FAMU/FSU College of Engineering

Department of Electrical and Computer Engineering

Testing and Validation

Team 301 – FPL Pole Health Detection
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GPR Simulation Tests

Test 1:

Date: Feb 11, 2021
Test: Using gprMax to simulate 2D cross section (22cm in diameter) with void in the center
Expectation: Simulation will produce magnetic and electric field waveforms and 2D model
Results: Output did not compile; model is too big for the given space

Test 2:

Date: Feb 11, 2021
Test: Using gprMax to simulate 2D cross section (11cm in diameter) with void in the center
Expectation: Simulation will produce magnetic and electric field waveforms and 2D model
Results: Model successfully compiled

Test 3:

Date: Feb 11, 2021
Test: Using gprMax to simulate 2D cross section (11cm in diameter) without any void
Expectation: Simulation will produce an output similar to Test 2 with varying waveform
Results: Model compiles and produces a different waveform from Test 2; proving that GPR will work as a sensor for our applications

GPR Image Classification Tests

Test 1:

Date: Mar 10, 2021
Test: Using ImageAI to train an image classification AI that can identify a good vs bad pole. This test uses the ResNet50 model and all tests.
Num_objects = 25
Num_experiments = 100
Num testing data = 20
Num training data = 80
Expectation: Trained model will be able to recognize a good and bad pole
Results: The model is unable to correctly identify a good or bad pole

Test 2:

Date: Mar 10, 2021

Test: Using ImageAI to train an image classification AI that can identify a good vs bad pole. This test uses the ResNet50 model and all tests.

Num_objects = 2

Num_experiments = 200

Num testing data = 30

Num training data = 80

Expectation: Trained model will be able to recognize a good and bad pole

Results: The model is unable to correctly identify a good or bad pole

Test 3:

Date: Mar 10, 2021

Test: Using ImageAI to train an image classification AI that can identify a good vs bad pole. This test uses the ResNet50 model and all tests.

Num_objects = 2

Num_experiments = 150

Num testing data = 90

Num training data = 230

Expectation: Trained model will be able to recognize a good and bad pole

Results: The model is unable to correctly identify a good or bad pole

Test 4:

Date: Mar 10, 2021

Test: Using ImageAI to train an image classification AI that can identify a good vs bad pole. This test uses the ResNet50 model and all tests using a Ricker waveform.

Num_objects = 2

Num_experiments = 50

Num testing data = 10

Num training data = 80

Expectation: Trained model will be able to recognize a good and bad pole

Results: The model is unable to correctly identify a good or bad pole

Test 5:

Date: Mar 10, 2021

Test: Using ImageAI to train an image classification AI that can identify a good vs bad pole. This test uses the ResNet50 model and all tests using a Ricker waveform.

Num_objects = 2

Num_experiments = 100

Num testing data = 400

Num training data = 980

Expectation: Trained model will be able to recognize a good and bad pole

Results: The model is unable to correctly identify a good or bad pole

Test 6:

Date: Mar 10, 2021

Test: Using ImageAI to train an image classification AI that can identify a good vs bad pole. This test uses the InceptionV3 model and all tests using a Ricker waveform.

Num_objects = 2

Num_experiments = 50

Num testing data = 10

Num training data = 80

Expectation: Trained model will be able to recognize a good and bad pole

Results: The model is unable to correctly identify a good or bad pole

Test 7:

Date: Mar 10, 2021

Test: Using ImageAI to train an image classification AI that can identify a good vs bad pole. This test uses the ResNet50 model and all tests using a Ricker waveform.

Num_objects = 2

Num_experiments = 100

Num testing data = 40

Num training data = 230

Expectation: Trained model will be able to recognize a good and bad pole

Results: Trained model can accurately classify good and bad pole waveforms from the GPR simulation.