

Tytonidae Tympanometry

Applying Machine Learning to predict hearing loss using wideband
tympanometry

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<https://github.com/danielchegwidden/tytonidae-tympanometry>

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1 Tytonidae Tympanometry

The Tytonidae Tympanometry (TyTy) project was born out of a need for audiologists to better understand wideband tympanometry (WBT). WBT data is used to classify ears as either normal, or with conductive conditions such as Otitis Media. The subjects in this data are children, and not identifying conductive conditions has consequences throughout their life. The societal cost of these conditions is estimated at \$20,000 across 10 years as children struggle to learn and engage at school amongst other effects.

TyTy attempts to use WBT data to improve the classification accuracy of the current receiver operating characteristic (ROC) analysis that is performed, as well as provide audiologists with insights as to how to better analyse the large quantities of data that is being generated. If this is achieved, then clinicians are able to spend less time analysing data, and more time interacting with patients, resulting in more patients being seen and better care being delivered.

To Add: Data

2 Models. Models. Models.

The Machine Learning approach that attempted to beat the ROC results involved Logistic Regression, Support Vector Machines, Decision Trees, Random Forests, and K-Nearest Neighbour as the modelling approaches taken. These were selected as having good classification applications, as well as a variety of complexity and interpretability.

To Add: Results

3 Finding Number 1

To Add: Results Comparison, Explainability Considerations

4 Looking Ahead

5 Contribution

To Add: Gantt Charts

Member	Number	Project Tasks	Skills
Di Yao	22795234	1. Research Wideband Absorbance Data and scope the project 2. Review code and approve changes using Pull Requests 3. Perform modelling using K-Nearest Neighbour and then Random Forest	Python Machine Learning Git and GitHub
Karan Rebello	22868277	1. Research Wideband Absorbance Data and scope the project 2. Review code and approve changes using Pull Requests 3. Perform modelling using Random Forest	Python Machine Learning
Anitha Raghupathy	22773933	1. Research Wideband Absorbance Data and scope the project 2. Review code and approve changes using Pull Requests 3. Perform modelling using Support Vector Machines	Python Machine Learning
Cheng Nian	23053313	1. Data Cleaning and Transformations including pressure-matching function 2. Review code and approve changes using Pull Requests 3. Perform modelling using Support Vector Machines	Python Machine Learning
Aminul Islam	22884375	1. Data Cleaning and Transformations 2. Perform modelling using Logistic Regression	Python Machine Learning

Daniel Chegwiddden	21282744	<ol style="list-style-type: none"> 1. Create GitHub Repository and set up applicable automation and structure around Commits and Pull Requests 2. Manage code integration to ensure a workable code base was maintained and applicable functions and structures were in place to support consistent and reproduceable analysis 3. Review code and approve changes using Pull Requests 4. Perform modelling using Decision Tree 	Team Leadership Meeting Organisation Python Machine Learning Git and GitHub Software Engineering
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