MULTI-USE METHOD AND SYSTEM FOR CAPTURING PNM DATA

INTERPRETATION EXPERTISE

INVENTORS:

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Description

We constructed a software tool that lets experts tag impairments in spectrum data. We intend to enhance it in several novel ways, including the last on this list that will make it truly unique, as we create a way to gather systems information through this method too. The results can be used for human training, anomaly detection training, benchmarking, gage capability analysis, and collecting the needed information for automating maintenance tasks further into the field, including creating a technician assistance program that directs the technician to choose the most likely solution first.

From the current draft tool that exists, we add several enhancements that make it truly unique.

- Add several impairments: Adjacency, Filter, Suckout, Resonant Peaking, Roll Off, Standing Wave, Water Wave, Tilt, Flat Loss, Pullout, RF Ingress (FM, direct pick up, Cellular, VHF, Switching Regulator, Power Line Gap, CPD, maybe as second pick in pull down).
- Add the ability to make a note with the tagging. This is especially important with "unknown" because they may want to add an impairment type this way, or have a guess added, or other comment about the unknown, for later discussion. This can also capture failure mode and effects information.
- Add the resolution bandwidth for the capture with the plot, maybe specify the bin-width or resolution bandwidth, state the segment width. And-or add the X axis to show the start frequency and show the frequency grid too, so that you can see the frequency associated with the data (helps with some identifying). Provide resolution bandwidth for the capture. Bin-width or resolution bandwidth, segment width divided by bins per segment. Starting frequency too.
- Compare spectrum with RxMER per subcarrier, lined up by subcarrier. May need to generalize to PreEQ and ChEst, and allow or force inversion.
- Would need the X axes lined up, so adjustments to make there. As for y axes, one can be on the left and the other on the right, as the two data sets have different values yet need to line up by bin-frequency.
- Color overlapping plots consistently so that the color indicates the data type.
- Add ability to mark severity in 3 to 5 levels for now, like Ignore, Watch, Investigate, Prioritize, Emergency.
- Add an option for notes about the file(s) being shown, from the meta data or other source such as an external table that matches metadata with the file name.
- We add the ability to capture more information than just the impairments. For example, there may be ways to tell a type of filter, or whether the water is in the coax or a tap or an active component. Because there is more information to capture beyond the anomaly, we add several ways to gather this information including a basic assumed failure mode breakdown in a menu approach, with the ability to capture severity (effect and criticality).

Background

Anomaly detectors need training data, which means it has to be tagged by experts. But the experts in this case don't always agree on the impairment classifications. We developed a solution that allows groups to tag impairments in data in a group, thus learning together. But also, individuals can take the tool and data to tag on their own. This allows gage capability

analysis to be done on individuals, group expert agreement on several examples, and thus the ability to confidently train others, train anomaly detectors (usually machine learning methods), and form a reference database for other purposes. By extending to collect information about the likely

causes too, including failure modes, effects, and criticality, we extract more useful information at the same time for more capabilities, automation, and discovery.

Abstract

We constructed a software tool that lets experts tag impairments in spectrum data. We intend to enhance it in several novel ways, including the last on this list that will make it truly unique, as we create a way to gather systems information through this method too. The results can be used for human training, anomaly detection training, benchmarking, gage capability analysis, and collecting the needed information for automating maintenance tasks further into the field, including creating a technician assistance program that directs the technician to choose the most likely solution first.

CobleLabs' Data Labeling Tool & Full-Band Capture Data & Labeling with Index Ranges

This page allows the user to specify index ranges for anomaly localization information. Each data sample can have multiple labels, each label consists of type, start index, and end index.

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Upload files

Select a .zip file
Choose File No file chosen



Index

Click to check the data

Show 10 \$ entries

Download the labeled dataset A DOWNLOAD

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10104.csv		Standing Wave, Unknown	
10105.csv		Suckout	
10110.csv		Water	

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CableLabs' Data Labeling Tool & Full-Band Capture Data & Labeling with Index Ranges

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		PULLOUT				RF INGRESS			UNKNOWN

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Index

Туре	Start Index	End Index	Notes	lgnore Low	Remove Label	Highlight Label	Edit Notes
Standing Wave	699	3272	This is a standing wave.	Normal	REMOVE	TOGGLE	EDIT NOTES
Standing Wave	3521	6390	This is another standing wave.	Normal 🗸	REMOVE	TOGGLE	EDIT NOTES