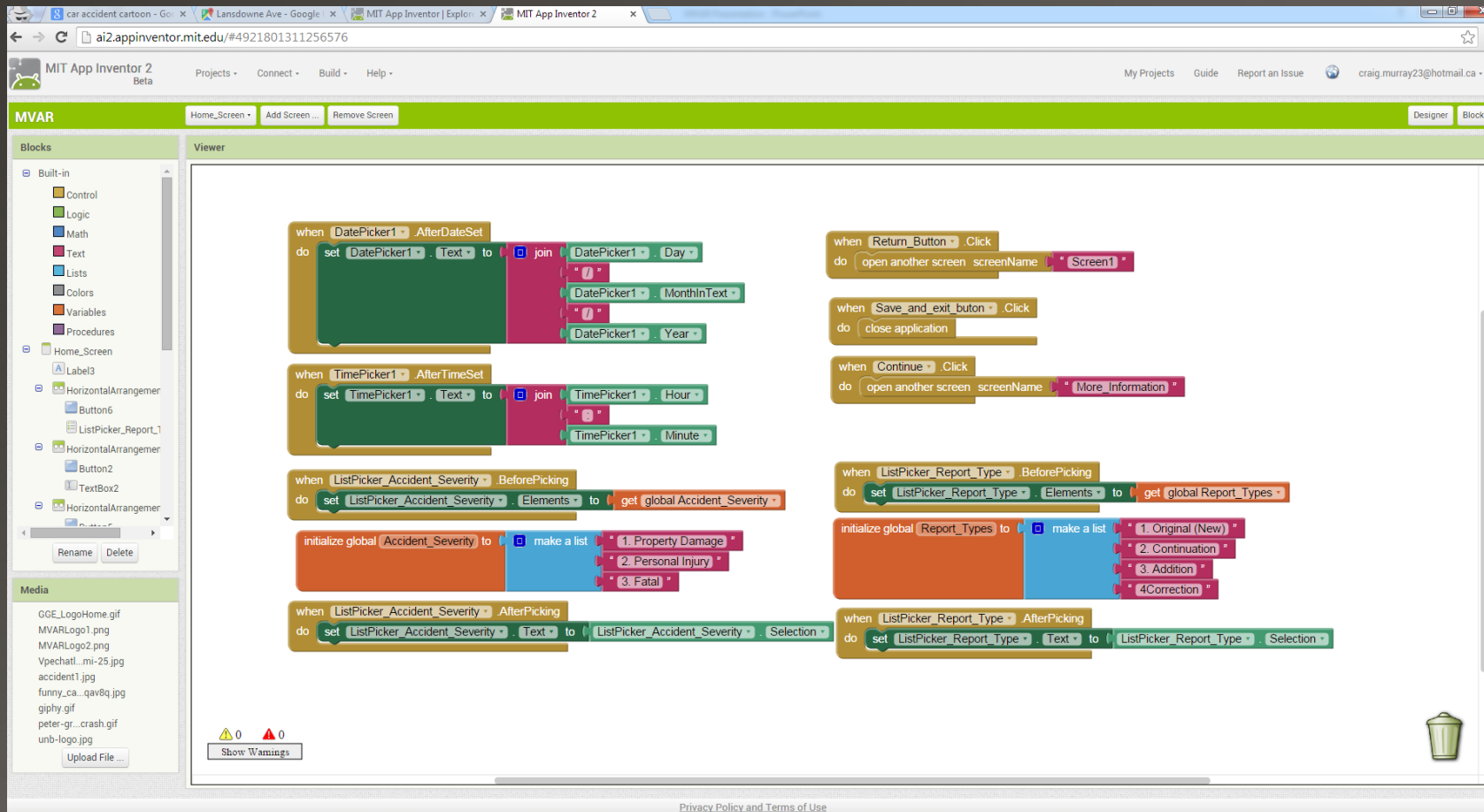
The screenshot displays the MIT App Inventor 2 Designer Interface. The browser address bar shows the URL `ai2.appinventor.mit.edu/#4921801311256576`. The interface is divided into several panels:

- Palette:** A sidebar on the left containing various UI components categorized by type: User Interface (Button, CheckBox, DatePicker, Image, Label, ListPicker, ListView, Notifier, PasswordTextBox, Slider, Spinner, TextBox, TimePicker, WebViewer), Layout, Media, Drawing and Animation, Sensors, Social, Storage, and Connectivity (LEGO® MINDSTORMS®).
- Viewer:** The central workspace showing a mobile app design for "MVAR Login". The design includes a header with a car accident cartoon, a "Credentials" section with "User Name:" and "Password:" text boxes, a "Login" button, a "Save Login Info" checkbox, a "Change Password and Username" button, and an "About" button. A "Hint user & password" label is also present. Below the design, "Non-visible components" includes a "TinyDB1" database component.
- Components:** A tree view on the right showing the hierarchical structure of the app's components, including "Screen1", "VerticalArrangement1", "Image1", "Label3", "HorizontalArrangement1", "TableArrangement1", "Label1", "Label2", "PasswordTextB...", "UserNameTextB...", "VerticalArrangement...", "checklabel", "HorizontalArrangement...", "LoginButton", "CheckBox1", "Button1", "TableArrangement2", and "about\_button".
- Properties:** A panel on the right showing the properties for the selected "Screen1" component, such as "AboutScreen", "AlignHorizontal" (Left), "AlignVertical" (Top), "AppName" (MVAR), "BackgroundColor" (White), "BackgroundImage", "CloseScreenAnimation" (Default), "Icon", "OpenScreenAnimation" (Default), "ScreenOrientation" (Unspecified), "Scrollable", "Title" (MVAR Login), "VersionCode" (1), and "VersionName" (1.0).

At the bottom of the interface, there is a "Privacy Policy and Terms of Use" link.

# MIT App Inventor 2

- Block Editor Interface



# Cell Phone Location Accuracy

- Assisted GPS (A-GPS)
  - +/- 8m
  - GPS and GLONASS systems
  - Uses hybrid method to speed up initial location
- Wi-Fi Positioning
  - +/- 74m
  - Uses wireless access points and signal intensity
- Network Positioning
  - +/- 600m
  - Triangulation from known precise locations of towers and signal strength

# Summary

## Benefits

- Fewer sources of error
- A-GPS Accuracy is superior
- No Redundancy – Spatially referenced Reports are ready for the GIS

## Limitations

- Security (Encryption)
- WGS84 Datum may not be useful

# Acknowledgments

- Dr. Wachowicz
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- Daniel Mason
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- S/Sgt. James Bates
- Cpl. Rick Younker

### GPS Location

#### Current Location

Address: University of New Brunswick - Fredericton  
687-747 Beaverbrook St  
Fredericton, NB E3B 9Y4  
Canada

GPS: 45.95034 , -66.6412

Record Current Location

#### Recorded Location

Address: Unknown

GPS 0 , 0

View My Location on Map

Return

